

KINROSS

Great Bear

Great Bear Gold Project Impact Statement

Appendix L-1:

Fisheries Resources Baseline Report



GREAT BEAR RESOURCES

GREAT BEAR PROJECT FISHERIES RESOURCES BASELINE REPORT

MARCH 2025





GREAT BEAR PROJECT FISHERIES RESOURCES BASELINE REPORT

GREAT BEAR RESOURCES

PROJECT NO.: OMEMA2303
MARCH 2025

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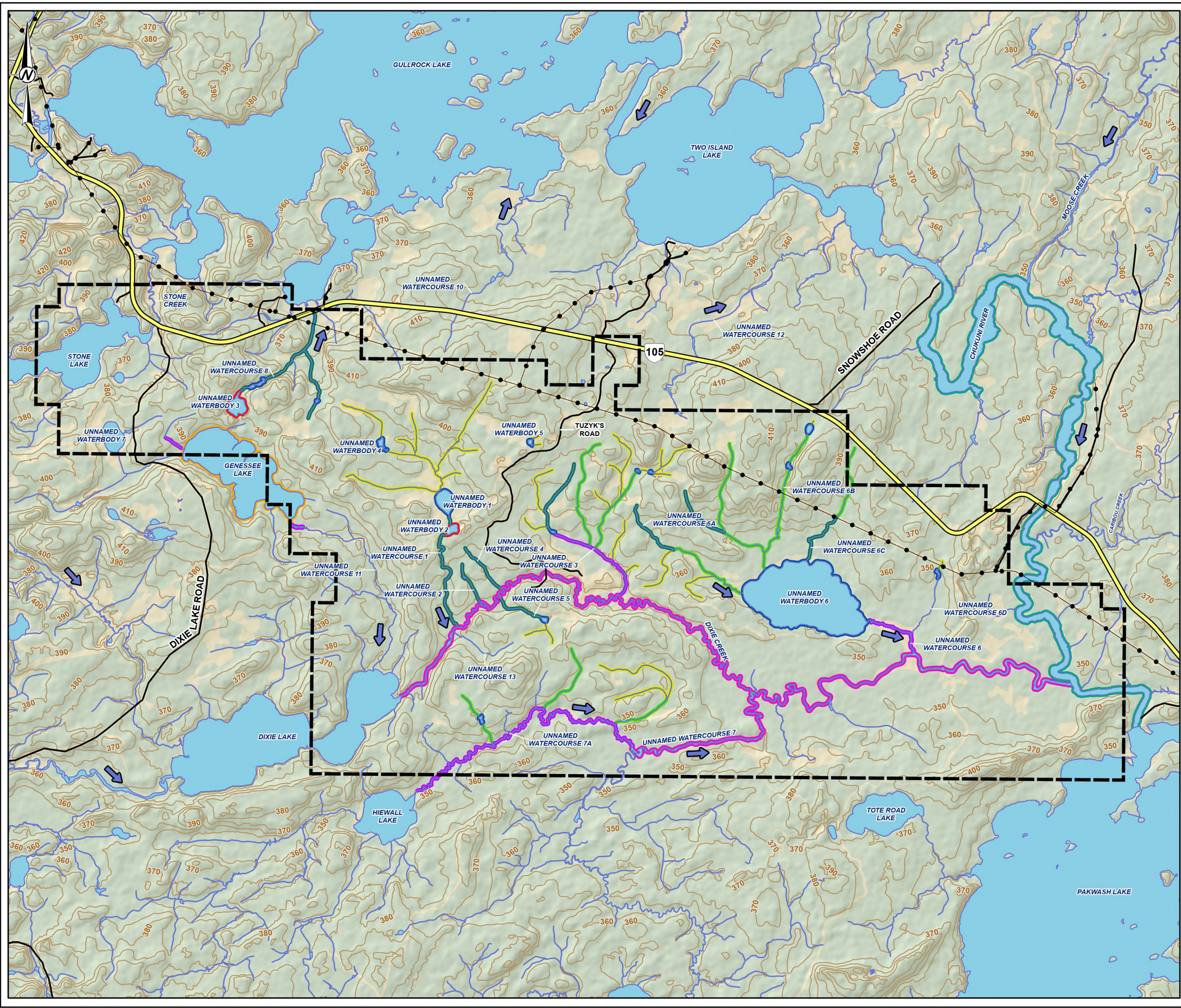
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ADDENDUM

This is an addendum to the Fisheries Resources Baseline Report (dated March 2025) for the Great Bear Project. This baseline report was distributed as part of consultation efforts and was part of the Impact Statement Submission #2 provided to the Impact Assessment Agency of Canada in December 2025. This addendum has resulted from continued communications with Fisheries and Oceans Canada and Environment and Climate Change Canada, who requested clarity on the baseline habitat classification of Unnamed Watercourse 3 and waters frequented by fish.

The content of the original Fisheries Resources Baseline Report (dated March 2025) remains valid except for changes specifically as follows:

- In follow up to federal guidance, habitat type was reclassified using available 2022 to 2025 fish habitat data, habitat typology and mapping, for the lower portion of Unnamed Watercourse 3, from Habitat Type H to Habitat Type G to differentiate it from Dixie Creek habitats. The attached Figure ADD-01 replaced Figure 3-3 of the Fisheries Resources Baseline Report (dated March 2025).
- Waterbodies and watercourses previously classified as not fish frequented where no fish were previously captured or observed in that report, were re-evaluated under a precautionary and conservative approach and federal guidance, to be considered as potentially fish frequented. Attached Figure ADD-02 replaces Figure 3-2 of the Fisheries Resources Baseline Report (dated March 2025).



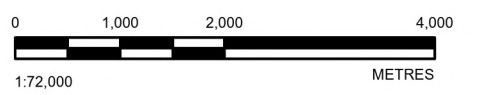
LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- POWER LINE
- WATERCOURSE (NOT ASSESSED FOR FISH HABITAT TYPE)
- WATERBODY (NOT ASSESSED FOR FISH HABITAT TYPE)
- CONTOURS (10 M INTERVAL)

FISH HABITAT TYPE

- A
- B
- C
- D
- E
- F
- G
- H
- I

FLOW DIRECTION



NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
FISH HABITAT TYPE BY WATERBODY

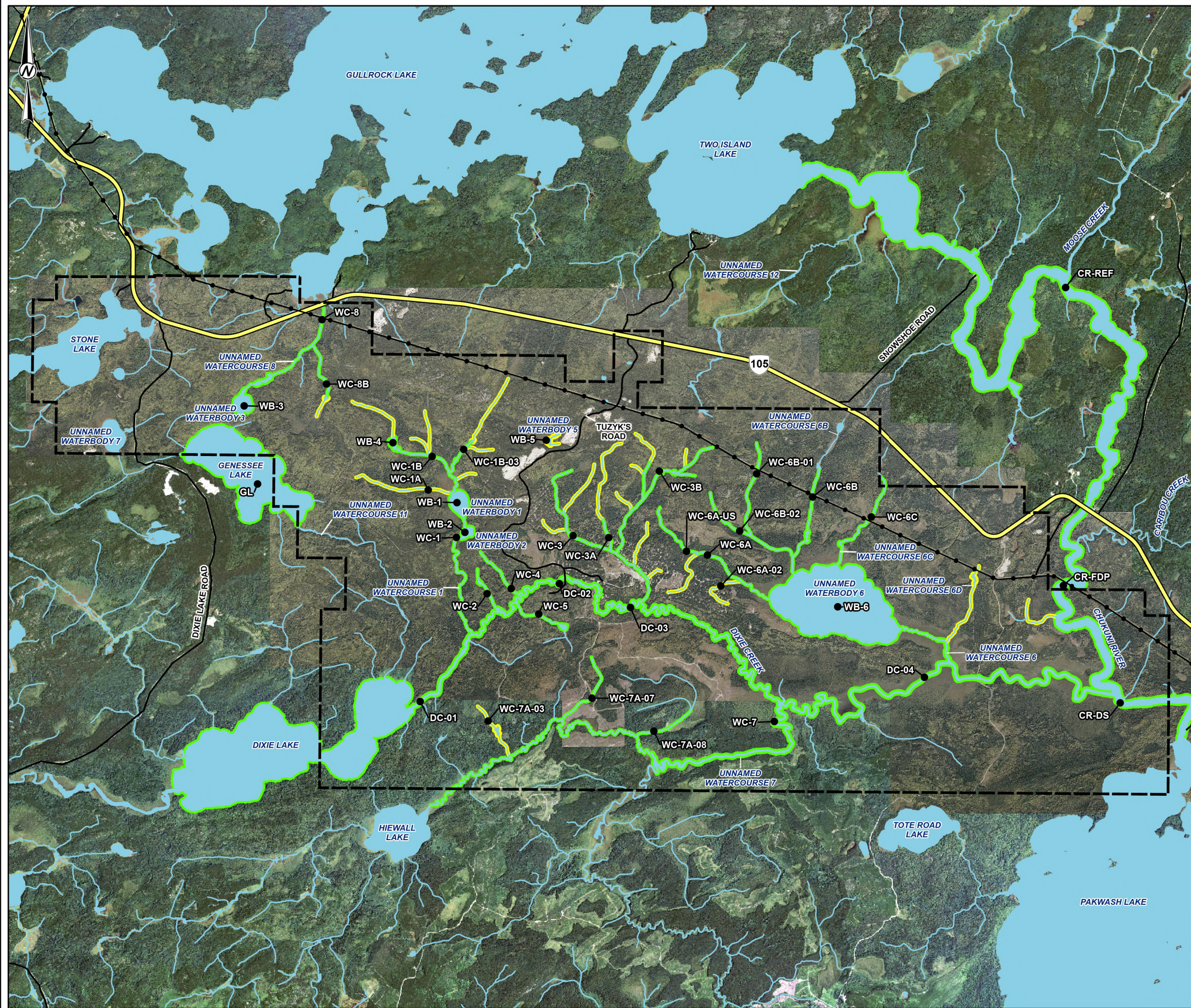
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	APPROVED	---



PROJECT NO. CA0031272 CONTROL 0001 REV. A FIGURE ADD-01

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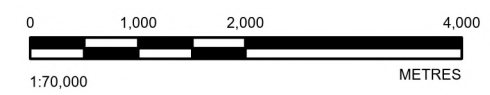


LEGEND

- PROPERTY BOUNDARY
- FISHERIES RESOURCE ASSESSMENT LOCATION
- POWER LINE
- HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- WATERBODY

FISH FREQUENTED WATERCOURSES AND WATERBODIES

- CONFIRMED FISH FREQUENTED
- POTENTIALLY FISH FREQUENTED



NOTE(S)
 1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
 1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
 2. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
 3. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
 GREAT BEAR RESOURCES

PROJECT
 GREAT BEAR PROJECT

TITLE
 FISH FREQUENTED WATERCOURSES AND WATERBODIES

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	REVIEWED	---
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PROJECT NO. CA0031272 CONTROL 0001 REV. A FIGURE ADD-02

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ABBREVIATIONS

°C	Degrees Celsius
#/L	Number per litre
BIC	Benthic Invertebrate Community
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
CR	Chukuni River
CSQG	Canadian Sediment Quality Guidelines
CWQG	Canadian Water Quality Guidelines
DC	Dixie Creek
DO	Dissolved oxygen
DQO	Data quality objectives
dwt	Dry weight
E	Simpson's Evenness
ECCC	Environment and Climate Change Canada
EPT	Ephemeroptera, Plecoptera, and Trichoptera benthic invertebrate taxa groups
FEQG	Federal Environmental Quality Guidelines
FLEN	Fork length
GL	Genessee Lake
Great Bear Resources	Great Bear Resources Ltd.
I-D	Simpson's Diversity Index
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ISQG	Interim Sediment Quality Guidelines
LCFSP	Licence to Collect Fish for Scientific Purposes
LEL	Lowest effect level
LWD	Large woody debris
MDMER	Metal and Diamond Mining Effluent Regulations
mg/kg	Milligram per kilogram
MNR	Ministry of Natural Resources
MOECC	Ministry of the Environment, Conservation and Parks
mS/cm	MilliSiemens per centimetre
n	Sampling size
NAD	North American Datum
PEL	Probable effect level
Project	Great Bear Project
PSQG	Provincial Sediment Quality Guidelines
PWQO	Provincial Water Quality Objectives
QA/QC	Quality assurance and control
RIN	Riverine Index Net
RPD	Relative percent difference
SEL	Severe effect level
TID	Total invertebrate density
TLEN	Total length
TKN	Total Kjeldahl nitrogen
TOC	Total organic carbon
µg/L	Microgram per litre
µm	Micrometre

US EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
WB	Waterbody
WSP	WSP Canada Inc.
wwt	Wet weight
YOY	Young of the year

FISH SPECIES

Blackchin Shiner	<i>Notropis heterodon</i>
Blacknose Shiner	<i>Notropis heterolepis</i>
Bluntnose Minnow	<i>Pimephales notatus</i>
Brook Stickleback	<i>Culaea inconstans</i>
Burbot	<i>Lota lota</i>
Central Mudminnow	<i>Umbra limi</i>
Cisco	<i>Coregonus artedi</i>
Common Shiner	<i>Luxilus cornutus</i>
Creek Chub	<i>Semotilus atromaculatus</i>
Eastern Blacknose Dace	<i>Rhinichthys atratulus</i>
Emerald Shiner	<i>Notropis atherinoides</i>
Fathead Minnow	<i>Pimephales promelas</i>
Finescale Dace	<i>Chrosomus neogaeus</i>
Golden Shiner	<i>Notemigonus crysoleucas</i>
Green Sunfish	<i>Lepomis cyanellus</i>
Iowa Darter	<i>Etheostoma exile</i>
Johnny Darter	<i>Etheostoma nigrum</i>
Lake Chub	<i>Couesius plumbeus</i>
Lake Whitefish	<i>Coregonus clupeaformis</i>
Longnose Dace	<i>Rhinichthys cataractae</i>
Mimic Shiner	<i>Notropis volucellus</i>
Mooneye	<i>Hiodon tergisus</i>
Mottled Sculpin	<i>Cottus bairdii</i>
Muskellunge	<i>Esox masquinongy</i>
Ninespine Stickleback	<i>Pungitius pungitius</i>
Northern Pearl Dace	<i>Margariscus nachtriebi</i>
Northern Pike	<i>Esox lucius</i>
Northern Redbelly Dace	<i>Chrosomus eos</i>
Rainbow Smelt	<i>Osmerus mordax</i>
Rock Bass	<i>Ambloplites rupestris</i>
Sauger	<i>Sander canadensis</i>
Silver Redhorse	<i>Moxostoma anisurum</i>
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>
Slimy Sculpin	<i>Cottus cognatus</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Spottail Shiner	<i>Notropis hudsonius</i>
Trout-perch	<i>Percopsis omiscomaycus</i>
Walleye	<i>Sander vitreus</i>
White Sucker	<i>Catostomus commersonii</i>
Yellow Perch	<i>Perca flavescens</i>

PLANT SPECIES

alder	<i>Alnus sp.</i>
Balsam Fir	<i>Abies balsamea</i>
Black Spruce	<i>Picea mariana</i>
Broadleaf Arrowhead	<i>Sagittaria latifolia</i>
cattail	<i>Typha sp.</i>
Coontail	<i>Ceratophyllum demersum</i>
Hardstem Bulrush	<i>Schoenoplectus acutus</i>
Jack Pine	<i>Pinus banksiana</i>
Northern Wild Rice	<i>Zizania palustri</i>
pondweed	<i>Potamogeton sp.</i>
poplar	<i>Populus sp.</i>
<i>Sphagnum</i> moss	<i>Sphagnum sp.</i>
Sweetgale	<i>Myrica gale</i>
Tamarack	<i>Larix laricina</i>
Tape Grass	<i>Vallisneria americana</i>
Trembling Aspen	<i>Populus tremuloides</i>
Yellow Pond Lily	<i>Nuphar lutea</i>
willow	<i>Salix sp.</i>
White Spruce	<i>Picea glauca</i>



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APPENDICES

- A Fish Habitat and Catch Record, Lake Profiles, and Lower Trophic Assessment
- B Fish Age Data
- C Fish Tissue Data
- D Sediment Quality and Benthic Invertebrate Community Data
- E Quality Assurance and Quality Control
- F Photographic Record

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Great Bear Resources Ltd. (Great Bear Resources) a wholly owned subsidiary of Kinross Gold Corporation, is proposing to develop a gold mine at the Great Bear Property (Property). The Property is located approximately 25 kilometres (km) southeast of the Municipality of Red Lake (Figure 1-1) in northwestern Ontario.

This report summarizes fisheries resources data collected by WSP Canada Inc. (WSP) on behalf of Great Bear Resources at the Great Bear Project (the Project) from 2022 through 2024. The baseline monitoring field programs were conducted during the following periods in chronological order:

- Spring (May 25 to June 6, 2022)
 - Summer (July 11 to 23, 2022)
 - Fall (October 20 to 29, 2022)
 - Spring (June 5 to 19, 2023)
 - Summer (July 24 to August 4, and August 12 to 13, 2023)
 - Fall (September 5 to 18 and September 25 to October 3, 2023)
 - Spring (June 10 to 17, 2024)
 - Summer (July 22 to 29, 2024)
 - Fall (September 9 to 22 and October 22 to 28, 2024).
-

1.2 PURPOSE AND OBJECTIVE OF THE REPORT

This report provides a summary of the 2022, 2023, and 2024 fish and fish habitat assessment findings. Results from all years of baseline surveys are included to provide comparisons between studies (e.g., lower trophic data) and for cumulative inventories (e.g., fish community distribution) data.

The 2022 scope of work included the following:

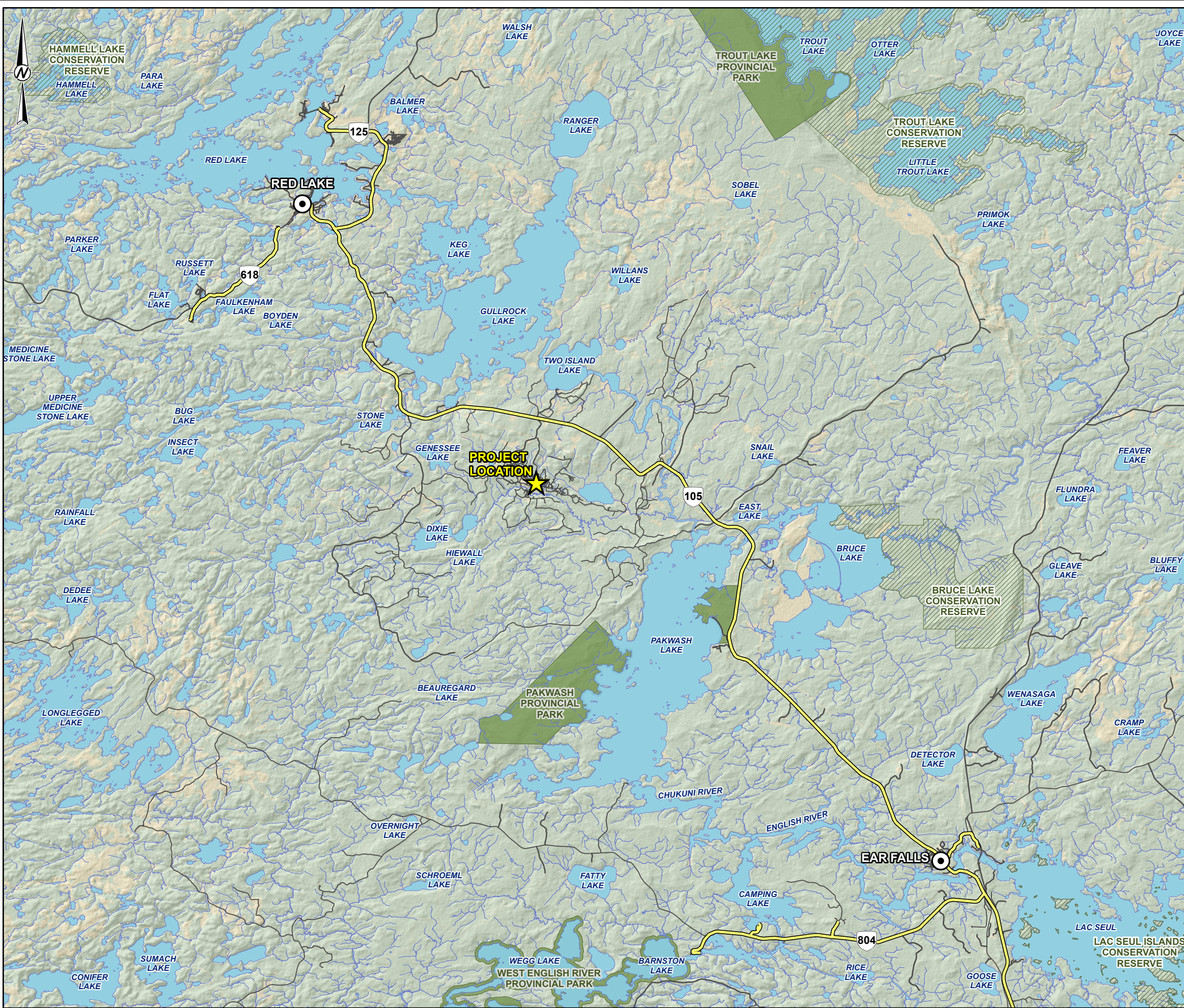
- Multi-season habitat assessments within Genessee Lake, Chukuni River, Dixie Creek, and nearby unnamed watercourses and waterbodies.
- Lake profile measurements of temperature and dissolved oxygen (DO) from the deepest point within Unnamed Waterbody 6, Genessee Lake, and Unnamed Waterbody 1.
- Bathymetry measurements of structure within Unnamed Waterbody 6 and Chukuni River.
- Fall primary productivity (zooplankton and benthic invertebrate community) assessment within Genessee Lake.
- Multi-season assessment of fish community within Genessee Lake, Chukuni River, Dixie Creek, and nearby unnamed watercourses and waterbodies.
- Fall large-bodied fish species lethal sampling to assess contaminants in fish tissue, fish community age structure, and to provide baseline data in support of future biological monitoring programs.
- Fall sediment quality assessment in Dixie Creek, Genessee Lake, Chukuni River, and nearby unnamed watercourses and waterbodies.

The 2023 scope of work included the following:

- Multi-season habitat assessments within Genessee Lake, Chukuni River, Dixie Creek, and nearby unnamed watercourses and waterbodies.
- Lake profile measurements of temperature and DO from the deepest point within Unnamed Waterbody 6, Genessee Lake, and Unnamed Waterbody 2.
- Primary productivity (zooplankton, periphyton, and benthic invertebrate community) assessments within Genessee Lake, Unnamed Waterbody 6, Unnamed Waterbody 2, Pakwash Lake, and the Chukuni River.
- Multi-season assessment of fish community within Genessee Lake, Chukuni River, Dixie Creek, and nearby unnamed watercourses and waterbodies.
- Fall large-bodied fish species lethal sampling to assess contaminants in fish tissue, fish community age structure, and to provide baseline data in support of future biological monitoring programs.
- Fall sediment quality assessment in Dixie Creek, Genessee Lake, Chukuni River, Pakwash Lake, and nearby unnamed watercourses and waterbodies.

The 2024 scope of work included the following:

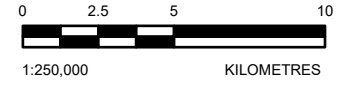
- Multi-season habitat assessments within Genessee Lake, Chukuni River, Dixie Creek, and nearby unnamed watercourses and waterbodies.
- Alternate reference location investigations for the Chukuni River final discharge point, upstream in the Chukuni River and in the nearby Troutlake River.
- Lake profile measurements of temperature and DO from the deepest point within Unnamed Waterbody 6, Genessee Lake, Unnamed Waterbody 2, and Pakwash Lake.
- Primary productivity (zooplankton, phytoplankton, chlorophyll a, periphyton, and benthic invertebrate community) assessments within Genessee Lake, Unnamed Waterbody 6, Unnamed Waterbody 2, Pakwash Lake, and the Chukuni River.
- Summer non-lethal fish community surveys via boat electrofishing within the Chukuni River upstream of Pakwash Lake to the downstream extent of Snowshoe Rapids.
- Summer lethal fish tissue and ageing structure sample collection for Northern Pike and White Sucker within the Chukuni River.
- Fall sediment quality and benthic invertebrate community assessments within the Chukuni River and Pakwash Lake.



SCALE: 1:30,000,000

LEGEND

- PROJECT LOCATION
- TOWN
- CONSERVATION RESERVE
- PROVINCIAL PARK
- HIGHWAY
- LOCAL ROAD
- RESOURCE / RECREATION ROAD
- WATERCOURSE
- WATERBODY



NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. WATERCOURSES AND WATERBODY ACQUIRED FROM LAND INFORMATION ONTARIO (MNR) AND MODIFIED TO MATCH AERIAL IMAGERY AND LIDAR.
3. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

GREAT BEAR RESOURCES

PROJECT

GREAT BEAR PROJECT

TITLE

PROJECT LOCATION

CONSULTANT



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REVIEWED	---
APPROVED	---

PROJECT NO.
CA0031272

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FIGURE
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2 METHODOLOGY

2.1 ASSESSMENT OVERVIEW

The 2022 to 2024 field studies sampled locations within the currently proposed Project footprint, as well as peripheral locations beyond the Project to characterize baseline conditions throughout the area. The sample locations are shown on Figure 2-1. Additional details are shown for the lower trophic community, in-situ water quality, sediment quality, and benthic invertebrate sample locations in Figure 2-2, with fish sampling locations in Figure 2-3A through Figure 2-3G. A summary of the 2022 to 2024 aquatic resources assessment sampling methods by season is provided in Table 2-1, and a summary of the fish community sampling gear types by area and season is provided in Table 2-2.

2.2 HABITAT ASSESSMENTS

Habitat assessments were conducted at representative riverine (lotic; includes streams, creeks and rivers) and ponded or lake (lentic) locations within the Project area during the 2022 to 2024 field studies. These assessments characterized the habitat types and supported delineation of homogeneous habitat throughout the Project area. Habitat types were classified using several criteria that included a combination of the following categories of natural features:

- Watercourse or waterbody type
- Permanence
- Stream order

Habitat characteristics including bankfull and wetted measurements were taken (were able), and cross section profiles were completed at all unnamed watercourse aquatic sampling locations and within Dixie Creek. In-field surface water quality measurements were recorded at each sample location using handheld portable water quality meters. Physicochemical parameter profiles at 1 metre (m) intervals (as able) were also collected within Unnamed Waterbody 2 (WB-2), Unnamed Waterbody 6 (WB-6), Genessee Lake, and Pakwash Lake. The water quality instruments were calibrated daily and measured the following parameters:

- Depth of parameter measurement
- Temperature
- pH
- Specific Conductivity
- DO

Bathymetry surveys were completed in 2022 and 2024 using a Lowrance Live Sonar™. Surveys included perimeter transects and cross-waterbody transects at approximately 150 to 200 m spacing following perpendicular pathways. Point depths were logged electronically and modelled using a geographic information system to generate bathymetric figures for WB-2, WB-6, Genessee Lake, and the Chukuni River.

2.3 FISH COMMUNITY

Fish community assessments were conducted during spring, summer, and fall as per conditions of the 2022, 2023, and 2024 Licences to Collect Fish for Scientific Purposes (LCFSP) issued by the Red Lake District Ministry of Natural Resources (MNR). The following gear types were utilized as able per the location-specific habitat conditions and MNR LCFSP permit conditions:

- Angling
- Backpack electrofishing
- Baited gee-style minnow traps
- Boat electrofishing
- Dip netting
- Gillnets of various stretched mesh sizes
- Seine netting

A summary of the fish sampling gear utilized at each sampling location by field program is provided in Table 2-2. All fish captured were identified to species by qualified fisheries staff. Lethal sampling during the summer and fall assessments included the following: measurements of fish length (total and fork, where possible) and fresh weight, visual assessments for malformation, parasites, and disease, determination of sex when possible, and collection of tissue and age structures.

Northern Bioscience staff conducted fish community surveys in 2022 at three sample locations additional to those completed by WSP, including WB-4, WC-1B-03, and WC-8B. These locations were assessed using baited gee-style minnow traps with catch enumerated and identified to species. Subsequent 2023 surveys by WSP targeted WC-1B-03 and WC-8B, however staff were unable to access WB-4. A fish habitat survey was conducted at WB-4 in 2024.

The MNR conducted three cycles of Broad-Scale Monitoring (BsM; Sandstrom et al. 2013) surveys in Gullrock and Pakwash lakes. The BsM surveys, which employ whole lake depth stratified sampling with small and large mesh gillnets, were completed in 2009, 2014, and 2019 (MNR 2024).

2.3.1 ENVIRONMENTAL DNA SAMPLING

Organisms are constantly releasing DNA into the environment through various means, including natural shedding of cells, excretions, and other processes. Using a relatively new technique it is now possible to detect their presence by collecting this environmental DNA (eDNA) and identifying species-specific nucleic acid sequences. This sampling method has rapidly gained popularity in the scientific and natural resource management fields over the last decade for both terrestrial and aquatic studies as it is a quick, cost-effective, and efficient way to determine species presence. Using a water sample, eDNA analysis can ascertain species DNA presence in a waterbody, making it particularly useful for identifying low levels of declining species, invasive species presence, species difficult to sample with or are sensitive to conventional methods, and locations difficult to sample (i.e., remote lands). As such, when non-invasive and/or non-lethal sampling is required, eDNA can be the preferred option.

Sampling for eDNA was conducted in 2023 to supplement conventional fish community sampling methods and characterize the fish communities within the Project site. Samples were taken during spring, summer, and fall at a total of 11 locations including Dixie Creek, the Chukuni River, Genessee Lake, Unnamed Waterbodies 2 and 6, and Unnamed Watercourses 3 and 7 (Figure 2-4). Sampling involved collecting triplicate water samples of approximately 2 litres (L) at each location and field filtering using 5 µm filters and a vacuum pump. These filters were analyzed using metabarcoding by Nature Metrics North America Ltd, in Guelph Ontario. One negative control, in triplicate, was collected during each sampling event for quality control and assurance, as well as to aid in results interpretation.

Composite water samples were collected at each location from a variety of microhabitats to capture a broad representation of the fish community. Water samples were taken with a sterile Kemmerer, van Dorn, or bucket depending on the environment and amalgamated in a large, sterile bin for filtering. Each sample replicate was filtered using the vacuum pump from this composite water sample, with the bin and equipment being sterilized immediately prior to water and eDNA collection.

2.4 CONTAMINANTS IN FISH TISSUE

Fish tissue samples for contaminant analysis included skinless, boneless left dorsal epaxial muscle tissue for large-bodied species. Sentinel species retained for analysis were determined at the time of field sampling, based on presence and abundance of the species within each sample location, as well as respecting the MNR LCFSP permit conditions.

Large-bodied sentinel fish species retained for tissue analysis during the field studies included: Cisco, Lake Whitefish, Northern Pike, Silver Redhorse, Walleye, White Sucker, and Yellow Perch. Composite samples of Brook Stickleback, Central Mudminnow, Finescale Dace, Iowa Darter, Lake Chub, Northern Redbelly Dace, Spottail Shiner, and Yellow Perch were submitted for analysis to represent the small-bodied fish species community.

The number of fish included in the small-bodied composite samples varied depending on the size (weight) of individuals at the time of sampling to meet the target total composite sample weight of 20 grams (g) or greater. Individual fish were measured for fork length (FLEN), total length (TLEN), and weight (g). The composites included the same fish species, where the smallest fish in each composite sample was generally greater than or equal to 85% of the total length of the largest fish chosen for the sample. If the smallest fish was not within 85% of the largest fish, the size difference (largest to smallest) was greater than 75%, which intended to include only one age cohort per composite sample. The length range of each composite sample was similar within and between study areas to provide an equitable comparison of the data (as able). Species-specific appropriate ageing structures (e.g., otoliths, scales) were submitted for age assessment. For large-bodied fish species, boneless, skinless dorsal epaxial muscle tissue fillet samples were collected from the left side of the body, with each sample having a total mass greater than 10 g wet weight (wwt).

Fish tissue samples were submitted to ALS Environmental (Thunder Bay, Ontario) for total metals including mercury, methylmercury, and selenium, as well as percent moisture. Metals of interest included deleterious substances measured in treated mining effluent under the Metal and Diamond Mining Effluent Regulations (MDMER), and metals known to have an impact on the health of aquatic life and consumers of aquatic biota.

Mercury and selenium are often of particular interest when assessing baseline conditions of Project areas, as these metals are known to have negative effects on the health of aquatic life and consumers of aquatic biota. The total mercury concentrations measured in large-bodied fish tissue were compared to the provincial consumption guidelines of the Ministry of the Environment, Conservation and Parks (MOECC 2015) and federal food and nutrition standards (Health Canada 2011). Concentrations of methylmercury were compared against the Canadian Council of Ministers of the Environment (CCME) Canadian Tissue Residue Guideline for the Protection of Wildlife Consumers of Aquatic Biota – methylmercury (CCME 2000). Concentrations of selenium in fish tissue were compared to the Federal Environmental Quality Guidelines (FEQG) criteria established for selenium (ECCC 2022).

2.5 SURFACE WATER

This report presents the in-field surface water quality measurements and lake profiles associated with the aquatic resources monitoring components, for a comprehensive summary of the surface water quality monitoring program please refer to the 2024 Surface Water Quality Report (WSP 2025).

2.5.1 LAKE PROFILES

Lake profile data including temperature (°C) and DO (mg/L) measurements at depth within the spring, summer, and fall sampling programs were used to graph seasonal differences. Profiles were measured at one metre intervals at the same location each season to ensure consistency for comparisons.

2.5.2 FIELD SAMPLING

In-situ surface water quality (physicochemical) measurements were recorded at each sample location using handheld portable water quality meters as noted in Section 2.2. The in-situ water quality results were compared to the Provincial Water Quality Objectives (PWQOs) and Canadian Water Quality Guidelines (CWQGs) for the protection of aquatic life.

2.6 LOWER TROPHIC AND PRIMARY PRODUCTIVITY ASSESSMENT

The lower trophic and primary productivity assessments evaluated eutrophication indicators at the zooplankton level (first order consumers; animal component of the planktonic community) by biomass and periphyton by contaminant level and carbon and nitrogen isotopes. Periphyton and the zooplankton group are one of the lowest trophic levels of an aquatic ecosystem, supporting the upper-level fish community. Zooplankton were sampled during spring, summer, and fall throughout all years while periphyton was sampled during the fall field programs in 2023 and 2024.

2.6.1 ZOOPLANKTON

Zooplankton sampling methods followed a standardized protocol which utilized a 0.13 m diameter, 63 micron (μm) mesh Wisconsin plankton net with a detachable collection bucket (codend) to collect zooplankton samples from the water column. The plankton net was lowered until the bottom of the collection bucket was approximately 30 centimetres (cm) above the bottom sediment and then towed vertically to the surface at a rate of approximately 0.5 metres per second (m/s). Approximately half an Alka-Seltzer tablet was added as a narcotizing agent to prevent contortion of organisms prior to the sample being transferred from the codend to a prelabelled container and preserved with 10% buffered formalin. Zooplankton samples were kept cool prior to shipment to Salki Consultants, (Winnipeg, Manitoba) for taxonomic analysis (species composition, density, and biomass).

2.6.2 PERIPHYTON

Periphyton were collected during the fall 2023 and 2024 field programs from natural and artificial substrate. The 2023 field program only collected from natural substrate at the three Chukuni River sampling locations (CR-REF, CR-FDP, and CR-DS) and at DC-02. A summary of the natural substrate sampling methods are as follows:

- Working in an upstream direction at each sample location, a minimum of five rocks were selected and moved to a holding basin on shore.
- A scraping guide was used to outline a known surface area (5 cm x 5 cm) on each rock and all periphyton biomass within was removed. Squirted deionized water on the rock and using a toothbrush or scalpel to scrape the periphyton off the rock was the preferred method.
- These steps were repeated for all rocks and all rinsed scrapings were combined into one sample container. One composite periphyton sample was collected per sampling station.
- Sample containers were frozen until submission to the laboratory.

Due to low sample volumes in 2023, the 2024 periphyton field sampling used artificial substrate Hester-Dendy samplers, a compact and lightweight device made of nine plates stacked on a threaded rod that provide a 0.104 m² sampling area (with nine 76 mm X 76 mm plates). These samplers were deployed in spring 2024 at all Chukuni River and Dixie Creek sampling locations (n = 7), attached to an anchor in water and driven rebar post on land to prevent sampler movement. As with the natural substrate, when these samplers were removed in fall 2024, the plates were removed from the threaded rod and scraped clean and processed the same to natural substrate samples.

Once samples arrived at the laboratory, they were split between two containers each (one container for submission of stable isotope analysis and one container for submission of Hg and MeHg analysis). Please note that for fall 2023 periphyton samples, mass was too low to split the sample and only stable isotope analysis was able to be completed.

All stable isotope analysis was conducted by the Fisk Lab of Trophic Ecology at the University of Windsor and all Hg and MeHg analysis was conducted by Flett Research in Winnipeg, Manitoba.

The 2024 periphyton sampling results were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.

2.6.3 DATA ANALYSIS

Analysis of the lower trophic and primary productivity results focused on total biomass and community composition. Biomass data can be used to interpret ecological condition and has food web linkages. Community composition was based on genus-level identifications for phytoplankton. Calculations were completed using Microsoft Excel and plots were generated using RStudio 3.6.2.

2.7 SEDIMENT QUALITY SURVEYS

2.7.1 FIELD SAMPLING

Surficial sediment samples were collected concurrently with benthic invertebrate community (BIC) samples using a Petite Ponar grab sampler at three replicate stations within each sampling location during the fall sampling program. Each ponar grab sampled a surface area of 0.023 square metres (m²). Three grab sub-samples were taken at each station within similar depths and homogenized into one composite sample to account for localized habitat heterogeneity and to represent the array of substrates within the station. Homogenizing the benthic samples also increases the likelihood of sampling all available taxa from the BIC by reducing the effects of intra-sample variation inherent to benthic communities.

The substrate properties at each benthic station (i.e., metal and nutrient concentrations) were characterized to further support interpretation of the BIC data between and among sample locations. All surficial sediment sampling followed the protocols as set out by the Canadian Association for Laboratory Accreditation (CALA) Guide to Current Sampling Practices (Fowle 2014) and Environment Canada's technical guidance for environmental effects monitoring (EC 2012).

The following quality assurance and control (QA/QC) measures were implemented during sediment and BIC sample collection:

- Sampling gear utilized was appropriate for substrate present.
- Laboratory gloves (e.g., nitrile) were worn throughout the sampling process and replaced at each sampling station.
- Equipment was thoroughly rinsed and cleaned using appropriate cleansers and decontaminant agents prior to use between sampling stations.
- BIC samples were stored in appropriate containers using appropriate preservatives as directed by the laboratory.
- Sediment samples were placed in clean, pre-labeled, laboratory prepared glass jars.
- Blind field duplicate sediment quality samples were collected for 10% of total samples.
- Sample identification, location, date and other pertinent information was recorded in a field logbook / log sheet, on the sample container and on laboratory Chain of Custody forms.
- An experienced taxonomist was used for identification of freshwater macroinvertebrates.

- Electronic data received from the taxonomist were checked to ensure correctness by qualified staff.

All BIC samples were labeled with unique identification numeration. BIC samples were field sieved in-field and preserved with 10% buffered formalin solution within six hours of sample collection to maintain sample integrity and minimize the likelihood of within sample predation or decomposition, before submission to the taxonomist.

2.7.2 LABORATORY SAMPLING PROCESSING

Substrate composition was characterized through qualitative visual field assessments and quantitative laboratory grain size analysis. Laboratory chemical analyses of sediment quality was conducted by ALS Environmental, Thunder Bay, accredited by the CALA in accordance with the International Organization for Standardization/ International Electrical Commission (ISO/IEC) 17025:2005 – General Requirements for the Competence of Testing and Calibration Laboratories for the tested parameters. The occurrence of large particle sizes (cobble and boulder) within representative reaches and sections of sampled watercourses was recorded by field staff during habitat assessment.

2.7.3 DATA ANALYSIS

The analytical sediment results were compared to the Ontario Provincial Sediment Quality Guidelines (PSQG; MOE 2008) and Canadian Sediment Quality Guidelines (CSQG) for the Protection of Aquatic Life (CCME 2001). The CSQG criteria are established based on the formal federal protocol to evaluate potential adverse biological effects in aquatic environments. They prescribe a level of contamination at which there are probable effects (Probable Effect Level, PEL). The PSQG are guidelines which promote the protection of aquatic life and are based on sound scientific information. The PSQG establish three levels of effects that reflect potential chronic and long-term effects of contaminants on benthic invertebrates as follows:

- No Effect Level: fish and sediment-dwelling organisms are not affected by chemicals in the sediment.
- Lowest Effect Level (LEL): level of sediment contamination that can be tolerated by the majority of sediment-dwelling benthic invertebrates.
- Severe Effect Level (SEL): level of sediment contamination at which pronounced disturbance of the sediment-dwelling community can be expected.

Sediment grain size and chemical analyses were conducted at a lab accredited by the CALA in accordance with ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories.

2.7.4 QUALITY ASSURANCE AND QUALITY CONTROL

The precision of the sediment data was assessed using blind, split field duplicate samples collected from the same Petite Ponar haul. The relative percent difference (RPD) between initial sample and the duplicate sample from the same station was calculated by dividing the difference of the two measurements by the average of the measurements and multiplying by 100. The equation for RPD is shown below:

$$RPD = \frac{(X1 - X2)}{\left(\frac{X1 + X2}{2}\right)} \times 100$$

When the concentrations are close to the laboratory limit of reporting, the relative error increases as the analysis approaches the limits of detection. Therefore, if the recorded concentrations were less than five times the limit of reporting, an RPD exceedance was not considered significant. Further data evaluation was considered when the RPD between initial sample and the duplicate sample results was greater than 30% for metals (inorganics and mercury; Maxxam 2015) and the concentrations were greater than five times the limit of reporting.

2.8 BENTHIC INVERTEBRATE SURVEYS

2.8.1 FIELD SAMPLING

The BIC samples were collected concurrently with the sediment quality samples using a Petite Ponar grab sampler at three replicate stations within each sampling location during the fall sampling programs. Please refer to Section 2.7.1 for a detailed field sampling procedure.

2.8.2 LABORATORY SAMPLING PROCESSING

Taxonomic laboratory BIC sample processing procedures included subsampling as required for samples containing large amounts of organic material and/or large sample volumes, to identify a minimum of 100 individuals. Sorting included washing samples through 250 and 500 µm sieves, and organism sorting and identification using a stereomicroscope (10x magnification). All invertebrates were identified to the lowest practical level.

2.8.3 DATA ANALYSIS

The BIC at each station was characterized using descriptive indices listed below. These indices were calculated and summarized using the Environmental Effects Monitoring guidelines as stipulated by Environment Canada (2012). In addition, the relative percent community contribution of the Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa groups and the Chironomid taxa were calculated to further characterize the BIC at each location. The BIC indices calculations were completed using Microsoft Excel and plots were created using RStudio 3.6.2.

- Total invertebrate density (TID) was calculated for each replicate station as the total number of individuals per square metre.
- Simpson's Index of Diversity (I-D) is a descriptor of both the abundance patterns and taxonomic richness of the community. Simpson's Index of Diversity can range from 0 to 1 and reaches its greatest indication of diversity at a value of 1.
- Simpson's Evenness (E) is similar to Simpson's Index of Diversity; it is a measure of how the abundance of individuals is distributed within the taxonomic groups inhabiting the station. Evenness ranges from 0 to 1 and reaches complete evenness at 1.
- Taxon richness (Family Richness) is a count of the number of taxa found within an area. For this study richness was reported at the family level.
- The percent of EPT taxa is the percentage of individual benthic invertebrates within a sample that belong to the orders Ephemeroptera, Plecoptera, and Trichoptera (mayflies, stoneflies, and caddisflies). A high relative percent EPT composition can indicate un-impacted water quality, since EPT taxa are generally intolerant of environmental stresses and are typically more abundant in areas unaffected by anthropogenic factors.
- The percentage of the community represented by Chironomids (family: *Chironomidae*). Some genera of this taxa group are more tolerant of environmental stresses (pollution) and tend to dominate the benthic invertebrate community in areas with degraded conditions.

Table 2-1: Fish and Fish Habitat Field Study Locations

Sample Location	Sample ID	UTM Easting (m)	UTM Northing (m)	Fish Community	Lower Trophic	eDNA	Habitat Observations	Sediment and Benthos Sampling
Chukuni River	CR-REF	466,123	5,639,204	Sp ²³ , Su ^{23, 24} , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ²³	Sp ²³ , Su ²³ , Fa ^{22, 23}	Fa ^{22, 23, 24}
	CR-FDP	465,083	5,633,796	Sp ²³ , Su ^{23, 24} , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ²³	Sp ²³ , Su ²³ , Fa ^{22, 23}	Fa ^{22, 23, 24}
	CR-DS	466,113	5,631,666	Sp ²³ , Su ^{23, 24} , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ²³	Sp ²³ , Su ²³ , Fa ^{22, 23}	Fa ^{22, 23, 24}
Dixie Creek	DC-01	453,411	5,631,690	Sp ^{22, 23} , Su ²³ , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ²³	Sp ^{22, 23} , Su ²³ , Fa ^{22, 23}	Fa ^{22, 23}
	DC-02	455,934	5,633,831	Sp ^{22, 23} , Su ^{22, 23} , Fa ²³			Su ²² , Fa ²² , Sp ²³ , Su ²³ , Fa ²³	Fa ^{22, 23}
	DC-03	457,223	5,633,399	Sp ²³ , Su ^{22, 23} , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ²³	Su ²² , Fa ²² , Sp ²³ , Su ²³ , Fa ²³	Fa ^{22, 23}
	DC-04	462,564	5,632,132	Sp ²³ , Su ²³ , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ²³	Sp ²² , Su ²² , Fa ²² , Sp ²³ , Su ²³ , Fa ²³	Fa ^{22, 23}
Genessee Lake	GL	450,216	5,636,144	Sp ²³ , Su ²³ , Fa ^{22, 23}	Sp ^{23, 24} , Su ^{23, 24} , Fa ^{22, 23, 24}	Sp ²³ , Su ²³ , Fa ²³	Sp ^{23, 24} , Su ^{22, 23, 24} , Fa ^{22, 23, 24}	Fa ²² , Fa ²³ , Fa ²³
Pakwash Lake	PKS	466,640	5,629,751				Fa ²³	Fa ²³
	PKD	466,485	5,629,819		Sp ²⁴ , Su ²⁴ , Fa ²⁴		Fa ²³	Fa ^{23, 24}
	PKL-N	466,485	5,629,819					Fa ²⁴
	PKL-C	462,790	5,623,987					Fa ²⁴
	PKL-D	465,318	5,621,847		Fa ²⁴			Fa ²⁴
	PKL-S	460,974	5,615,855					Fa ²⁴
Troutlake River	TR-1	481,041	5,630,676				Sp ²⁴	Sp ²⁴
	TR-2	483,241	5,630,842				Sp ²⁴	Sp ²⁴
	TR-3	485,503	5,632,064				Sp ²⁴	Sp ²⁴
Unnamed Waterbody 1	WB-1	454,132	563,369	Sp ^{22, 23} , Su ^{22, 23} , Fa ²³			Sp ^{23, 24} , Su ^{22, 23} , Fa ^{22, 23}	Fa ^{22, 23}
Unnamed Waterbody 2	WB-2	454,269	5,634,780	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Sp ²⁴ , Su ²⁴ , Fa ^{23, 24}	Sp ²³ , Su ²³ , Fa ²³	Sp ^{22, 23, 24} , Su ^{22, 23, 24} , Fa ^{22, 23, 24}	Fa ^{22, 23}
Unnamed Waterbody 3	WB-3	450,136	5,636,910	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ²³	Fa ^{22, 23}
Unnamed Waterbody 4	WB-4	452,924	5,636,400	Su ²² , Fa ²²			Su ²² , Fa ²²	
Unnamed Waterbody 5	WB-5	455,718	5,636,406	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ^{22, 23}
Unnamed Waterbody 6	WB-6	454,273	5,634,781	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Sp ^{23, 24} , Su ^{23, 24} , Fa ^{23, 24}	Sp ²³ , Su ²³ , Fa ²³	Sp ^{22, 23, 24} , Su ^{22, 23, 24} , Fa ^{22, 23, 24}	Fa ^{22, 23, 24}
Unnamed Watercourse 1	WC-1	454,067	5,634,669	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ^{22, 23}
Unnamed Watercourse 1A	WC-1A	453,555	5,635,530	Su ²² , Sp ²³			Sp ²² , Su ²² , Sp ²³	
Unnamed Watercourse 1B	WC-1B	453,626	5,636,138	Sp ²²			Sp ²² , Su ²²	
Unnamed Watercourse 1B-03	WC-1B-03	454,199	5,636,266	Sp ^{23, 23} , Su ²³ , Fa ²³			Sp ^{22, 23} , Su ^{22, 23} , Fa ²³	
Unnamed Watercourse 2	WC-2	454,625	5,633,649	Sp ²² , Su ^{23, 23} , Fa ^{22, 23}			Sp ²² , Su ^{22, 23} , Fa ^{22, 23}	Fa ²²
Unnamed Watercourse 3	WC-3	456,184	5,634,704	Sp ^{22, 23} , Su ²² , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ²³	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ²²
Unnamed Watercourse 3A	WC-3A	456,830	5,634,665	Sp ^{22, 23} , Su ²² , Fa ²²			Sp ^{22, 23} , Su ²² , Fa ²²	Fa ²²
Unnamed Watercourse 3B	WC-3B	457,748	5,635,873	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ^{22, 23}
Unnamed Watercourse 4	WC-4	457,265	5,633,445	Sp ²² , Su ^{22, 23} , Fa ^{22, 23}			Sp ²² , Su ²² , Fa ²² , Su ²³ , Fa ²³	Fa ^{22, 23}
Unnamed Watercourse 5	WC-5	455,560	5,633,279	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ^{22, 23}
Unnamed Watercourse 6A	WC-6A	458,621	5,634,349	Fa ^{22, 23}			Fa ²² , Fa ²³	Fa ²²
Unnamed Watercourse 6A-01	WC-6A-01	458,861	5,633,788	Sp ²³ , Su ²³ , Fa ²³			Sp ²³ , Su ²³ , Fa ²³	
Unnamed Watercourse 6A-02	WC-6A-02	458,240	5,634,418	Su ²³ , Fa ²³			Su ²³ , Fa ²³	Fa ²³
Unnamed Watercourse 6B	WC-6B	460,527	5,635,402	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ^{22, 23}
Unnamed Watercourse 6B-01	WC-6B-01	459,511	5,635,824	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ^{22, 23}
Unnamed Watercourse 6B-02	WC-6B-02	459,206	5,634,786	Sp ²³ , Su ²³ , Fa ²³			Sp ²³ , Su ²³ , Fa ²³	
Unnamed Watercourse 6C	WC-6C	461,592	5,635,041	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ^{22, 23}
Unnamed Watercourse 7	WC-7	459,832	5,631,329	Sp ²³ , Su ²³ , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ²³	Fa ²² , Sp ²³ , Su ²³ , Fa ²³	Fa ^{22, 23}

Sample Location	Sample ID	UTM Easting (m)	UTM Northing (m)	Fish Community	Lower Trophic	eDNA	Habitat Observations	Sediment and Benthos Sampling
Unnamed Watercourse 7A-03	WC-7A-03	454,642	5,631,338	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ²²
Unnamed Watercourse 7A-07	WC-7A-07	456,525	5,631,753	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ²²
Unnamed Watercourse 7A-08	WC-7A-08	457,648	5,631,155	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ²²
Unnamed Watercourse 8	WC-8	451,618	5,638,621	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}			Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Fa ^{22, 23}
Unnamed Watercourse 8B	WC-8B	451,701	5,637,453	Sp ^{22, 23} , Su ²³ , Fa ²³			Sp ^{22, 23} , Su ²³ , Fa ²³	
Unnamed Watercourse 9	WC-9	455,710	5,634,203	Sp ^{22, 23} , Su ²² , Fa ²²			Sp ²² , Su ²² , Fa ²²	

Notes:

Coordinates provided represent the approximate midpoint of the study area in Universal Transverse Mercator (UTM) Zone 15U, North American Datum 83.

Sp²² data collected during the 2022 spring field study (May 26 to June 5, 2022).

Su²² data collected during the 2022 summer field study (July 11 to 23, 2022).

Fa²² data collected during the 2022 fall field study (October 20 to 29, 2022).

Sp²³ data collected during the 2023 spring field study (June 5 to 19, 2023).

Su²³ data collected during the 2023 spring field study (July 25 to August 3, 2023).

Fa²³ data collected during the 2023 spring field study (September 6 to 17, 2023 and September 26 to October 2, 2023).

Sp²⁴ data collected during the 2024 spring field study (June 10 to 17, 2024).

Su²⁴ data collected during the 2024 summer field study (July 22 to 29, 2024).

Fa²⁴ data collected during the 2024 fall field study (September 9 to 22 and October 22 to 28, 2024).

Table 2-2: Fish Community Sampling Methods by Location

Sample Location	Sample ID	Angling	Gillnetting	Dip Netting	Minnow Trapping	Electrofishing	Seine Netting
Chukuni River	CR-DS		Fa ^{22, 23} , Su ²³		Fa ²² , Sp ²³	Su ²⁴	Sp ²³ , Su ²³ , Fa ²³
	CR-REF		Fa ^{22, 23}		Fa ²² , Sp ²³ , Su ²³	Su ²⁴	Sp ²³ , Su ²³ , Fa ²³
	CR-FDP		Sp ²² , Su ²³ , Fa ²³		Fa ²² , Sp ²³	Su ²⁴	Sp ²³ , Su ²³ , Fa ²³
Dixie Creek	DC-01		Sp ²³ , Su ²³ , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ^{22, 23}		
	DC-02		Sp ²³ , Su ^{22, 23} , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ^{22, 23}		
	DC-03		Sp ²³ , Su ^{22, 23} , Fa ^{22, 23}		Sp ²³ , Su ^{22, 23} , Fa ^{22, 23}		
	DC-04		Sp ²³ , Su ²³ , Fa ^{22, 23}		Fa ²² , Sp ²³ , Su ²³ , Fa ²³		
Genessee Lake	GL		Sp ²³ , Su ^{22, 23} , Fa ^{22, 23}		Sp ²³ , Su ^{22, 23} , Fa ²²		Su ²³ , Fa ²³
Unnamed Waterbody 1	WB-1	Su ²²	Su ²²	Sp ²³	Sp ^{22, 23} , Su ^{22, 23} , Fa ²³	Sp ²³	
Unnamed Waterbody 2	WB-2	Su ²²	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Sp ²²	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}		
Unnamed Waterbody 3	WB-03				Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}		
Unnamed Waterbody 4	WB-04				Sp ^{22*}		
Unnamed Waterbody 5	WB-5		Sp ²² , Su ²²		Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}		
Unnamed Waterbody 6	WB-6	Sp ²²	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Sp ²² , Su ²²	Sp ²² , Su ^{22, 23} , Fa ²²		Sp ²³ , Su ²³ , Fa ²³
Unnamed Watercourse 1	WC-1				Su ²²	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 1A	WC-1A				Sp ²²	Su ²² , Sp ²³	
Unnamed Watercourse 1B	WC-1B				Sp ²²		
Unnamed Watercourse 1B-03	WC-1B-03				Sp ^{22*}	Sp ²³ , Su ²³ , Fa ²³	
Unnamed Watercourse 2	WC-2					Sp ²² , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 3	WC-3			Sp ²²	Sp ^{22, 23} , Su ²²	Sp ^{22, 23} , Su ²² , Fa ^{22, 23}	
Unnamed Watercourse 3A	WC-3A			Sp ²³	Sp ²²	Sp ^{22, 23} , Su ²² , Fa ²²	
Unnamed Watercourse 3B	WC-3B				Sp ^{22, 23} , Su ²³ , Fa ²²	Sp ²² , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 4	WC-4				Su ²² , Fa ²²	Sp ²² , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 5	WC-5				Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Sp ²² , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 6A	WC-6A				Sp ²²	Fa ^{22, 23}	
Unnamed Watercourse 6A-01	WC-6A-01					Sp ²³ , Su ²³ , Fa ²³	
Unnamed Watercourse 6A-02	WC-6A-02				Su ²³ , Fa ²³	Su ²³ , Fa ²³	
Unnamed Watercourse 6B	WC-6B				Sp ²³ , Su ²³ , Fa ^{22, 23}	Sp ²² , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 6B-01	WC-6B-01				Sp ²³ , Su ²³ , Fa ²²	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 6B-02	WC-6B-02				Sp ²³ , Su ²³ , Fa ²³	Sp ²³	
Unnamed Watercourse 6C	WC-6C				Sp ²³ , Su ²³ , Fa ^{22, 23}	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 7	WC-7		Sp ²³ , Su ²³ , Fa ^{22, 23}		Sp ²³ , Su ²³ , Fa ^{22, 23}		
Unnamed Watercourse 7A-03	WC-7A-03				Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Sp ²² , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 7A-07	WC-7A-07				Sp ²² , Fa ²² , Sp ²³	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 7A-08	WC-7A-08				Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	Sp ^{22, 23} , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 8	WC-8				Sp ²²	Sp ²² , Su ^{22, 23} , Fa ^{22, 23}	
Unnamed Watercourse 8B	WC-8B				Sp ^{22*} , Su ²³ , Fa ²³	Sp ²³ , Su ²³ , Fa ²³	
Unnamed Watercourse 9	WC-9			Sp ²³		Sp ²² , Su ²²	

Notes:

Sp²² data collected during the 2022 spring field study (May 26 to June 5, 2022).

Fa²² data collected during the 2022 fall field study (October 20 to 29, 2022).

Su²³ data collected during the 2023 spring field study (July 25 to August 3, 2023).

Sp²⁴ data collected during the 2024 spring field study (June 10 to 17, 2024).

Fa²⁴ data collected during the 2024 fall field study (September 9 to 22 and October 22 to 28, 2024).

Su²² data collected during the 2022 summer field study (July 11 to 23, 2022).

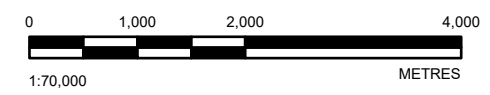
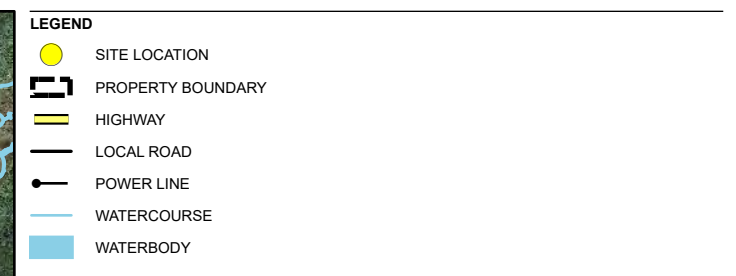
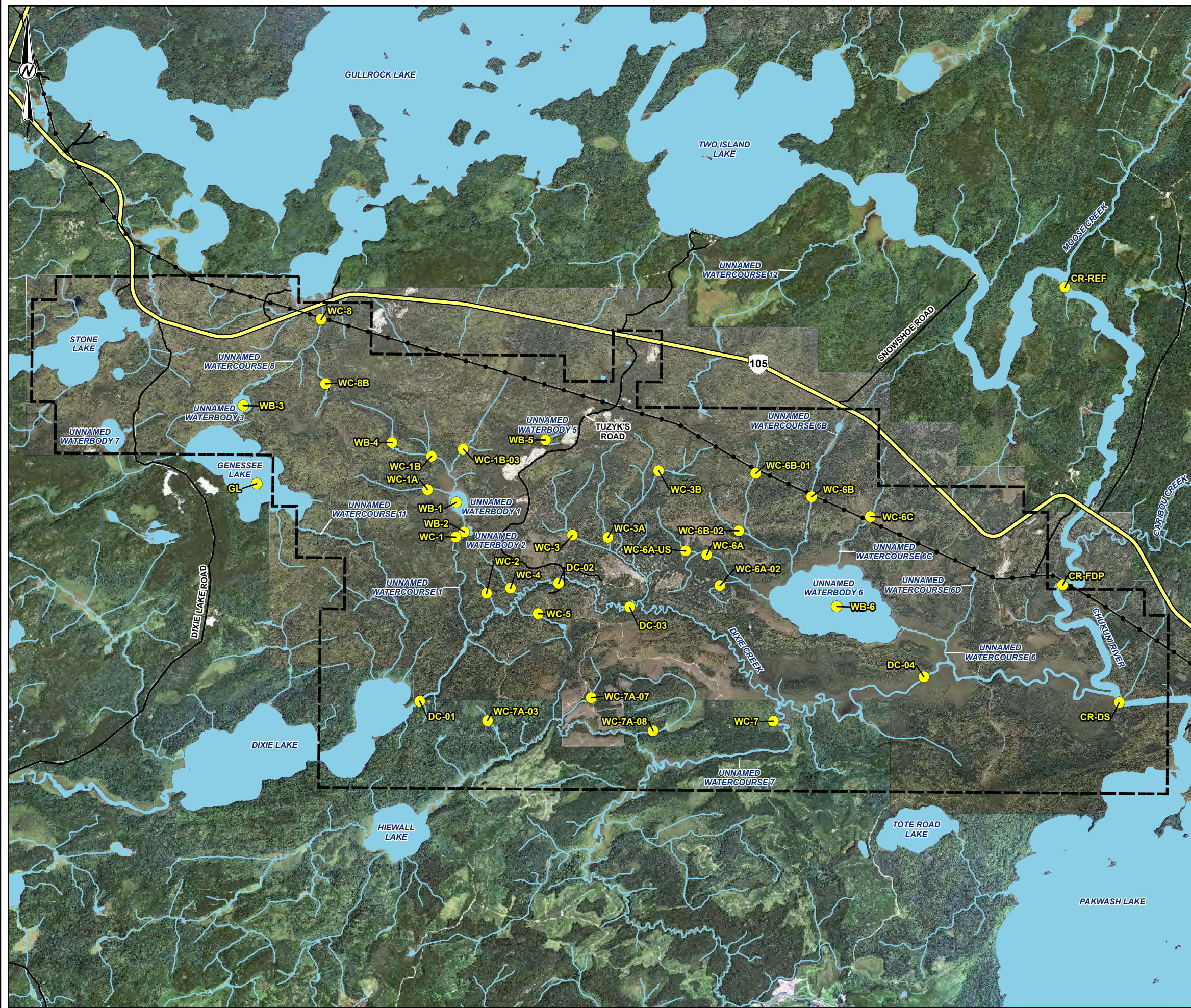
Sp²³ data collected during the 2023 spring field study (June 5 to 19, 2023).

Fa²³ data collected during the 2023 spring field study (September 6 to 17, 2023 and September 26 to October 2, 2023).

Su²⁴ data collected during the 2024 summer field study (July 22 to 29, 2024).

Table 2-3: Fish Habitat Type and Key Components

Habitat Type Classification		Lake / Pond			Riverine					
		Type A	Type B	Type C	Type D	Type E	Type F	Type G	Type H	Type I
General Habitat Attributes		<ul style="list-style-type: none"> Shallow inland lake / pond habitat Shoreline varies between extensive floating mats of herbaceous species Consisting mostly of fine-grained sediment and localized sections with boulder, cobble and/or sand 	<ul style="list-style-type: none"> Small, deep inland lake habitat Support a variety of forage fish and large body/sport fish Shoreline varies between extensive floating mats of herbaceous species and localized sections with boulder, cobble and/or sand 	<ul style="list-style-type: none"> Large lake habitat Shoreline mostly bedrock / boulder substrate, with some and shallow nearshore soft sediments commonly at tributary inflows 	<ul style="list-style-type: none"> Low lying area with diffuse pockets of standing water Sections of complete loss of channel, can transition into muskeg drainage, overland drainage flow path or underground flow 	<ul style="list-style-type: none"> Little to no floodplain with dense shrub riparian vegetation Steep banks Bedrock, boulder and cobble substrate with coarse wood debris 	<ul style="list-style-type: none"> Moderate beaver activity creating alternating series of pools / impoundments Side overflow channels created during high flow and stream stage events Abundant coarse wood debris 	<ul style="list-style-type: none"> Broad floodplain with extensive floating mats of herbaceous species typical of muskeg and beaver ponds / impoundments Primarily flat morphology with occasional pools in the thalweg of meander bends and back bays of the channel 	<ul style="list-style-type: none"> Moderate river with broad floodplain Primarily flat morphology with occasional pools Commonly occurring as main connecting channels between inland waterbodies 	<ul style="list-style-type: none"> Large river with moderate flow with occasional fast flowing riffle / rapids habitat and steep banks Soft fine-grained substrate with some localized boulder and cobble, as well as exposed bedrock
Permanence		Permanent	Permanent	Permanent	Ephemeral	Intermittent	Permanent	Permanent	Permanent	Permanent
Characteristic Morphology Features	Bankfull Width (m)	N/A	N/A	N/A	0.10 to 0.57	1.0 to 3.4 m	1.0 to 5.1 m	>5 m	>5 m	>10 m
	Bankfull Depth (m)	Total depth <4 m	Total depth >4 m	Total depth >10 m	0.1 to 0.6 m	0.1 to 1.0 m	0.1 to 0.9 m	>1 m	>1 m	>2 m
	Channel Morphology	Pool: 100%	Pool: 100%	Pool: 100%	N/A	Slow Riffle: 5% Glide: 95%	Flat: 80% Pool: 20%	Flat: 98% Pool: 2%	Flat: 96% Pool: 2% Slow Riffle: 2%	Fast Riffle: 20% Slow Riffle: 30% Glide: 50%
Substrate Composition (approximate %)		Boulder: 2% Cobble: 2% Fines: 96%	Boulder: 5% Cobble: 5% Fines: 90%	Bedrock: 20% Boulder: 20% Fines: 60%	Bedrock: 20% Boulder: 20% Fines: 60%	Bedrock: 20% Boulder: 60% Fines: 10%	Bedrock: 5% Boulder: 15% Fines: 80%	Bedrock: 5% Boulder: 15% Fines: 80%	Bedrock: 5% Boulder: 5% Fines: 90%	Bedrock: 25% Boulder: 20% Cobble: 15% Fines: 40%
Instream Cover (approximate %)		Macrophytes: 80% Rock: 5% Wood: 15%	Macrophytes: 80% Rock: 10% Wood: 10%	Macrophytes: 15% Rock: 75% Wood: 10%	Rock: 60% Wood: 40%	Bank: 15% Macrophytes: 5% Rock: 40% Wood: 40%	Bank: 5% Macrophytes: 50% Rock: 10% Wood: 25%	Bank: 5% Macrophytes: 40% Rock: 10% Wood: 45%	Bank: 15% Macrophytes: 40% Rock: 10% Wood: 35%	Rock: 80% Wood: 20%
Dominant Riparian Types (approximate %)		Macrophytes: 10% Grasses and Sedges: 45% Shrubs: 35% Trees: 10%	Macrophytes: 10% Grasses and Sedges: 45% Shrubs: 35% Trees: 10%	Grasses and Sedges: 10% Shrubs: 65% Trees: 25%	Grasses and Sedges: 10% Shrubs: 60% Trees: 30%	Macrophytes: 5% Grasses and Sedges: 10% Shrubs: 40% Trees: 45%	Macrophytes: 15% Grasses and Sedges: 70% Shrubs: 10% Trees: 5%	Macrophytes: 10% Grasses and Sedges: 80% Shrubs: 5% Trees: 5%	Macrophytes: 10% Grasses and Sedges: 80% Shrubs: 5% Trees: 5%	Grasses and Sedges: 30% Shrubs: 60% Trees: 10%
Representative 2022 to 2024 Habitat Sampling Locations		WB-1, WB-4, WB-5, WB-6	WB-2, WB-3	Gullrock Lake, GL, PKL	WC-1A, WC-1B, WC-1B-03, WC-6A-01, WC-6A-02	WC-2, WC-3A, WC-3B, WC-6A, WC-6B, WC-6B-01, WC-6C, WC-7A-03, WC-7A-07, WC-7A-08	WC-1, WC-4, WC-5, WC-6B-02, WC-6C, WC-8, WC-8B	WC-1A, WC-7	DC-01, DC-02, DC-03, DC-04, WC-3	CR-REF, CR-FDP, CR-DS



NOTE(S)
 1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
 1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
 2. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
 3. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

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GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

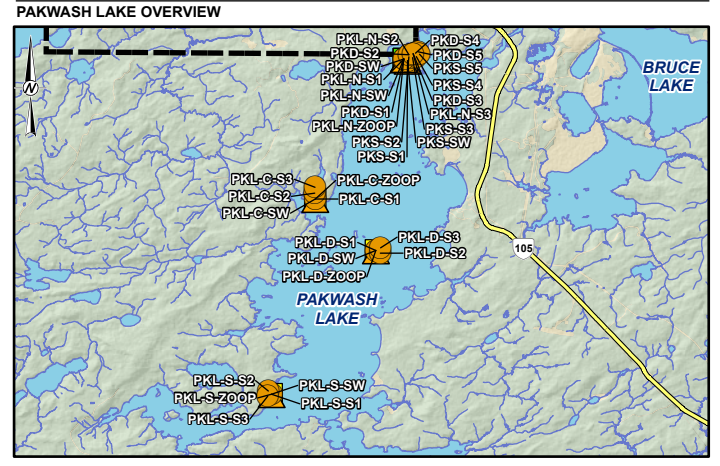
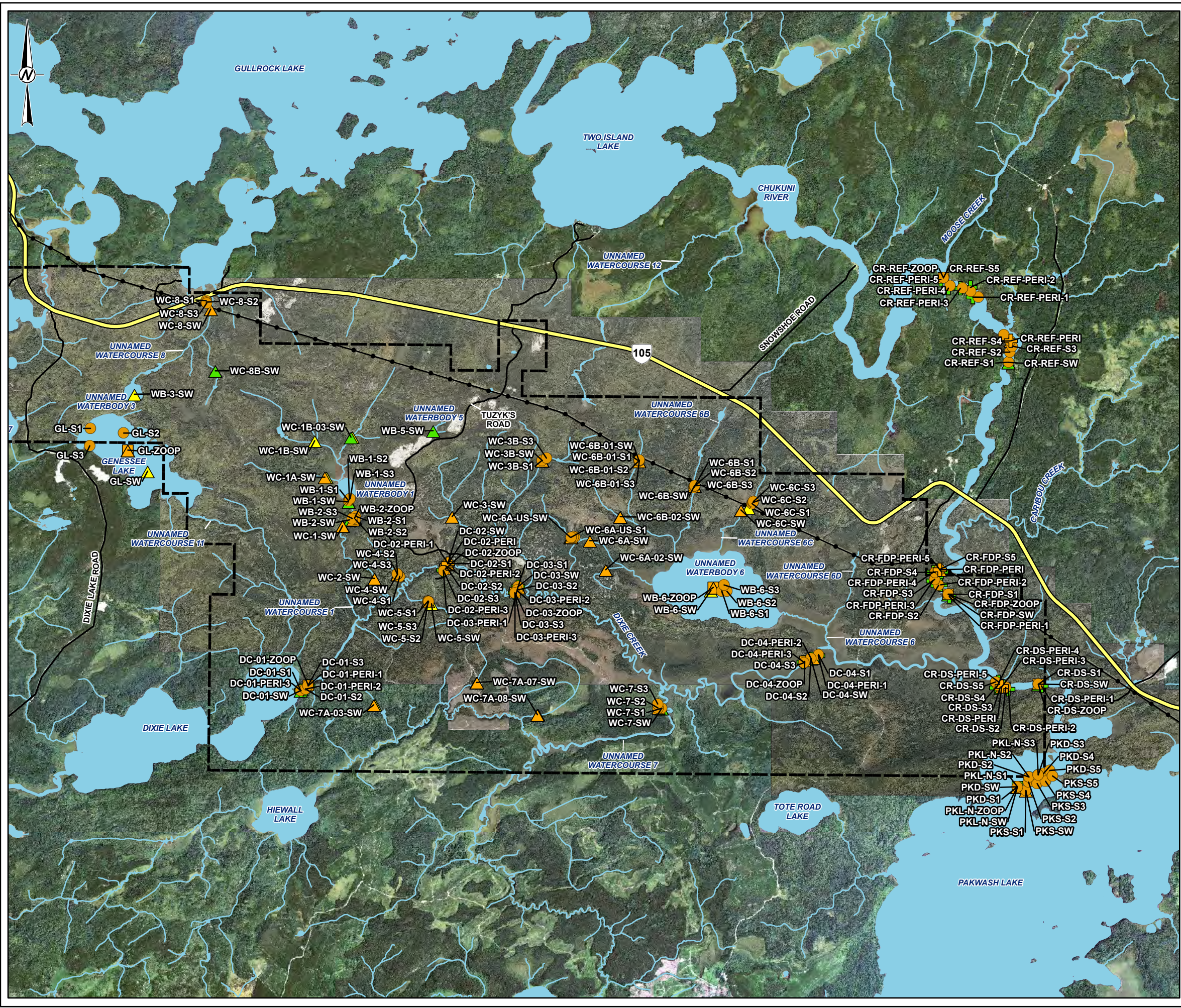
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AQUATIC BASELINE SITE LOCATIONS

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	PREPARED	MD
	REVIEWED	---
	APPROVED	---

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LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- POWER LINE
- WATERCOURSE
- WATERBODY

SAMPLING TYPE

- PERIPHYTON
- SEDIMENT / BENTHIC
- SURFACE WATER
- ZOOPLANKTON

SEASON

- SPRING
- SUMMER
- FALL

0 1,000 2,000 4,000
1:70,000 METRES

NOTE(S)

- ALL LOCATIONS ARE APPROXIMATE
- CR-REF UPSTREAM SAMPLE LOCATIONS WERE COMPLETED IN 2024. CR-REF DOWNSTREAM SAMPLE LOCATIONS WERE COMPLETED IN 2022-2023.

REFERENCE(S)

- CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
- WATERCOURSES AND WATERBODY ACQUIRED FROM LAND INFORMATION ONTARIO (MNR) AND MODIFIED TO MATCH AERIAL IMAGERY AND LIDAR.
- ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
- AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
- COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

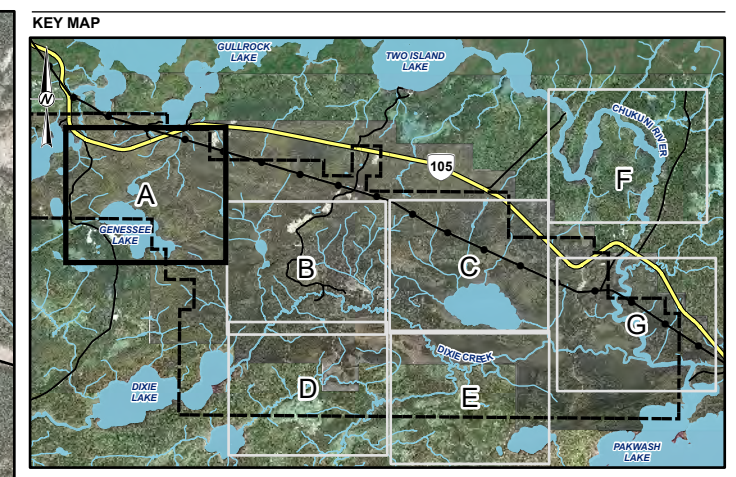
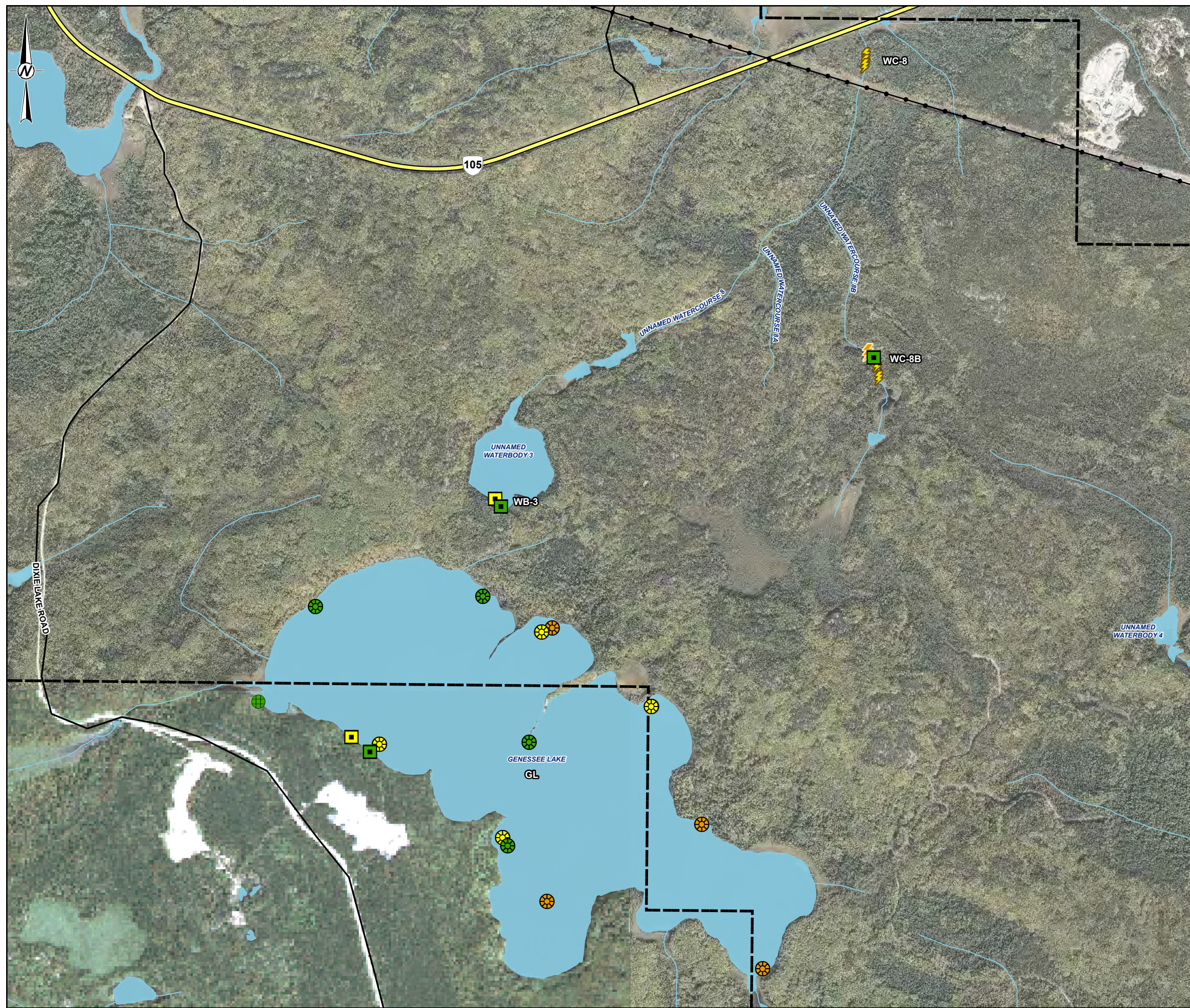
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CONSULTANT	YYYY-MM-DD	2025-03-10
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APPROVED	---	---

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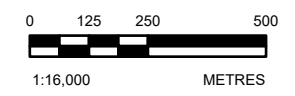


LEGEND

- PROPERTY BOUNDARY
 - HIGHWAY
 - LOCAL ROAD
 - EXISTING TRANSMISSION LINE
 - WATERCOURSE
 - WATERBODY
- GEAR TYPE**
- DIP NET
 - ELECTROFISHING
 - GILL NET
 - MINNOW TRAP
 - SEINE NET

SEASON

- SPRING
- SUMMER
- FALL



NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
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5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

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GREAT BEAR RESOURCES

PROJECT

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TITLE

FISH COMMUNITY LOCATIONS

CONSULTANT



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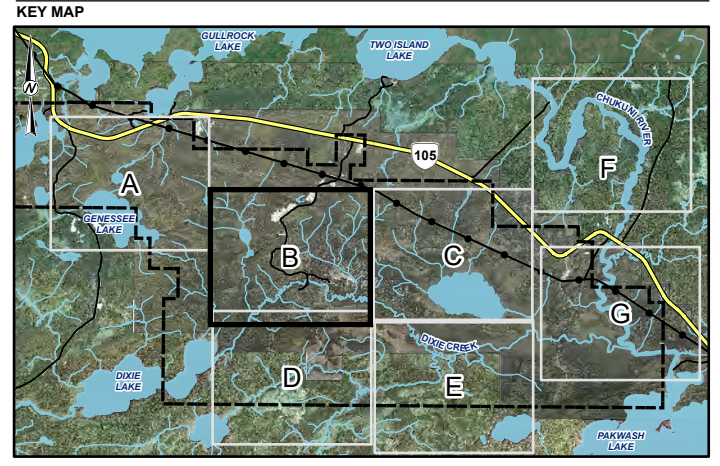
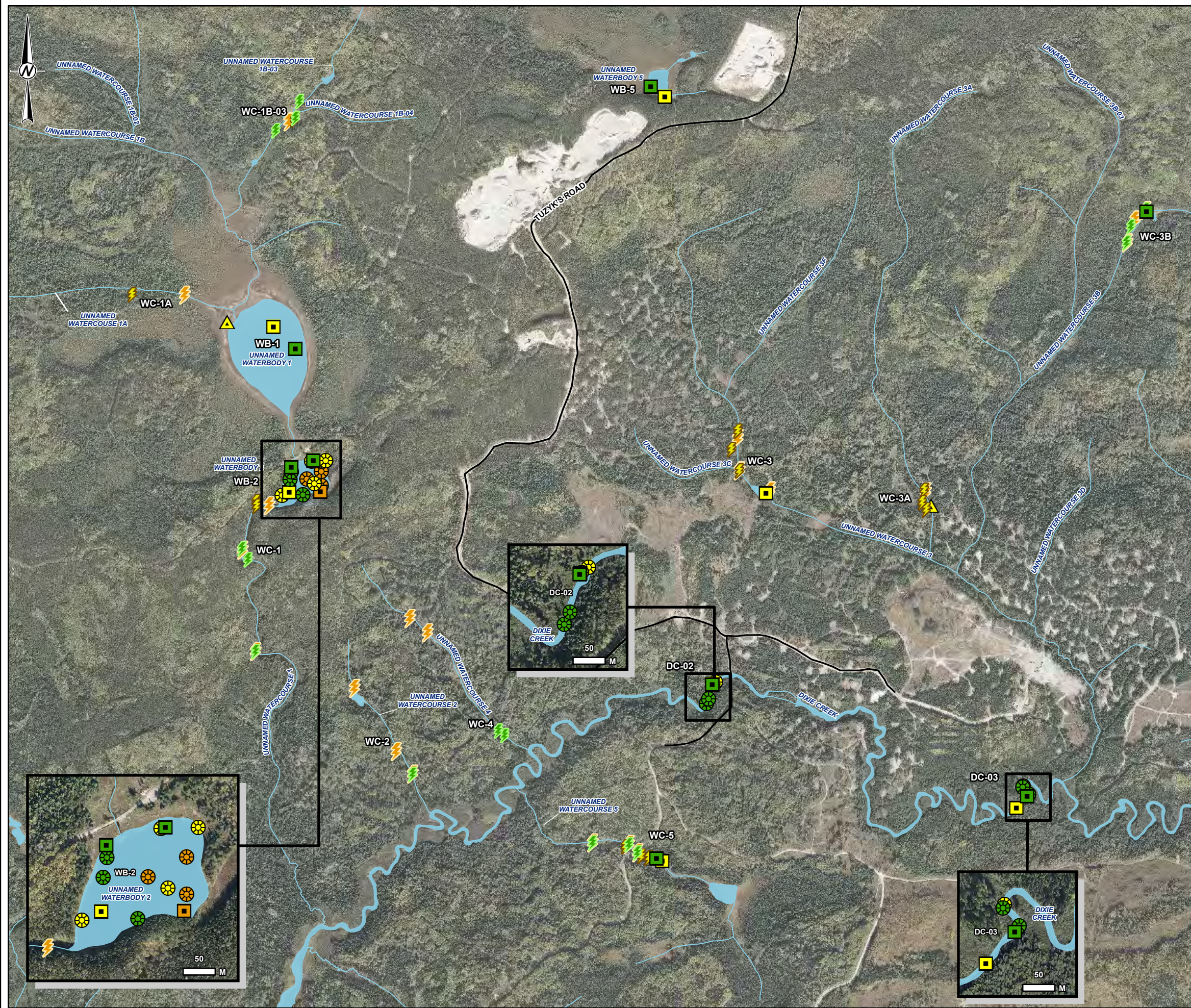
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FIGURE
2-3A

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LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- GEAR TYPE**
- DIP NET
- ELECTROFISHING
- GILL NET
- MINNOW TRAP
- SEINE NET

SEASON

- SPRING
- SUMMER
- FALL



NOTE(S)

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4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

GREAT BEAR RESOURCES

PROJECT

GREAT BEAR PROJECT

TITLE

FISH COMMUNITY LOCATIONS

CONSULTANT



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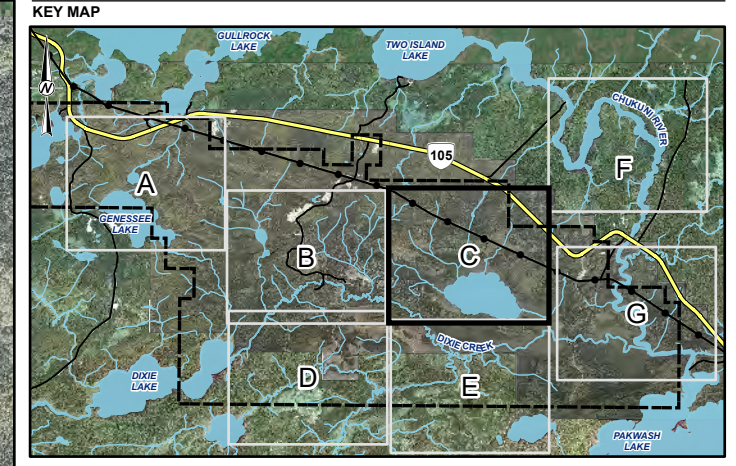
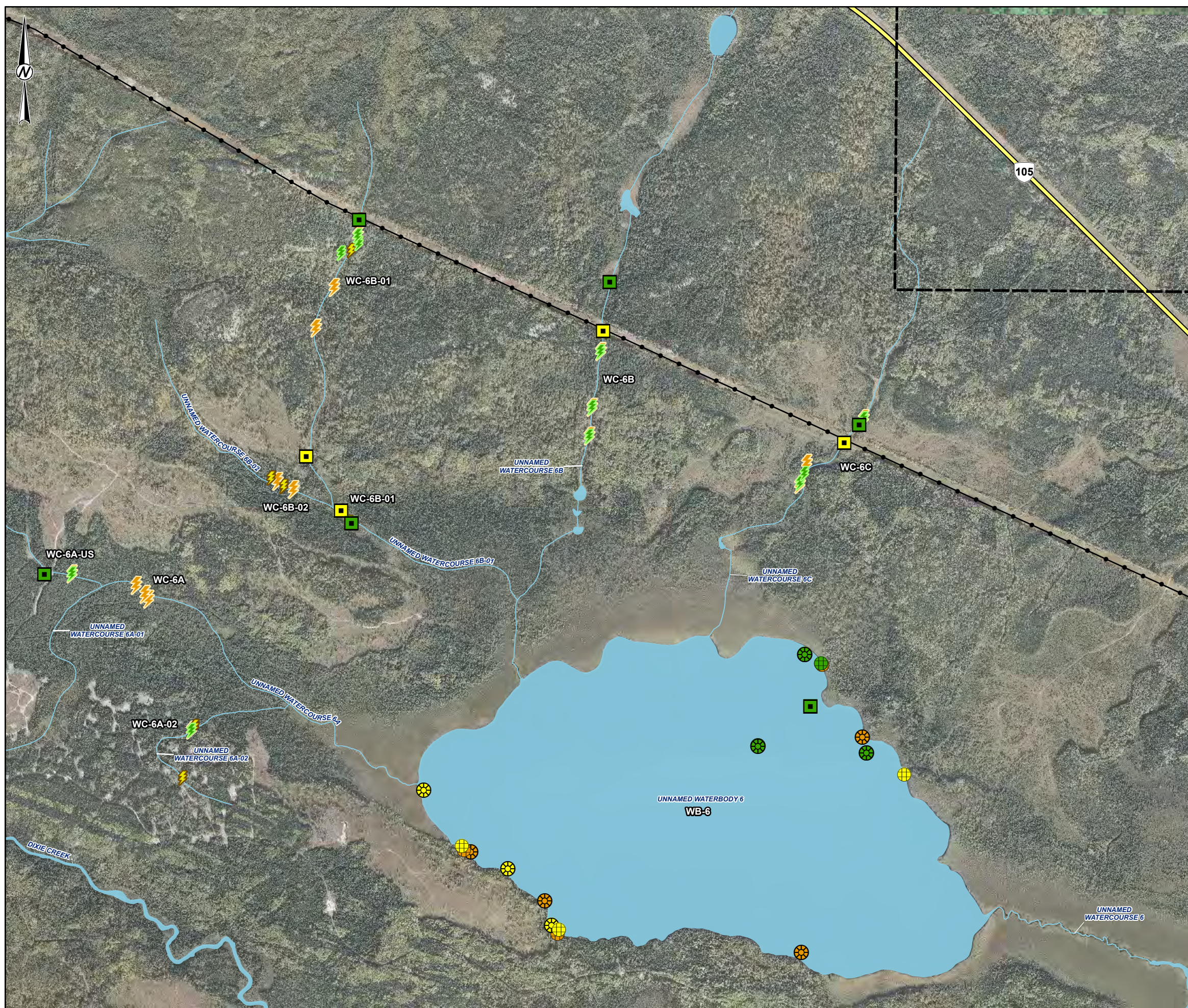
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FIGURE
2-3B

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LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY

GEAR TYPE

- DIP NET
- ELECTROFISHING
- GILL NET
- MINNOW TRAP
- SEINE NET

SEASON

- SPRING
- SUMMER
- FALL

0 125 250 500
1:16,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

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GREAT BEAR RESOURCES

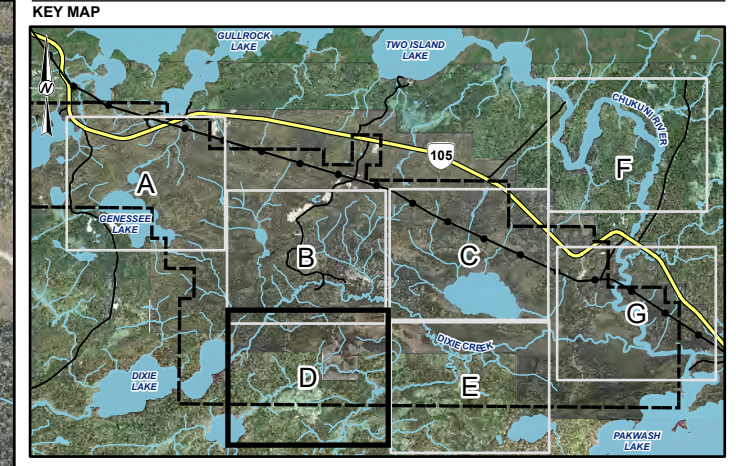
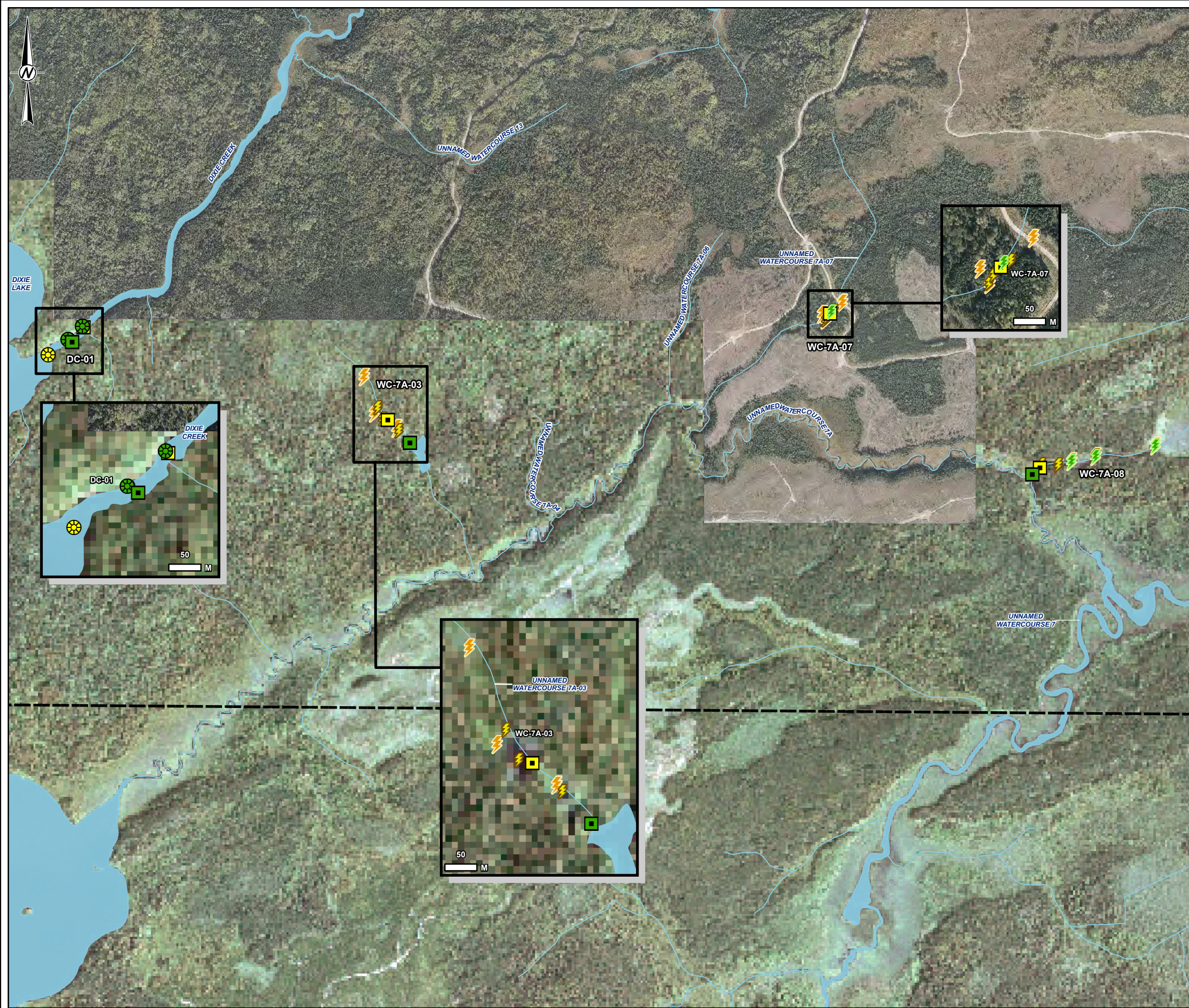
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TITLE
FISH COMMUNITY LOCATIONS

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	APPROVED	---

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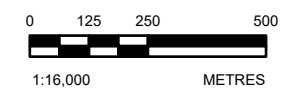
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LEGEND

- PROPERTY BOUNDARY
 - HIGHWAY
 - LOCAL ROAD
 - EXISTING TRANSMISSION LINE
 - WATERCOURSE
 - WATERBODY
- GEAR TYPE**
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SEASON

- SPRING
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- FALL



NOTE(S)

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5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

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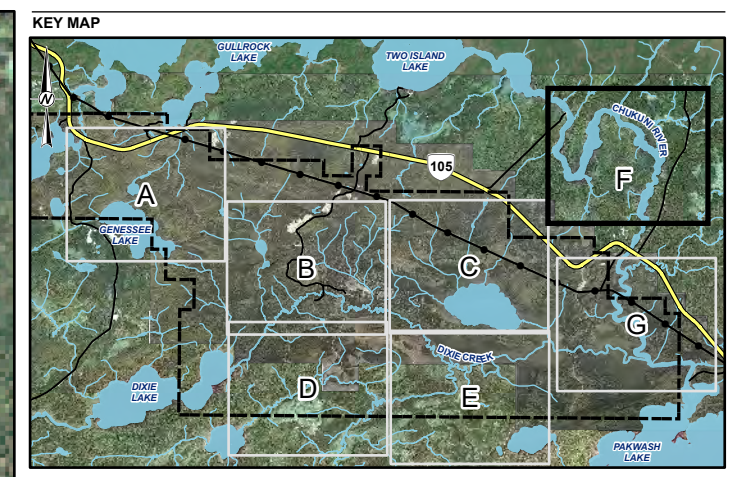
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FIGURE
2-3D

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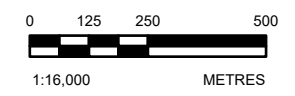
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LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- GEAR TYPE**
- DIP NET
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- SEINE NET

SEASON

- SPRING
- SUMMER
- FALL



NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

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3. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

GREAT BEAR RESOURCES

PROJECT

GREAT BEAR PROJECT

TITLE

FISH COMMUNITY LOCATIONS

CONSULTANT



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PROJECT NO.
CA0031272

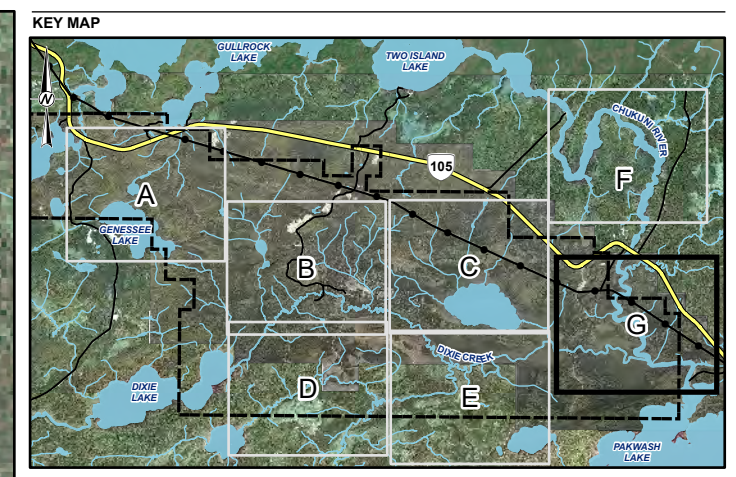
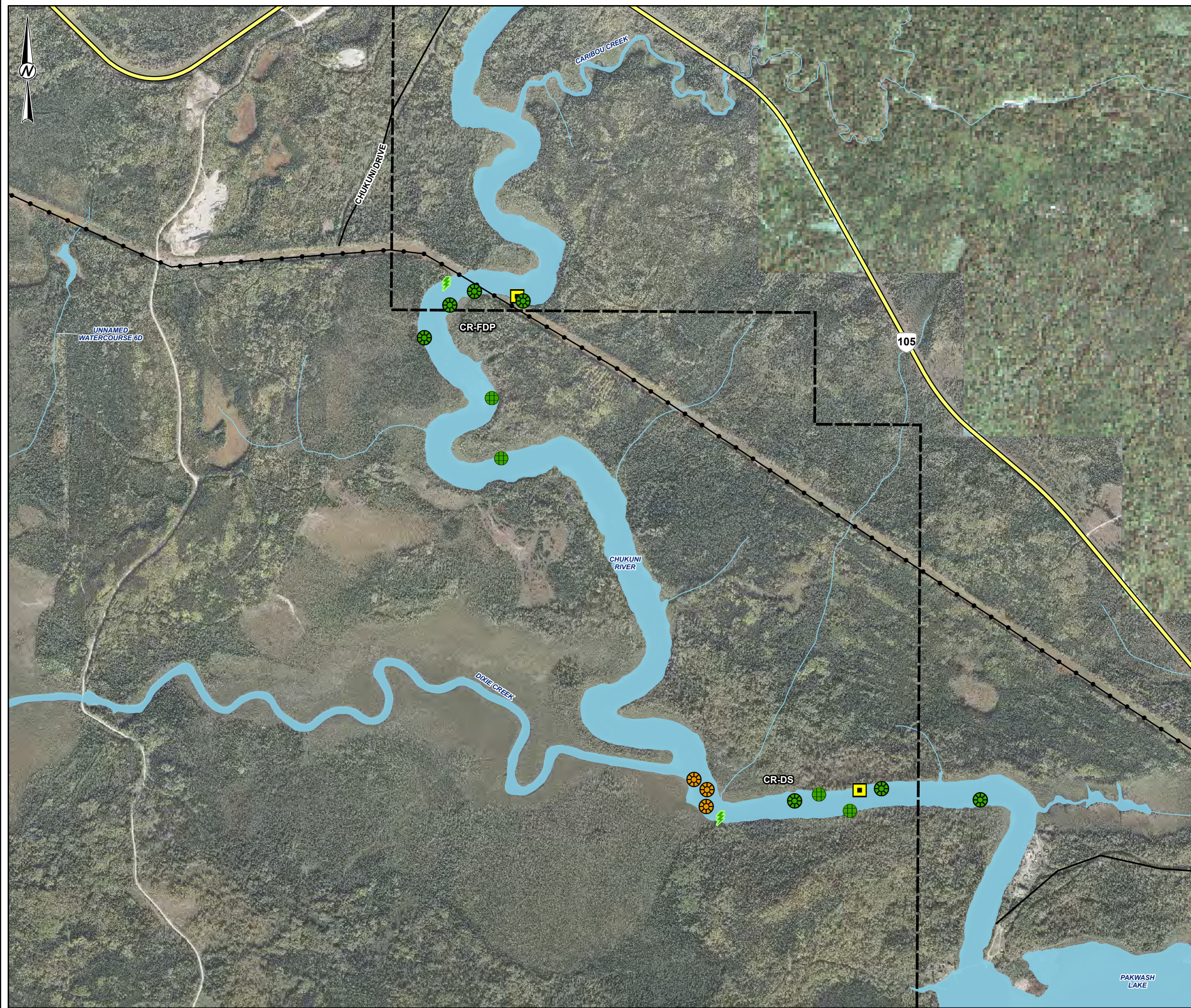
CONTROL
0001

REV.
A

FIGURE
2-3F

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B 26mm

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LEGEND

- PROPERTY BOUNDARY
 - HIGHWAY
 - LOCAL ROAD
 - EXISTING TRANSMISSION LINE
 - WATERCOURSE
 - WATERBODY
- GEAR TYPE**
- DIP NET
 - ELECTROFISHING
 - GILL NET
 - MINNOW TRAP
 - SEINE NET

SEASON

- SPRING
- SUMMER
- FALL



NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT

GREAT BEAR RESOURCES

PROJECT

GREAT BEAR PROJECT

TITLE

FISH COMMUNITY LOCATIONS

CONSULTANT



YYYY-MM-DD	2025-03-06
DESIGNED	---
PREPARED	MD
REVIEWED	---
APPROVED	---

PROJECT NO.
CA0031272

CONTROL
0001

REV.
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FIGURE
2-3G

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

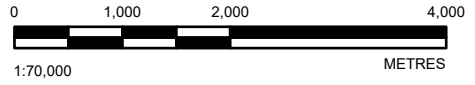


LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- POWER LINE
- WATERCOURSE
- WATERBODY

ENVIRONMENTAL DNA SAMPLING LOCATION

- SPRING
- SUMMER
- FALL



NOTE(S)
 1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
 1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
 2. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
 3. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
 GREAT BEAR RESOURCES

PROJECT
 GREAT BEAR PROJECT

TITLE
 ENVIRONMENTAL DNA SAMPLING LOCATIONS

CONSULTANT	YYYY-MM-DD	2025-03-07
	DESIGNED	---
	PREPARED	MD
	REVIEWED	---
	APPROVED	---

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031272	0001	A	2-4

PRINTN: X:\CADCAD\K030-CAD\MIS-FBI-Project\2025\Project\01\EMIA3203_K030_K030_G03\AquaticBaseline_2024.mxd PRINTED ON: AT 10:39:41 AM

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

3 RESULTS AND DISCUSSION

The following sections (and associated tables and figures) provide location-specific assessment results for the fisheries resources assessment, including as appropriate:

- Fish habitat survey results including habitat type and channel characteristics are provided within Appendix A (Tables A1-1A and A1-1B).
- Bathymetric surveys to characterize fish habitat are provided within Appendix A (Figures A1-1 to A1-4).
- In-situ physicochemical surface water quality parameters and analytical water quality provided in Appendix A (Tables A1-2A to A1-2C; Figures A1-5 to A1-9).
- Lower trophic / primary productivity results provided within Appendix A (Tables A2-1 and A2-2; Figures A2-1 to A2-3).
- Fish community survey results including method-specific capture results listing fish species occurrence in each waterbody are provided within Appendix B (Tables B1-1 to B1-10). A fish species richness table denoting all species found in each waterbody is provided in Table 3.1, please note that no endangered or invasive species were detected during baseline fish community sampling.
- Fish length frequency and age results are provided within Appendix B (Tables B2-1 to B2-3; Figures B1-1 to B1-8).
- Fish community metabarcoding results from eDNA samples are provided within Appendix B (Table B3-1).
- Concentrations of select contaminants of concern in fish tissue, including total mercury and methylmercury are provided within Appendix C (Tables C1-1 to C1-7; Figures C1-1 to C1-21 and C2-1 to C2-14).
- Sediment quality and particle size distribution are provided within Appendix D (Tables D1-1 to D1-5; Figures D1-1 and D1-2).
- The BIC results including descriptive community-based metrics for each sample area, as well as the raw data and associate community metrics plots within Appendix D (Tables D2-1 to D2-8; Figures D2-1 to D2-6).
- Quality assurance and control evaluation results are provided in Appendix E (Tables E1-1 to E1-3).
- A photographic record of the sample locations and points of interest are provided in Appendix F.

Table 3-1: Fish Species Occurrence by Waterbody Summary

Waterbody	Waterbody Name (ID)	Blackchin Shiner	Blacknose Shiner	Bluntnose Minnow	Brook Stickleback	Burbot	Central Mudminnow	Cisco	Common Shiner	Emerald Shiner	Fathead Minnow	Finescale Dace	Golden Shiner	Iowa Darter	Johnny Darter	Lake Chub	Lake Whitefish	Mimic Shiner	Mooneye	Muskellunge	Northern Pearl Dace	Northern Pike	Northern Redbelly Dace	Rainbow Smelt	Rock Bass	Sauger	Silver Redhorse	Shorthead Redhorse	Slimy Sculpin	Smallmouth Bass	Spottail Shiner	Trout Perch	Walleye	White Sucker	Yellow Perch	Species Richness	
Dixie Creek	DC				X	X	X		X	X		X		X	X				X		Xi	X			X					X		X	X	X	X	16	
Chukuni River	CR	X	X			X		Xi		X				X		X			X	Xi	Xi	X		Xi	X	X	X	X		X	X	X	X	X	X	21	
Genessee Lake	GL	X	X	X	X			X					X	X	X							X			X	X				X		X	X	X	X	15	
Gullrock Lake*	GRL							Xi		Xi							Xi					Xi		Xi	Xi		Xi		Xi	Xi	Xi	Xi	Xi	Xi	Xi	Xi	15
Pakwash Lake*	PKL							Xi	Xi	Xi							Xi	Xi	Xi	Xi		Xi		Xi	Xi	Xi	Xi	Xi		Xi	Xi	Xi	Xi	Xi	Xi	Xi	20
Dixie Lake*																	Xi					Xi			Xi								Xi	Xi	Xi	6	
Unnamed Waterbody 1	WB-1						X						X																							2	
Unnamed Waterbody 2	WB-2												X									X															2
Unnamed Waterbody 3	WB-3		X		X						X	X		X		X						X		X										X	X	10	
Unnamed Waterbody 4	WB-4				X		X				X	X																								4	
Unnamed Waterbody 5	WB-5																																			0	
Unnamed Waterbody 6	WB-6	X	X								X											X													X	5	
Unnamed Watercourse 1	WC-1				X		X														X	X												X		5	
Unnamed Watercourse 1A	WC-1A																																			0	
Unnamed Watercourse 1B	WC-1B																																			0	
Unnamed Watercourse 1B-03	WC-1B-03						X																													1	
Unnamed Watercourse 2	WC-2				X		X																													2	
Unnamed Watercourse 3	WC-3				X		X					X											X											X		5	
Unnamed Watercourse 3A	WC-3A				X		X															X														3	
Unnamed Watercourse 3B	WC-3B				X		X																													1	
Unnamed Watercourse 4	WC-4				X		X				X											X	X		X				X	X			X	X	10		
Unnamed Watercourse 5	WC-5				X		X					X									X	X												X	6		
Unnamed Watercourse 6	WC-6																																			0	
Unnamed Watercourse 6A	WC-6A				X		X																													2	
Unnamed Watercourse 6A-2	WC-6A-02						X																													1	
Unnamed Watercourse 6B	WC-6B				X		X																													2	
Unnamed Watercourse 6B-01	WC-6B-01				X		X																													2	
Unnamed Watercourse 6B-02	WC-6B-02				X		X																													2	
Unnamed Watercourse 6C	WC-6C				X		X					X											X													4	
Unnamed Watercourse 7	WC-7																					X													X	2	
Unnamed Watercourse 7A-03	WC-7A-03																																			0	
Unnamed Watercourse 7A-07	WC-7A-07				X		X																													2	
Unnamed Watercourse 7A-08	WC-7A-08				X	X	X															X														4	
Unnamed Watercourse 8	WC-8				X	X	X				X	X									X	X												X		8	
Unnamed Watercourse 8B	WC-8B				X							X									X	X														4	
Species Total Count (n)		3	4	1	19	5	18	4	1	3	5	7	3	2	2	1	4	1	2	2	6	12	7	3	6	4	2	3	1	3	5	2	5	11	9		

Notes:
 "X" indicates species presence was confirmed during field studies
 "Xi" indicates species occurrence was documented by the MNR through Fish On-Line or BsM surveys
 * denotes nearby waterbodies not sampled during the 2022 or 2023 field studies with information provided by the MNR through Fish On-Line or BsM Survey

3.1 HABITAT CHARACTERIZATION

Fish habitat was characterized throughout the Property with stream order, waters frequented by fish and habitat types presented on Figures 3-1 to 3-3. The following sections describe the habitat types characterized during the field studies 2022 to 2024.

3.1.1 *HABITAT TYPE A*

Habitat type A represents lentic (lake/pond) habitat characterizing the small, shallow waterbodies (less than 4 m total depth) within the Project area that are likely to support spawning, rearing, and foraging habitat for a variety of small-body species with potential of large-body fish species such as Northern Pike and Yellow Perch. Substrate composition in habitat type A includes predominantly soft, fine-grained sediments with some localized boulder/bedrock and cobble/sand occurrences, as well as coarse woody debris with detritus. Vegetation in the upland zones was composed mainly of mixed coniferous and deciduous dominated by Black Spruce and Tamarack; vegetation near to the riparian zone included wood shrub species such as alder, and a variety herbaceous species, including sedges and grasses. In general, two types of riparian zone vegetation were observed in habitat type A: a graminoid (grasses and sedges) floating mat with mosses (bryophytes), Sweetgale and herbaceous species; or a narrow riparian zone with overhanging shrubs and rushes, such as Hardstem Bulrush, that extended into the open water littoral zone covering a portion of the open water surface. Nearshore, shallow areas were also commonly populated by other emergent and submergent or floating aquatic macrophytes such as Yellow Pond Lily and pondweed.

3.1.2 *HABITAT TYPE B*

Habitat type B represents lentic habitat characterizing the small, deep (greater than 4 m total depth) inland waterbodies within the Project area. The total depth is the primary difference between habitat types A and B, where habitat type B is characteristically deeper. The difference in depth can influence fish species community composition, vegetation, and thermal regime. Habitat type B is likely to support a variety of small-body and large-body species of varying life stages. Substrate composition in habitat type B is similar to habitat type A, being composed predominantly of soft, fine-grained sediments and a greater abundance of localized boulder, bedrock and cobble or sand occurrences, as well as coarse woody debris with detritus. Vegetation in the upland zones is mainly mixed coniferous and deciduous dominated by Black Spruce and White Spruce; while vegetation near to the riparian zone included woody shrub species such as alder, and a variety of herbaceous species, including sedges and grasses. In general, two types of riparian zone vegetation were observed in habitat type B; a graminoid floating mat with mosses and herbaceous species or a narrow riparian zone with overhanging shrubs and rushes, such as Hardstem Bulrush, that extended into the open water littoral zone covering a portion of the open water surface. Nearshore, shallow areas were also commonly populated by other emergent and submergent or floating aquatic macrophytes such as Yellow Pond Lily and pondweed species.

3.1.3 *HABITAT TYPE C*

Habitat type C represents deep water lentic habitat characterizing the large lake environs such as Genessee Lake, differing from habitat type B by surface area. These lake habitats support a variety of forage fish and large-body/sport fish, such as Northern Pike and Walleye, indicative of deep water and rocky shoal habitat. Substrate composition nearshore is mainly comprised of exposed bedrock and boulder, with localized areas of soft, fine-grained sediments commonly associated with tributary inflows and sheltered embayments. Coarse wood structure, such as driftwood, and some localized areas of aquatic macrophytes within the soft sediment substrate areas are present. Vegetation in the upland zones consists mainly of mixed coniferous and deciduous dominated by Black Spruce and White Spruce, while vegetation near to the riparian zone included woody shrub species such as alder and various herbaceous species.

3.1.4 *HABITAT TYPE D*

Habitat type D represents ephemeral stream environments characterized as low-lying areas that may contain diffused pockets of standing water which only convey overland flow during periods of heavy rainfall or during spring freshet (snowmelt). Habitat type D environments are commonly associated with a complete loss of defined channel, transitioning into areas of muskeg drainage and underground seepage, and are not considered fish habitat. This habitat type characterized the subsurface flow paths typically observed in the headwater areas and was dominated by alder, grasses, and sedges, with some Black Spruce and various mosses.

3.1.5 *HABITAT TYPE E*

Habitat type E represents riverine habitat that experiences intermittent flow or low year-round flow. The habitat includes little to no floodplain, steep banks and shrub riparian vegetation providing nearly complete canopy cover. The substrate is mostly exposed bedrock and boulder with some isolated pockets of fine-grained sediments. This habitat type supports fish communities, with increased usage during the higher flow periods (e.g., spring freshet and spawning season). Riparian vegetation is dense alder and willow, with some Balsam Fir, Black Spruce, and various poplar. This habitat type commonly occurs within gradient changes of inland streams and habitat type C waterbodies.

3.1.6 *HABITAT TYPE F*

Habitat type F represents riverine habitats with beaver dams and activity creating alternating series of pools and impoundments. These areas are characterized by side overflow channels formed during high flow events. The pool habitat has abundant coarse and fine woody debris, with soft, fine-grained sediments that support dense aquatic macrophytes. Riparian vegetation is mostly comprised of grasses and sedges (graminoids) with alder and willow species further upland adjacent to mixed conifer and deciduous forest. Habitat type F environments typically occur between inland waterbodies and at the downstream extent of the habitat types G and H reaches, where beavers have utilized the natural narrow topography to construct dams. These pooled areas can support a variety of small-body fish species.

3.1.7 *HABITAT TYPE G*

Habitat type G represents riverine habitat with a broad floodplain and extensive floating mats of herbaceous species typical of wetlands and beaver ponds. This habitat is primarily represented by flat channel morphology with occasional pools in the thalweg of meander bends and back bays of the channel and provides fish habitat for various small-body fish. The substrate is characterized by soft, fine-grained sediment with occasional boulders and localized areas of exposed bedrock. Dense aquatic macrophyte growth and coarse wood debris contribute most of the instream cover. Vegetation in the upland zones is mainly mixed coniferous and deciduous dominated by Black Spruce, poplar species, and Tamarack; while vegetation near to the riparian zone includes alder, willow, and herbaceous species.

3.1.8 *HABITAT TYPE H*

Habitat type H represents riverine habitat with a moderate to broad floodplain like habitat type G, however wetted width of habitat type H is much wider (greater than 10 m). As with habitat type G, the type H habitat is characterized by U shaped channel morphology with occasional pools and provides fish habitat for various small-body and large-body fish. The substrate is characterized by soft, fine-grained sediment with small amount of boulder with the presence of sparse aquatic macrophytes and coarse woody debris. The riparian zone consists mostly of grasses and sedges. Upland areas are mainly mixed coniferous and deciduous dominated by Black Spruce, poplar species, and Tamarack, while vegetation near to the riparian zone includes alder and herbaceous species.

3.1.9 HABITAT TYPE I

Habitat type I represents the Chukuni River, or large river, habitat and is mostly characterized by reaches with moderate flow and occasional fast flowing sections consisting of cobble, boulder, and bedrock riffle. This habitat type is characteristic of moderate gradients and generally deep channel cross-sections. The substrate consists of soft, fine-grained sediments with some localized boulder/bedrock and cobble/sand occurrences, as well as coarse woody debris with detritus. The upland vegetation communities are mainly mixed coniferous and deciduous dominated by Black Spruce and poplar species while vegetation near to the riparian zone included alder, willow, and herbaceous species. Nearshore, shallow areas are also commonly populated by emergent and submergent macrophytes such as Hardstem Bulrush, cattail, and pondweed species.

3.2 DIXIE CREEK

3.2.1 DIXIE CREEK-01

3.2.1.1 FISH HABITAT

Dixie Creek-01 (DC-01) is the farthest west sampling location in Dixie Creek, directly downstream of the outlet of Dixie Lake and represents habitat type H as lotic riverine habitat (Figure 2-1, Table A1-1A). At this sampling location, Dixie Creek has steep banks with a narrow floodplain, and a riparian consisting of alder and willow species with upland Black Spruce and poplar. The substrate consists mostly of soft fine-grained sediments with occasional cobble and large woody debris (LWD) and cover within the margins.

3.2.1.2 FISH COMMUNITY

A total of 27 fish were caught from DC-01 during the spring, summer, and fall 2023 field investigations, including Northern Pike, Spottail Shiner, and Yellow Perch. Fish were not captured during 2022 surveys (Table 3.1). Baited minnow traps and gillnets were utilized, with minnow traps being the most effective capture gear (Appendix B, Tables B1-8 and B1-9). Summer (July) water temperature measurements and captured fish species show the thermal guild classification for DC-01 represents a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Metabarcoding analysis identified DNA from 17 species in water samples collected from DC-01 during spring, summer, and fall 2023 sampling. Species DNA included, Blacknose Shiner, Burbot, Central Mudminnow, Fathead Minnow, Iowa Darter, Johnny Darter, Lake Chub, Northern Pike, Rock Bass, Sauger, sculpin species, Shorthead Redhorse, Silver Redhorse, Spottail Shiner, Walleye, White Sucker, and Yellow Perch. Of these, sculpin could only be identified to genus. The *Cottus* species in this sample location is most likely the Mottled and Slimy sculpins.

3.2.1.3 FISH LENGTH FREQUENCY AND AGE

A total of 6 Northern Pike and 18 Yellow Perch were captured from DC-01 in 2023 and used to generate length frequency histograms showing data from all Dixie Creek sample locations. Northern Pike ranged from 60 to 570 mm TLEN, with most individuals (67%) between 400 to 600 mm. Yellow Perch ranged from 37 to 135 mm TLEN. Fish age results and length frequency histograms are displayed by species and sampling location in Appendix B (Table B2-2 and Figures B1-1 and B1-2).

Four total Yellow Perch were submitted for aging analysis, ranging from 100 to 109 mm TLEN. All were one year old. Of the 18 Yellow Perch captured, 7 (39%) measured greater than 100 mm, suggesting most Yellow Perch captured (61%) were likely young of the year (YOY). This highlights the potential for suitable habitat for the rearing and/or survival of young individuals of this species.

3.2.1.4 FISH TISSUE

Two Yellow Perch composite samples were submitted for fish tissue analysis from DC-01 in 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww. Results have also been presented in dry weight (dwt) for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury concentrations for Yellow Perch were 0.03 and 0.05 mg/kg and less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg) as well as those developed for women of child-bearing age and children (0.5 mg/kg)
- Methylmercury concentrations were 0.021 to 0.031 mg/kg and less than the Health Canada maximum contaminant concentration (0.5 mg/kg) and CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- All selenium concentrations were less than the FEQG for whole body samples (6.7 mg/kg)

3.2.1.5 WATER QUALITY

In-situ measurements were collected during the fall 2022, spring 2023, and summer 2023 field investigations. Water temperature ranged from 4.8°C to 22.1°C, DO from 7.0 to 12.4 mg/L, and pH from 7.11 to 7.81 (Appendix A; Tables A1-2A to A1-2B). All measurements of DO and pH met the PWQO and CWQG.

3.2.1.6 LOWER TROPHIC AND PRIMARY PRODUCTIVITY

The 2024 periphyton sampling results were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.

3.2.1.7 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 2 m at DC-01 during the fall 2022 and 2023 field investigations. Laboratory chemical analysis is presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of fine sand and silt.
- Total organic carbon (TOC) was greater than the PSQG LEL at all stations and one station under the PSQG SEL in 2023.
- Background concentrations greater than the PSQG LEL were noted for arsenic, chromium, copper, and nickel.

3.2.1.8 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from DC-01 during the fall 2022 and 2023 field programs from total water depths between 1.0 and 1.5 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. Results of statistical analyses involving Dixie Creek sampling locations are also provided in Appendix D (Tables D2-3 and D2-5). A summary of these findings is provided below.

- DC-01 had the highest average value of TID among all sampling locations, and consistently high richness and diversity among replicate stations and between years. Values of TID at DC-01 replicate stations were approximately ten times higher than those at downgradient Dixie Creek locations 02, 03, and 04. This is likely due to the upstream influence from Dixie Lake as the DC-01 sample location is immediately downstream (approximately 100 m) of the lake outlet.
- While the Dixie Creek BIC had relatively high values of richness and diversity, midges (Chironomids) and clams (Sphaeriidae), dominated count numbers. Chironomid taxa averaged 45% to 47% in 2022 and 2023 respectively, of the total numbers across replicate stations.

- EPT taxa were present at all replicate stations in both years, averaging approximately 12% and 19% in 2022 and 2023 respectively.
- The Bray Curtis index, which provides an overall measure of BIC dissimilarity, found DC-01 to be different from DC-02 and DC-04 in 2022 and different from all other Dixie Creek locations in 2023.
- Statistical analyses of the Dixie Creek BIC descriptors indicated that in 2022 DC-01 had higher TID than all other locations, higher richness than DC-04, and higher diversity than DC-02.
- The 2023 analysis provided similar results, with DC-01 having higher TID than DC-02 and DC-03, higher richness than all other locations, higher evenness than DC-03, and higher percentages of both Chironomids and EPT than DC-02 and DC-03, respectively. This shows inherent variability in benthic invertebrate assemblages and habitats across these sample locations.

The shallow water depths and clear water likely also increased productivity at DC-01, compared to sample locations farther downstream which have higher natural turbidity from tributary contributions. Further, Dixie Creek had a shift in substrate upstream compared to downstream, changing from a sand/silt mix to one dominated by finer silt/clay substrate which may be linked to differences in the benthic community.

3.2.2 DIXIE CREEK-02

3.2.2.1 FISH HABITAT

Dixie Creek-02 (DC-02) is a portion of Dixie Creek with moderate flow, characteristic of habitat type H (Table A1-1A). DC-02 is downstream of a bridge crossing that constricts the channel, increasing water velocity (Figure 2-1). There is a dense riparian zone of mixed overhanging coniferous and deciduous vegetation, with tag alders choking the shoreline, and clay banks. The substrate consists mostly of soft fine-grained sediments with occasional boulder, LWD, cover, and emergent macrophytes (such as Broadleaf Arrowhead) within the margins.

Fish spawning habitat surveys were conducted in Dixie Creek during the 2024 field investigations, identifying two potential areas of Lake Whitefish and Walleye spawning. One area is positioned between the DC-02 and DC-03 locations, beginning 100 m downstream of the bridge at DC-02 and extending downstream approximately 500 m. Fish were not observed to be spawning in spring 2024.

3.2.2.2 FISH COMMUNITY

A total of 13 fish were caught from DC-02 during the spring, summer, and fall 2023 field investigations, including Burbot, Northern Pike, White Sucker, and Yellow Perch (Table 3-1). Fish were not captured during 2022 surveys while using minnow traps and gillnets. Gillnet set durations were reduced within areas of Dixie Creek to limit the potential mortality rates of fish as per the LCFSP. Baited minnow traps and gillnets were utilized with minnow traps being the most effective capture gear (Appendix B; Tables B1-4, B1-5, B1-8, and B1-9). Summer (July) water temperature measurements and captured fish species show the thermal guild classification for DC-02 represents a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.2.2.3 FISH LENGTH FREQUENCY AND AGE

A total of three Northern Pike, one White Sucker, and three Yellow Perch captured from DC-02 in 2023, and meristic data was used to generate length frequency histograms showing data from all Dixie Creek sample locations. All fish, except for one Yellow Perch captured in summer, were submitted for age assessment. Fish age results are displayed in Appendix B (Table B2-2) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 and B1-2).

- Northern Pike ranged from 195 to 300 mm TLEN. All Northern Pike submitted for age assessment were less than one year old.
- White Sucker measured 115 mm TLEN and was less than one year old.

- Yellow Perch ranged from 51 to 158 mm TLEN. The assessed ages of the two Yellow Perch submitted were two years of age and measured 154 and 158 mm TLEN.

3.2.2.4 FISH TISSUE

A total of three Northern Pike, one White Sucker, and two Yellow Perch were submitted for metals analysis from DC-02 in 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury concentrations ranged from 0.02 to 0.07 mg/kg, 0.04 mg/kg, and 0.03 to 0.04 mg/kg for Northern Pike, White Sucker, and Yellow Perch, respectively. All samples were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg) as well as those developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg).
- Total methylmercury concentration ranged from 0.025 to 0.049 mg/kg, 0.033 mg/kg, and 0.023 to 0.025 mg/kg for Northern Pike, White Sucker, and Yellow Perch, respectively. All values were below the CCME (2000) guideline of 0.033 mg/kg for the protection of wildlife consumers of aquatic biota apart from one Northern Pike.
- Selenium concentration in tissue samples ranged from 0.82 to 0.92 mg/kg, 0.78 mg/kg, and 0.98 to 1.2 mg/kg for Northern Pike, White Sucker and Yellow Perch, respectively and all values were less than the FEQG for whole body samples (6.7 mg/kg).

Regressions of total mercury and methylmercury at length for Northern Pike, White Sucker and Yellow Perch are presented in Appendix C (Figures C2-1 to C2-14). These plots are inclusive of all Dixie Creek sample locations to increase sample size for graphical comparison. The plots do not show a relationship between total length and total mercury or methylmercury concentrations.

3.2.2.5 WATER QUALITY

In-situ measurements were collected in the spring and summer 2022 and spring, summer and fall 2023 field investigations. Temperature ranged from 14.5°C to 22.7°C, DO from 4.25 to 7.62 mg/L, and pH from 6.12 to 7.26 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG except for two DO measurements in 2023 (spring and fall).

3.2.2.6 LOWER TROPHIC AND PRIMARY PRODUCTIVITY

Samples of periphyton from natural substrate were collected from DC-02 and analysed for stable isotopes ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$). Results of laboratory analyses are summarized in Appendix A (Table A2-1).

Stable isotope results from DC-02 measured -30.18, 1.76, and 11.75 for $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ and C:N, respectively. DC-02 showed the lowest $\delta^{13}\text{C}$ values of all samples collected in 2023. Lower $\delta^{13}\text{C}$ is expected at DC-02 due to its smaller channel width compared to the Chukuni River as increased periphyton $\delta^{13}\text{C}$ is often associated with increased river size (Ishikawa et al. 2012).

The 2024 periphyton sampling results were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.

3.2.2.7 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 1.5 m at DC-02 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Sample grain size varied across stations in 2022, with coarse sand dominating replicate S1, silt dominating S2, and the third station (S3) being well mixed between coarse sand, fine sand, and silt.
- Samples collected in 2023 were consistent across all stations predominantly consisting of silt and fine sand.

- TOC was higher than the PSQG LEL at all stations.
- DC-02-S02 measured greater than the PSQG LEL for chromium, copper, and nickel concentrations.

3.2.2.8 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from DC-02 during the fall 2022 and 2023 field programs from total water depths between 1.0 and 1.5 m. Benthic invertebrate community data and statistical results are provided in Appendix D (Tables D2-1 to D2-2 and D2-4 to D2-5; Figures D2-1 to D2-3 and D2-5), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- DC-02 had decreases in abundance and TID from DC-01, however still had high richness and was consistent in percent of EPT taxa in 2022. In 2023, DC-02 again had decreases in abundance and TID, as well as all other metrics. Of note, Chironomid numbers decreased dramatically to only 0.6% of total biomass and were only found at one replicate. Instead, the community was dominated (67%) by *Ceratopogonidae* (biting midges).
- It is unclear why Chironomid numbers decreased in this manner between years, however high water and flooding events during 2022 may have impacted the BIC community.
- EPT taxa were present in all replicate stations, averaging approximately 12%, but were as high as 22% in replicate station B1 in 2022. In 2023, EPT taxa were only present in replicate station B1, at approximately 9% of the total count. This is likely due to the lower total number of organisms captured, ranging from 8 to 116 in 2023, but ranging from 239 to 343 individuals in 2022.

Statistical analysis of the Dixie Creek BIC descriptors indicated that in 2022 DC-02 had lower TID than DC-01, lower evenness than DC-03 and DC-04, lower diversity than DC-01 and DC-03, higher Chironomid proportions than DC-03, and lower percent EPT than DC-03. In 2023, DC-02 had lower TID, richness, and percent Chironomids than DC-01. The Bray Curtis index found DC-02 to be different from DC-01 and DC-03 in 2022, and DC-01 and DC-04 in 2023.

3.2.3 DIXIE CREEK-03

3.2.3.1 FISH HABITAT

Dixie Creek-03 (DC-03) is similar to DC-02 with moderate flow and characteristics of habitat type H (Table A1-1A). There is a dense riparian zone of mixed overhanging coniferous and deciduous vegetation, with tag alders along the shoreline, and clay banks. The substrate consists mostly of soft fine-grained sediments with occasional boulder, LWD, cover, and emergent macrophytes (such as Broadleaf Arrowhead) within the margins. DC-03 is shown in Figure 2-1.

3.2.3.2 FISH COMMUNITY

A total of 15 fish were caught from DC-03 during the 2022 and 2023 field investigations, including Brook Stickleback, Burbot, Iowa Darter, Johnny Darter, Mooneye, Northern Pike, Rock Bass, and Yellow Perch (Table 3.1). Baited minnow traps and gillnets were utilized, with minnow traps being the most effective capture gear (Appendix B; Tables B1-4, B1-5, B1-8, and B1-9). A greater species diversity was captured in the 2023 field investigations, likely because of multi-season sampling. Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for DC-03 represents a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Metabarcoding analysis identified DNA from 19 species in water samples collected from DC-03 during spring, summer, and fall sampling. Species DNA included, Blacknose Shiner, Burbot, Central Mudminnow, Finescale Dace, Golden Shiner, Iowa Darter, Johnny Darter, Mimic Shiner, Mooneye, Northern Pearl Dace, Northern Pike, Rock Bass, Sauger, sculpin species, Shorthead Redhorse, Spottail Shiner, Walleye, White Sucker, and Yellow Perch. Of these, sculpin could only be identified to genus. The *Cottus* species in this sample location are most likely the Mottled and Slimy sculpins.

3.2.3.3 FISH LENGTH FREQUENCY AND AGE

Seven Northern Pike and four Yellow Perch were captured from DC-03 and meristic data was used to generate length frequency histograms. Of these, three Northern Pike was submitted for age assessment in 2022 and 2023. Fish age results are displayed in Appendix B (Table B2-1 and B2-2) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 and B1-2).

- Northern Pike ranged from 113 to 350 mm TLEN. The age of the Northern Pike submitted in 2022 for age assessment was one year old at 350 mm TLEN. Two Northern Pike were submitted for age assessment in 2023 and were less than one year at 235 mm TLEN. Of the seven Northern Pike captured, six were less than 350 mm and presumed to be YOY.
- Yellow Perch from DC-02 ranged from 10 to 61 mm TLEN. No Yellow Perch samples were submitted for age analysis.

3.2.3.4 FISH TISSUE

A single Northern Pike tissue sample was submitted for analysis from DC-03 in 2022 and two Northern Pike samples were submitted in 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21). Total mercury concentrations ranged from 0.40 to 0.11 mg/kg. All samples were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg).

- The total methylmercury concentrations ranged from 0.060 to 0.207 mg/kg, with all samples greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- Selenium concentration in the tissue samples ranged from 0.69 to 1.13 mg/kg and was less than the FEQG for whole body samples (6.7 mg/kg).

Regressions of total mercury and methylmercury against Northern Pike and Yellow Perch TLEN are presented in Appendix C (Figures C2-1 to C2-14). These plots are inclusive of all Dixie Creek sampling locations to increase sample size. The plots do not show a relationship between total length and total mercury or methylmercury concentrations.

3.2.3.5 WATER QUALITY

In-situ measurements were collected during the summer 2022 and the spring, summer, and fall 2023 field investigations. Water temperature measured ranged from 14.6°C to 24.0°C, DO from 4.62 to 6.51 mg/L, and pH from 6.6 to 7.17 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG except for two DO measurements in 2023 (summer and fall) measuring below the CWQG (5.5 mg/L).

3.2.3.6 LOWER TROPHIC AND PRIMARY PRODUCTIVITY

The 2024 periphyton sampling results were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.

3.2.3.7 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 2.5 m at DC-03 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Grain size consisted predominantly of silt and fine sand, with smaller amounts of clay.
- TOC was higher than the PSQG LEL at all stations.

- DC-03-S03 measured greater than the PSQG LEL for chromium, copper, manganese, and nickel concentrations in 2022.

3.2.3.8 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from DC-03 during the fall 2022 and 2023 field programs from total water depths between 1.0 and 2.0 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. Results of statistical analyses involving Dixie Creek sampling locations are also provided in Appendix D (Tables D2-3 and D2-5). A summary of these findings is provided below.

- In 2022, DC-03 was proportionally high in EPT taxa, despite having lower total numbers and TID than other Dixie Creek locations. It had relatively high taxa richness, tying for the highest number of species in a replicate station (19) with WC-4, but few individuals off all species.
- Midges (Chironomids) dominated the community, despite having lower total numbers than other Dixie Creek locations, since the multitude of other species were few in numbers. Chironomid taxa averaged 38% of the total numbers across replicate stations. EPT taxa were present in all replicate stations, averaging approximately 36%, the second highest of all locations, and were as high as 48% in replicate station B3.
- In 2023, similar to DC-02, the community differed from the year previous. No EPT taxa were recorded at DC-03 and Chironomids ranged from 0% to 94% of total count in the replicates. This is likely due to the lower total organisms in each sample, which ranged from 8 to 64, while in 2022 numbers ranged from 92 to 333 individuals.

Statistical analysis of the Dixie Creek BICs indicates that in 2022 DC-03 had lower TID than DC-01, higher richness than DC-04, higher evenness than DC-02, higher diversity than DC-02 and DC-04, lower percent Chironomids than DC-02, and higher percent EPT than all other Dixie Creek locations. In 2023, DC-03 had lower TID, richness, evenness, and percent EPT than DC-01. The Bray Curtis index found DC-03 to be different from DC-02 and DC-04 in 2022, and DC-01 in 2023.

3.2.4 DIXIE CREEK-04

3.2.4.1 FISH HABITAT

Dixie Creek-04 (DC-04) is a moderate flowing, wide riverine section of creek with habitat type H characteristics (Table A1-1A). The location is upstream of the WB-6 outlet but downstream of the WC-7 inflow and consists of a broad floodplain dominated by alder with grasses and sedges along the riparian area (Figure 2-1). The substrate consists mostly of soft fine-grained sediments with occasional boulder, and emergent macrophytes such as Broadleaf Arrowhead within the margins.

Fish spawning habitat surveys were conducted in Dixie Creek during the 2024 field investigations, identifying two potential areas of Lake Whitefish and Walleye spawning. One area resides several kilometres upstream of DC-04. Fish were not observed to be spawning in spring 2024.

3.2.4.2 FISH COMMUNITY

A total of 35 fish were caught from DC-04 during the 2022 and 2023 field investigations, including Northern Pike, Rock Bass, Walleye, White Sucker, and Yellow Perch (Table 3.1). Baited minnow traps and gillnets were utilized with gill nets being the most effective capture gear (Appendix B; Tables B1-4 to B1-5, and B1-8 to B1-9). Gillnets included Riverine Index Nets (RIN) and larger mesh sized nets. Summer (July and August) water temperatures measurements and captured fish species indicate the thermal guild classification for DC-04 represents a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Metabarcoding analysis identified DNA from 28 species in water samples collected from DC-04 during spring, summer, and fall sampling. Species DNA included, Blacknose Shiner, Burbot, Central Mudminnow, Common Shiner, Creek Chub, Emerald Shiner, Fathead Minnow, Finescale Dace, Golden Shiner, Green Sunfish, Iowa Darter, Johnny Darter, Lake Chub, Lake Whitefish, Mimic Shiner, Mooneye,

Northern Pearl Dace, Northern Pike, Northern Redbelly Dace, Rock Bass, sculpin species, Shorthead Redhorse, Silver Redhorse, Smallmouth Bass, Spottail Shiner, Trout-perch, Walleye, White Sucker, and Yellow Perch. Of these, sculpin could only be identified to genus. The *Cottus* species in this sample location are most likely the Mottled and Slimy sculpins.

The most species DNA was collected at DC-04 compared to all sampling locations other than the Chukuni River (maximum 29), suggesting most, if not all, species from the Chukuni River will utilize habitat within the lower end of Dixie Creek.

3.2.4.3 FISH LENGTH FREQUENCY AND AGE

A total of 17 Northern Pike and 10 Yellow Perch were captured from DC-04 in 2022 and 2023 and used to generate length frequency histograms. 1 White Sucker and 10 Northern Pike were submitted for age assessment in 2022, and 2 Northern Pike and 3 Yellow Perch were submitted in 2023. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8). Northern Pike ranged from 66 to 643 mm TLEN, with aged individuals ranging from one to three years of age. The single White Sucker was three years of age at 200 mm TLEN. Yellow Perch ranged from 142 to 167 mm TLEN and measured two years of age. Generally, Northern Pike captured in 2022 and 2023 were larger (TLEN) at DC-04 than DC-03.

3.2.4.4 FISH TISSUE

A total of 12 Northern Pike, 1 White Sucker, and 3 Yellow Perch tissue samples were submitted for analysis from DC-04 in 2023 and 2024. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury concentrations in tissue ranged from 0.21 to 0.81 mg/kg, 0.10 mg/kg, and 0.11 to 0.19 mg/kg in Northern Pike, White Sucker, and Yellow Perch, respectively and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), with one exceedance for those developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg).
- Methylmercury concentrations in tissue ranged from 0.102 to 0.524 mg/kg, 0.131 mg/kg, and 0.066 to 0.106 mg/kg in Northern Pike, White Sucker, and Yellow Perch, respectively and all values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- Selenium concentrations in tissue samples ranged from 0.47 to 0.74 mg/kg, 0.81 mg/kg, 0.72 to 0.93 mg/kg and in Northern Pike, White Sucker, and Yellow Perch, respectively and were less than the FEQG for whole body samples (6.7 mg/kg).

Regressions of total mercury and methylmercury against Northern Pike and Yellow Perch TLEN are presented in Appendix C (Figures C2-1 to C2-14). These plots are inclusive of all Dixie Creek sampling locations to increase sample size. The plots do not show a relationship between total length and total mercury or methylmercury concentrations.

3.2.4.5 WATER QUALITY

In-situ measurements were collected in the spring and fall 2022 and spring, summer, and fall 2023 field investigations. Water quality parameters remained consistent between sampling years. Temperature ranged from 5.3°C to 22.4°C, DO from 6.38 to 13.56 mg/L, and pH from 6.17 to 7.29 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG, except for the pH value in fall 2023 (6.35).

3.2.4.6 LOWER TROPHIC AND PRIMARY PRODUCTIVITY

The 2024 periphyton sampling results were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.

3.2.4.7 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 2.2 m at DC-04 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D: Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Grain size samples had large percentages of silt with some clay and fine sand.
- TOC was higher than the PSQG LEL at all stations.
- Background concentrations were greater than the PSQG LEL were noted for chromium, copper and nickel.

3.2.4.8 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from DC-04 during the fall 2022 and 2023 field programs from total water depths between 1.8 and 3.0 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-4), including estimations of benthic invertebrate community descriptors. Results of statistical analyses involving Dixie Creek sampling locations are also provided in Appendix D (Tables D2-3 and D2-6). A summary of these findings is provided below.

- In 2022, DC-04 had the lowest BIC metrics of all Dixie Creek locations, from total abundance to percent EPT. The small community sampled was high in Chironomid taxa and there was comparatively low diversity, however due to the even higher abundance of Chironomids in the DC-02 sample the Simpson's Diversity index was lower. The primary difference between DC-04 and upgradient locations is the drop in taxa richness, going from 12 to 14 down to 6. As noted in the DC-01 discussion, this may be due to the higher percentage of fine grain (silt/clay) sediment noted in the DC-04 samples in this slower, deeper, part of the creek.
- Midges (Chironomids) dominated the benthic community, averaging 52% of the total numbers across replicate stations. EPT taxa were present in two replicate stations, at 3% and 16% for replicate stations B1 and B2, respectively.
- In 2023, the percentage of Chironomids dropped to an average of 7% across replicates, and percent of EPT taxa dropped to approximately 1%. Taxa richness stayed the same at 6, while DC-02 and DC-03 (both upstream) dropped to 4 and 2, respectively. Total abundance remained consistent between years. Phantom midges (*Chaoboridae*) represented 50% of the BIC, followed by clams (*Sphaeriidae*) at 25%.
- Overall, BIC total abundance was much lower at Dixie Creek locations in 2023, except for DC-04, compared to the previous year.

Statistical analysis of the Dixie Creek BIC descriptors indicated that in 2022 DC-04 had lower TID than DC-01, lower richness than DC-01 and DC-03, higher evenness than DC-02, lower diversity than DC-03, and lower percent EPT than DC-03. In 2023, DC-04 had lower richness than DC-01. The Bray Curtis index found DC-04 to differ from DC-01 and DC-03 in 2022, and DC-01 and DC-02 in 2023.

3.3 CHUKUNI RIVER

3.3.1 CHUKUNI RIVER-REF

3.3.1.1 FISH HABITAT

The Chukuni River-REF (CR-REF) location is north of the disturbance area, upstream of several falls. It represents habitat type I, with deep cross channel sections, surrounded by mixed coniferous and deciduous forest and emergent vegetation (grasses) lining the margins (Table A1-1A). Water level was observed to be highly variable, fluctuating up to two meters in height between daily and seasonal

sampling, controlled by upstream dams. Near-shore areas resemble low tide marine zones during times of low flow with 10 to 15 m of exposed shoreline below bankfull, here the sediment is primarily consisting of sand/silt and occasional larger cobble and boulder pieces. Large boulders are frequent throughout the channel. Channel width at this location is approximately 100 to 150 m, with strong current.

The Chukuni River has been identified as spawning habitat for Lake Whitefish, Northern Pike, Walleye, cyprinid/shiner species, and others. The nearshore littoral zone provides abundant cover and spawning habitat for species such as Northern Pike and shiners, with submergent and emergent vegetation, varying substrate (silt to boulder size) and slope. Spawning locations for species like Lake Whitefish and Walleye are limited to in-stream locations with higher flow / DO and larger gravel, cobble, and boulder substrate. The only two areas identified in the CR-REF reach occur immediately upstream of Highway 105 at a series of rapids extending approximately two river kilometres upstream and on the downstream end of Snowshoe Rapids dam.

3.3.1.2 FISH COMMUNITY

A total of 1,126 individuals from 10 species were captured from CR-REF during the 2022, 2023, and 2024 field investigations, including Blacknose Shiner, Burbot, Emerald Shiner, Johnny Darter, Northern Pike, Rock Bass, Sauger, Spottail Shiner, Walleye, and Yellow Perch (Table 3.1 and Appendix B; Tables B1-1 to B1-10). Baited minnow traps, gillnets seine nets, and boat electrofishing were utilized, with seine netting being the most effective capture gear. Emerald Shiner represented the greatest proportion of species captured (43%). A higher species diversity was observed in 2023, likely as a result of multi-season sampling. Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for CR-REF represents a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010). Boat electrofishing was conducted along the shoreline margins during the summer in 2024 which also produced a high species diversity within CR-REF.

Metabarcoding analysis identified DNA from 27 species in water samples collected from CR-REF during spring, summer, and fall 2023 sampling. Species DNA included, Blacknose Shiner, Burbot, Central Mudminnow, Creek Chub, Emerald Shiner, Fathead Minnow, Finescale Dace, Golden Shiner, Iowa Darter, Johnny Darter, Lake Chub, Lake Whitefish, Mimic Shiner, Mooneye, Northern Pearl Dace, Northern Pike, riffle dace species, Rock Bass, sculpin species, Shorthead Redhorse, Silver Redhorse, Smallmouth Bass, Spottail Shiner, Trout-perch, Walleye, White Sucker, and Yellow Perch. Of these, sculpin and riffle dace species could only be identified to genus. The *Cottus* species in this sample location are most likely the Mottled and Slimy sculpins, while the *Rhynchthys* species would include the Eastern Blacknose Dace or Longnose Dace.

Of all watercourses, the most species DNA was collected within the Chukuni River. Given the connectivity and size of the system, this is expected when compared to other Project locations.

3.3.1.3 FISH LENGTH FREQUENCY AND AGE

A total of 7 Northern Pike, 11 Walleye, 1 White Sucker, and 38 Yellow Perch were captured from CR-REF in 2022 to 2024 and used to generate length frequency figures. Of these, 6 Northern Pike, 6 Walleye, 1 White Sucker, and 11 Yellow Perch, were submitted for age assessments. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and fish length frequency figures are presented in Appendix B (Figures B1-1 to B1-8).

Northern Pike TLENs ranged from 360 to 668 mm and assessed ages were one to five years. Walleye TLENs ranged from 320 to 435 mm and assessed ages ranged from four to eight. The White Sucker measured 420 mm TLEN and was five years. Yellow Perch ranged from 240 to 340 mm TLEN and assessed ages were three to six years.

3.3.1.4 FISH TISSUE

A total of 6 Northern Pike, 6 Walleye, 1 White Sucker, and 11 Yellow Perch tissue samples were submitted for analysis from CR-REF from 2022 to 2024. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

Northern Pike total mercury concentrations ranged from 0.17 to 0.44 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.145 to 0.401 mg/kg. All values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentration in tissue samples ranged from 0.76 to 0.98 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

Walleye total mercury concentrations ranged from 0.26 to 0.48 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.220 to 0.446 mg/kg. All values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentration in tissue samples ranged from 0.89 to 1.08 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

White Sucker total mercury and selenium concentrations were 0.08 mg/kg and 0.98 mg/kg, respectively and were less than the Ontario, Federal, and Health Canada consumption guidelines. The methylmercury concentration was 0.078 mg/kg which is greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.

Yellow Perch total mercury concentrations ranged from 0.03 to 0.24 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.019 to 0.204 mg/kg. Most values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentration in tissue samples ranged from 1.39 to 1.89 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

Data trends between total mercury concentration, total methylmercury concentration, and TLEN in Northern Pike, Walleye, White Sucker, and Yellow Perch were analyzed inclusive of all Chukuni River sampling locations to increase sample size and are displayed in Appendix C (Figures C2-1 to C2-14). Graphical analysis shows no relationship between Northern Pike and Yellow Perch TLEN and total mercury or methylmercury concentrations as all samples occupied a narrow TLEN range and displayed similar metal concentrations. Walleye and White Sucker tissue samples showed weak positive relationship between TLEN and total mercury and methylmercury concentrations.

3.3.1.5 WATER QUALITY

In-situ measurements were collected in the spring and fall 2022 and spring, summer, and fall 2023 field investigations. Temperature values ranged from 5.8°C to 23.3°C, DO values ranged from 8.7 to 12.37 mg/L, and pH values measured 6.07 to 8.32 (Appendix A; Tables A1-2A to A1-2B). The fall 2022 and 2023 pH values (6.44 and 6.07, respectively) were below the PWQO and CWQG.

3.3.1.6 LOWER TROPHIC AND PRIMARY PRODUCTIVITY

Samples of periphyton from natural substrate were collected from CR-REF and analysed for stable isotopes ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$). Results of laboratory analyses are summarized in Appendix A (Table A2-1).

Stable isotope results from CR-REF measured -14.4, -0.56 and 8.09 for $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ and C:N, respectively. CR-REF showed the highest $\delta^{13}\text{C}$ concentration of all samples collected. Increased periphyton $\delta^{13}\text{C}$ is often associated with increased river size due to channel widening, light availability, and nutrient loading (Ishikawa et al. 2012) which matches the CR-REF sample locations characteristics.

The 2024 periphyton sampling results were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.

3.3.1.7 SEDIMENT QUALITY

Sediment samples were collected from five stations with a maximum water depth of 7.05 m at CR-REF during the fall 2022, 2023, and 2024 field investigations. Laboratory chemical analyses of sediment

quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6. Grain size comparisons between Chukuni River locations are presented in Tables D1-7 to D1-8.

- Samples contained high amounts of silt, clay, and fine sand.
- TOC was higher than the PSQG LEL at most stations.
- Background concentrations greater than the PSQG LEL and CSQG PEL were noted for arsenic, chromium, copper, and nickel.
- In 2024, Background concentrations greater than the PSQG LEL were only noted for arsenic and nickel.
- Grain size analysis between Chukuni River locations in 2023 indicated that CR-REF had higher percentages of silt and clay (p values of less than 0.001 and 0.006), and lower fine sand ($p = 0.002$).
- Given higher percentages of silt can increase total metal concentrations, the CR-REF location was moved upstream in 2024 to provide an adequate reference for the discharge location.
- Grain size analysis between Chukuni River locations in 2024 (after the reference location was moved) found no significant differences.

3.3.1.8 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from CR-REF during the fall 2022, 2023, and 2024 field programs from total water depths between 3.85 and 7.05 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. Results of statistical analyses involving Chukuni River sampling locations are also provided in Appendix D (Tables D2-5, D2-7, and D2-8). A summary of these findings is provided below.

- In 2022, CR-REF, the upstream Chukuni River reference location, had the highest overall percentage of EPT taxa of any location (53%) and overall had high BIC metrics. It is comparable with the other Chukuni River locations, although there are discernable changes downgradient, with TID, percent EPT, evenness, and diversity being statistically different from the downstream (CR-DS) location. Of these, TID, evenness, and diversity are all higher downstream. Furthermore, CR-REF is higher in percent EPT than CR-FDP.
- In 2023, percent EPT was similar to CR-FDP at 13%, but percent Chironomids rose to an average of 48% of the total numbers across replicates from 21% the year previous. Overall, total abundance and richness decreased from 2022. Furthermore, no statistical differences were observed between Chukuni River sample locations in 2023, where statistical differences were present in 2022.
- In 2024, the BIC was similar to 2023, however percent Chironomids dropped to 36%. This increased taxa richness and diversity overall. CR-REF was significantly higher than CR-DS in density, richness, evenness and percent EPT in 2024.
- Clams (*Sphaeriidae*), mayflies (*Ephemeroidea*), phantom midges (*Chaoboridae*), and midges (*Chironomidae*) were the families present in the highest abundance in all years. In 2024, worms (*Naididae*) were present in high numbers as well.
- The Bray-Curtis index found that in 2022 CR-REF was statistically different from both CR-DS and CR-FDP; in 2023 all three sampling locations were found to be similar.

3.3.2 CHUKUNI RIVER-FDP

3.3.2.1 FISH HABITAT

Chukuni River-FDP (CR-FDP) is located directly downstream of a hydro easement and Highway 105. The location represents habitat type I, with deep channel cross sections, surrounded by mixed coniferous and deciduous forest (Table A1-1A). Nearshore areas along river margins have steep banks, full of submergent and emergent vegetation, and LWD, providing cover for both small-body and large-bodied

fish. The substrate consists of introduced cobble and rock debris within the margins of the crossing and high amounts of fine sediment (clay/silt/fine grained sand) throughout the rest of the reach. This section of the Chukuni River has lower flow and an approximate average channel width of 100 m.

The Chukuni River has been identified as spawning habitat for Lake Whitefish, Northern Pike, Walleye, cyprinid/shiner species, and others. The nearshore littoral zone provides abundant cover and spawning habitat for species such as Northern Pike and shiners, with submergent and emergent vegetation, varying substrate (silt to boulder size) and slope. Spawning locations for species like Lake Whitefish and Walleye are limited to in-stream locations with higher flow / DO and larger gravel, cobble, and boulder substrate. No areas have been identified in the CR-FDP reach for Lake Whitefish or Walleye spawning.

3.3.2.2 BATHYMETRY

Bathymetry was conducted at CR-FDP during the fall 2022 field program. A one km reach of river was surveyed downstream of the hydro easement and consisted of a shallow water littoral zone margins and a deep U-shaped basin. Maximum recorded water depth was 13.85 metres (m), with an average water depth of 4.66 m throughout the reach (Figure A1-2).

3.3.2.3 FISH COMMUNITY

A total of 2,685 fish from 12 species were captured from CR-FDP during the 2022, 2023, and 2024 field investigations, including Blacknose Shiner, Emerald Shiner, Lake Whitefish, Mooneye, Northern Pike, Rock Bass, Shorthead Redhorse, Silver Redhorse, Smallmouth Bass, Spottail Shiner, Walleye, and Yellow Perch (Table 3.1 and Appendix B; Tables B1-1 to B1-10). Baited minnow traps, seine nets, boat electrofishing, and gillnets were utilized. Boat electrofishing along the shallow, weedy margins was the most effective capture gear, yielding mostly Yellow Perch and represented the greatest proportion of species captured in 2024 (97%). CR-FDP showed the highest species richness of all Chukuni River sampling locations. Summer (July and August) water temperature measurements and captured fish species indicate the thermal guild classification for CR-FDP represents a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010). CR-

Metabarcoding analysis identified DNA from 29 species in water samples collected from CR-FDP during spring, summer, and fall 2023 sampling. Species DNA included, Blacknose Shiner, Burbot, Central Mudminnow, Common Shiner, Creek Chub, Emerald Shiner, Fathead Minnow, Finescale Dace, Golden Shiner, Iowa Darter, Johnny Darter, Lake Chub, Lake Whitefish, Mimic Shiner, Mooneye, Northern Pearl Dace, Northern Pike, riffle dace species, Rock Bass, sculpin species, Shorthead Redhorse, Silver Redhorse, Smallmouth Bass, Spottail Shiner, Trout-perch, Walleye, White Sucker, and Yellow Perch. Of these, sculpin and riffle dace species could only be identified to genus. The *Cottus* species in this sample location are most likely the Mottled and Slimy sculpins, while the *Rhinichthys* species would include the Eastern Blacknose Dace or Longnose Dace.

Of all watercourses, the most species DNA was collected within the Chukuni River. Given the connectivity and size of the system, this is expected when compared to other Project locations.

3.3.2.4 FISH LENGTH FREQUENCY AND AGE

Two Lake Whitefish, nine Northern Pike, one Silver Redhorse, eight Walleye, 11 White Sucker and 17 Yellow Perch were captured at CR-FDP from 2022 to 2024 and submitted for aging to generate length frequency figures. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B18).

Both Lake Whitefish had a TLENS of 420 mm with ages ranging from 6 to 10, Northern Pike TLENS ranged from 360 to 620 mm with assessed ages ranging from two to three years old. Walleye TLENS ranged from 260 to 513 mm with assessed ages ranging from two to seven years old. White Sucker TLENS ranged from 280 to 510 mm with assessed ages ranging from two to 10 years old. Yellow Perch TLENS ranged from 48 to 272 mm with assessed ages ranging from zero to five years old.

3.3.2.5 FISH TISSUE

Fish submitted for tissue analysis from CR-FDP included two Lake Whitefish, nine Northern Pike, one Silver Redhorse, eight Walleye, 11 White Sucker, and seven Yellow Perch from 2022 to 2024. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

Lake Whitefish total mercury concentrations were 0.06 and 0.10 mg/kg for 2022 and 2023, respectively. Both samples were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg). One sample was greater than the Ontario guideline developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations were 0.080 and 0.054 mg/kg for Lake Whitefish in 2022 and 2023, respectively. Both samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentrations in 2022 and 2023 tissue samples were 1.50 and 1.36 mg/kg for Lake Whitefish, respectively, and were less than the FEQG for whole body samples (6.7 mg/kg).

Northern Pike total mercury concentrations ranged from 0.12 to 0.61 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg). One sample was greater than the Ontario guideline developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.134 to 0.406 mg/kg. All samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentrations in tissue samples ranged from 0.65 to 1.04 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

Walleye total mercury concentrations ranged from 0.14 to 0.86 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg). Three samples were greater than the Ontario guideline developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.078 to 0.426 mg/kg. All samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentrations in tissue samples ranged from 0.65 to 0.77 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

White Sucker total mercury concentrations ranged from 0.05 to 0.32 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg) and were also less than the Ontario guideline developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.025 to 0.269 mg/kg. Five samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentrations in tissue samples ranged from 0.16 to 0.26 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

Yellow Perch total mercury concentrations ranged from 0.09 to 0.25 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg) and were also less than the Ontario guideline developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.041 to 0.106 mg/kg. All samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentrations in tissue samples ranged from 0.20 to 0.34 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

Data trends between total mercury concentration, total methylmercury concentration, and TLEN in Northern Pike, Walleye, White Sucker and Yellow Perch were analyzed inclusive of all Chukuni River sample locations to increase sample size and are displayed in Appendix C (Figures C2-1 to C2-14). Graphical analysis shows no relationship between Northern Pike and Yellow Perch TLEN and total

mercury or methylmercury concentrations as all samples occupied a narrow TLEN range and displayed similar metal concentrations. Walleye and White Sucker tissue samples showed weak positive relationship between TLEN and total mercury and methylmercury concentrations.

3.3.2.6 WATER QUALITY

In-situ measurements were collected in the spring and fall 2022 and spring, summer and fall 2023 field investigations. Water quality parameters remained consistent across sampling years. Water temperature ranged from 6.2°C and 23.2°C, DO ranged from 8.8 and 11.38 mg/L, and pH ranged from 6.74 and 7.9 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG in both years.

3.3.2.7 LOWER TROPHIC AND PRIMARY PRODUCTIVITY

Samples of periphyton from natural substrate were collected from CR-FDP and analysed for stable isotopes ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$). Results of laboratory analyses are summarized in Appendix A (Table A2-1).

Stable isotope results from CR-FDP measured -18.7, 0.7 and 10.7 for $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ and C:N, respectively. CR-FDP showed the highest C:N ratio of all samples collected, suggesting less nitrogen than carbon is bioavailable to primary producers than CR-DS and CR-REF.

The 2024 periphyton sampling results were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.

3.3.2.8 SEDIMENT QUALITY

Sediment samples were collected from five stations with a maximum water depth of 13.4 m at CR-FDP during the fall 2022, 2023, and 2024 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6. Grain size comparisons between Chukuni River locations are presented in Tables D1-7 to D1-8.

- Samples contained high amounts of silt and fine sand.
- TOC was higher than the PSQG LEL at most stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic, chromium, copper, and nickel.

3.3.2.9 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from CR-FDP during the fall 2022, 2023, and 2024 field programs from total water depths between 5.6 and 13.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. Results of statistical analyses of Chukuni River sampling locations are also provided in Appendix D (Tables D2-5, D2-7, and D2-8). A summary of these findings is provided below.

- In 2022, CR-FDP had the highest average value of taxa richness among Chukuni River locations, averaging 14 species per replicate station.
- In 2023, CR-FDP had the lowest percent Chironomids, with the highest abundance, taxa richness, diversity, evenness, and percent EPT. Statistical differences between CR-FDP and the other sampling locations were not observed in 2023.
- In 2024, CR-FDP likewise had the lowest percent Chironomids of Chukuni River locations and had similarly strong BIC metrics to 2023.
- All other BIC metrics were similar to CR-REF and CR-DS with no statistical differences in 2022 and 2023. In 2024, CR-FDP was significantly higher in richness, evenness, and percent EPT than CR-DS.
- Clams (*Sphaeriidae*), mayflies (*Ephemeridae*), phantom midges (*Chaoboridae*), and midges (*Chironomids*) were the families with the highest abundance in all years. In 2024, worms (*Naididae*) were present in high numbers as well.

3.3.3 CHUKUNI RIVER-DS

3.3.3.1 FISH HABITAT

Chukuni River-DS (CR-DS) is the furthest downstream location in the Chukuni River, several hundred metres upstream of Pakwash Lake. CR-DS consists of habitat type I with deep channel cross sections, large, wide meander bends, and a deep thalweg surrounded by mixed coniferous and deciduous forest (Table A1-1A). Nearshore areas along river margins are full of submergent and emergent vegetation and LWD, providing cover for small-bodied fish. Substrate consists of high amounts of fine sediment (clay/silt/fine grained sand). This section of the Chukuni River has lower flow and an approximate average channel width of 100 m.

The Chukuni River has been identified as spawning habitat for Lake Whitefish, Northern Pike, Walleye, cyprinid/shiner species, and others. The nearshore littoral zone provides abundant cover and spawning habitat for species such as Northern Pike and shiners, with submergent and emergent vegetation, varying substrate (silt to boulder size) and slope. Spawning locations for species like Lake Whitefish and Walleye are limited to in-stream locations with higher flow / DO and larger gravel, cobble, and boulder substrate. No areas have been identified in the CR-DS reach for Lake Whitefish or Walleye spawning.

3.3.3.2 FISH COMMUNITY

A total of 1,977 fish from 11 species were captured at CR-DS during the 2022 and 2023 field investigations, including Emerald Shiner, Lake Whitefish, Mooneye, Northern Pike, Shorthead Redhorse, Silver Redhorse, Spottail Shiner, Walleye, White Sucker and Yellow Perch (Table 3.1). Baited minnow traps, seine nets, boat electrofishing and gill nets were utilized. Boat electrofishing the shallow and heavily vegetated areas along the margins was the most effective capture gear during the summer 2024. Adult and YOY Yellow Perch dominated the greatest proportion of species captured at the CR-DS reach in the summer 2024 (98%) (Appendix B; Tables B1-1 to B1-10). Summer (July and August) water temperature measurements take in 2022 and 2023 with captured fish species indicate the thermal guild classification for CR-DS represents a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Metabarcoding analysis identified DNA from 25 species in water samples collected from CR-DS during spring, summer, and fall 2023 sampling. Species DNA included, Blacknose Shiner, Burbot, Central Mudminnow, Emerald Shiner, Fathead Minnow, Green Sunfish, Iowa Darter, Johnny Darter, Lake Chub, Lake Whitefish, Mimic Shiner, Mooneye, Northern Pearl Dace, Northern Pike, riffle dace species, Rock Bass, sculpin species, Shorthead Redhorse, Silver Redhorse, Smallmouth Bass, Spottail Shiner, Trout-perch, Walleye, White Sucker, and Yellow Perch (Appendix B). Of these, sculpin and riffle dace species could only be identified to genus. The *Cottus* species in this sample location are most likely the Mottled and Slimy sculpins, while the *Rhinichthys* species would include the Eastern Blacknose Dace or Longnose Dace.

Of all watercourses, the most species DNA was collected within the Chukuni River. Given the connectivity and size of the system, this is expected when compared to other Project locations.

3.3.3.3 FISH LENGTH FREQUENCY AND AGE

A total of 8 Northern Pike, 12 Walleye, 13 White Sucker and 12 Yellow Perch were captured at CR-DS from 2022 to 2024 and submitted for aging to generate length frequency figures. Fish age results are displayed in Appendix B (Tables B1-1 and B1-3) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8).

Northern Pike TLENs ranged from 415 to 583 mm and assessed ages ranged from one to nine years. Walleye TLENs ranged from 300 to 616 mm and assessed ages ranged from three to 11 years. White Sucker TLENs ranged from 272 to 530 mm and assessed ages ranged from one to six years. Yellow Perch TLENs ranged from 211 to 352 mm and assessed ages ranged from three to five years.

3.3.3.4 FISH TISSUE

A total of 8 Northern Pike, 12 Walleye, 13 White Sucker and 12 Yellow Perch tissue samples were submitted for fish tissue metal analysis from CR-DS from 2022 to 2024. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

Northern Pike total mercury concentrations ranged from 0.20 to 0.67 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), with one individual greater than the guidelines developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg). Total methylmercury concentrations ranged from 0.259 to 0.507 mg/kg and all values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of consumers of aquatic biota. Selenium concentrations in tissue samples ranged from 0.70 to 0.80 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

Walleye total mercury concentrations ranged from 0.24 to 0.80 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg). Three samples were greater than the Ontario consumption guideline developed for women of child-bearing age and children (0.5 mg/kg wwt), and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.118 to 0.525 mg/kg and all values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentrations in tissue samples ranged from 0.76 to 1.13 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

White Sucker total mercury concentrations ranged from 0.07 to 0.25 mg/kg wwt and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.045 to 0.197 mg/kg and all values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentrations in tissue samples ranged from 0.75 to 1.64 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

Yellow Perch total mercury concentrations ranged from 0.09 to 0.30 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations ranged from 0.046 to 0.333 mg/kg and all values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentrations in tissue samples ranged from 0.97 to 1.28 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

Data trends between total mercury concentration, total methylmercury concentration, and TLEN in Northern Pike, Walleye, White Sucker and Yellow Perch were analyzed inclusive of all Chukuni River sample locations to increase sample size and are displayed in Appendix C (Figures C2-1 to C2-14). Graphical analysis shows no relationship between Northern Pike and Yellow Perch TLEN and total mercury or methylmercury concentrations as all samples occupied a narrow TLEN range and displayed similar metal concentrations. Walleye and White Sucker tissue samples showed weak positive relationship between TLEN and total mercury and methylmercury concentrations.

3.3.3.5 WATER QUALITY

In-situ measurements were collected in the spring and fall 2022 and spring, summer and fall 2023 field investigations. Water temperature ranged from 6.5°C and 23.5°C, DO ranged from 7.62 to 14.0 mg/L, and pH ranged from 6.70 and 7.69 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG.

3.3.3.6 LOWER TROPHIC AND PRIMARY PRODUCTIVITY

PERIPHYTON

Samples of periphyton from natural substrate were collected from CR-DS and analysed for stable isotopes ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$). Results of laboratory analyses are summarized in Appendix A (Table A2-1).

Stable isotope results from CR-DS measured -19.3, 0.2 and 8.9 for $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ and C:N, respectively. CR-DS showed the lowest $\delta^{13}\text{C}$ values of all Chukuni River sample locations. Lower $\delta^{13}\text{C}$ can be associated with increased methylmercury (MeHg) concentrations (Swinton et al. 2022), however the MeHg concentrations in large-body fish tissue did not reflect this.

The 2024 periphyton sampling results were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.

3.3.3.7 SEDIMENT QUALITY

Sediment samples were collected from five stations with a maximum water depth of 7.8 m at CR-DS during the fall 2022, 2023, and 2024 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6. Grain size comparisons between Chukuni River locations are presented in Tables D1-7 to D1-8.

- Samples contained high amounts of silt, fine, and coarse sand.
- TOC was higher than the PSQG LEL at most stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic and nickel.
- Grain size analysis between Chukuni River locations in 2023 indicated that CR-DS had higher percentages of coarse sand ($p = \text{less than } 0.001$). Given the downstream location is within a section of the river with wider meander patterns, and likely lower flow, it is expected that more deposition of coarse material will occur.
- Repeated grain size analysis in 2024 with a new reference location did not find any significant differences between CR-DS and the other Chukuni River locations.

3.3.3.8 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from CR-DS during the fall 2022, 2023, and 2024 field programs from total water depths between 5.0 and 7.8 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. Results of statistical analyses involving Chukuni River sampling locations are also provided in Appendix D (Tables D2-5, D2-7, and D2-8). A summary of these findings is provided below.

- In 2022, CR-DS had the highest diversity and evenness of the Chukuni River locations, being statistically higher than CR-REF.
- In 2023, the percentage of EPT taxa in samples decreased from 19% to 3%, while the percentage of Chironomids increased from 32% to 55%. Other metrics remained similar between years, and no statistical differences between Chukuni River sampling locations were observed in 2023.
- In 2024, CR-DS had the lowest richness (average 5.2 taxa) of all years, which likely caused the poor BIC scores. Abundance and density were similar to 2023, however no EPT taxa were collected.
- All other BIC metrics were statistically similar to CR-REF and CR-FDP in 2022 and 2023. In 2024, CR-DS was significantly lower in density, richness, evenness, and percent EPT than both CR-REF and CR-FDP.
- Clams (*Sphaeriidae*), mayflies (*Ephemeroidea*), phantom midges (*Chaoboridae*), and midges (*Chironomidae*) were the families with the highest abundance in both years, while in 2023 and 2024, worms (*Naididae*) were also present in high counts.

3.4 TROUTLAKE RIVER

3.4.1.1 FISH HABITAT

In spring 2024 the Troutlake River was assessed as a potential reference location to the Chukuni River, due to concerns on the current effluent final discharge point (CR-FDP) reference location (CR-REF). The Troutlake River is a moderately sized river flowing from Little Trout Lake south into Pakwash Lake, with wetted widths ranging from 100 to 500 m in the lower reaches upstream of Pakwash Lake. Approximately six kilometres upstream of Pakwash Lake in the Troutlake River system lies Bruce Lake, where Griffith mine, an iron mine operated until 1986, resides. Previous operation included a large berm blocking off the southwestern portion of Bruce Lake and other impacts to the waterbody as such the Troutriver River upstream of Bruce Lake was assessed for suitability as a reference location to the Chukuni River.

Upstream of Bruce Lake the widest wetted width is approximately 100 m with an approximate depth of 10 m center-channel, becoming shallower (3 to 6 m deep) in reaches farther upstream. The nearshore riparian is dominated by shrubs, willow, and alder species with a 20 to 30 m setback before the forest upland. Upland is primarily comprised of Black Spruce and Tamarack. Generally, the lower reaches of the Troutlake River resemble the Chukuni River at the CR-FDP location, however the Troutlake River is generally shallower and narrower than the Chukuni River.

3.4.1.2 SEDIMENT QUALITY

Sediment samples were collected from three locations, between one and five kilometers upstream of Bruce Lake (TR1, TR2, and TR3; Table 2-1) with a maximum water depth of 10 m during spring 2024. Laboratory chemical analyses of sediment quality are presented in Appendix D; Table D1-3 as well as grain size analyses in Tables D1-6.

- Samples contained high amounts of silt and clay with only trace amounts of other grain sizes.
- TOC was higher than the PSQG LEL at all locations.
- Background concentrations greater than the PSQG LEL, CSQG Interim Sediment Quality Guidelines (ISQG), and CSQG PEL were noted for cadmium, chromium, copper, iron, manganese, nickel, and zinc.

Due to the differing grain sizes from the Chukuni River and metal concentrations greater than the respective sediment quality guidelines, the Troutlake River is not a suitable reference area.

3.5 LAKES

3.5.1 GENESSEE LAKE

3.5.1.1 FISH HABITAT

Genessee Lake (GL) is a large, deep lake (greater than 10 m) consisting of habitat type C characteristics with multiple basins and embayment's (Table A1-1B, Figure 2-1). The east basin is deep (greater than 10 m) and consists mostly of exposed bedrock shorelines with boulders and mixed coniferous and deciduous forest. The west basin is comprised of gradual sloping shorelines with emergent grasses and shrubs merging into a mixed deciduous and coniferous forest. Most embayment's consist of shallow soft fine-grained sediments with submergent aquatic macrophytes (such as Coontail and Tape Grass) and emergent macrophytes consisting mostly of cattail.

3.5.1.2 BATHYMETRY

Bathymetry was conducted at Genessee Lake during the spring 2024 field program. The lake is oriented northwest (inlet) to southeast (outlet). It can be best described as a series of three large basins with

distinct characteristics. The northeast basin is wide and gently sloping from the shoreline to a maximum depth of 9 m in the southwest corner with uniform silt substrate. The central basin has the greatest depth of 11 m with two distinct deep holes and similar uniform substrate. The shorelines of these two basins are characterized by the exposed bedrock and boulder material with a short riparian area dictated primarily by lake levels. The southeast basin is distinct with its generally shallow depth (1 to 3 m average, 4 m maximum) and high amounts of submergent vegetation. The surrounding shoreline is primarily wetland with larger riparian areas (2 to 30 m) before the forest upland (Figure A1-3).

3.5.1.3 FISH COMMUNITY

A total of 970 fish from 15 species were captured from Genessee Lake during the 2022 and 2023 field programs, including Blackchin Shiner, Blacknose Shiner, Brook Stickleback, Cisco, Emerald Shiner, Golden Shiner, Iowa Darter, Johnny Darter, Mottled Sculpin, Northern Pike, Northern Redbelly Dace, Rock Bass, Spottail Shiner, Walleye and Yellow Perch (Table 3.1). Baited minnow traps, seine nets and gillnets were utilized, with the most effective capture gear being seine nets along shallow sandy shoreline margins. Spottail Shiner represented the greatest proportion of fish species caught with a total of 456 individuals in two hauls. In 2022, 23 of 31 Yellow Perch captured were YOY, indicating that spawning of this species likely occurs within the lake (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements in conjunction with the presence of fish species within the waterbody indicate the thermal guild classification for Genessee Lake is a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Metabarcoding analysis identified DNA from 24 species in water samples collected from Genessee Lake during spring, summer, and fall 2023 sampling. Species DNA included, Blacknose Shiner, Burbot, Common Shiner, Fathead Minnow, Finescale Dace, Golden Shiner, Iowa Darter, Johnny Darter, Lake Chub, Lake Whitefish, Mooneye, Northern Pearl Dace, Northern Pike, Northern Redbelly Dace, Rock Bass, Sauger, sculpin species, Shorthead Redhorse, Silver Redhorse, Spottail Shiner, Trout-perch, Walleye, White Sucker, and Yellow Perch. Of these, sculpin could only be identified to genus. The *Cottus* species in this sample location are most likely the Mottled and Slimy sculpins.

Of all waterbodies, the most species DNA was collected within Genessee Lake. Given the size of the lake, this is expected when compared to other Project locations.

3.5.1.4 FISH LENGTH FREQUENCY AND AGE

Meristic data from 17 Northern Pike and 79 Yellow Perch were obtained from captured individuals in Genessee Lake and used to generate length frequency histograms. Of these, 13 Northern Pike and 18 Yellow Perch were submitted for aging in 2022 and 2023. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-B8).

Northern Pike ranged from 234 to 935 mm TLEN, with half of the individuals (54%) between 400 to 650 mm. Ages of the 13 lethally sampled Northern Pike captured during fall varied from zero to seven years of age. The only YOY Northern Pike sent for aging had a TLEN of 234 mm, and individuals aged one year and older exceeded 400 mm TLEN (with a 415 mm minimum). Genessee Lake had the greatest TLEN distribution for Northern Pike among all locations, including the two largest individuals captured within the Project area (855 mm and 935 mm TLEN).

Yellow Perch ranged from 97 to 220 mm TLEN and assessed ages of lethally sampled Yellow Perch ranged from one to four years of age. The youngest aged Yellow Perch was one, with a maximum TLEN of 146 mm. Length frequency aging analysis indicates that 90% of captured Yellow Perch in Genessee Lake were likely YOY, suggesting Genessee Lake provides suitable habitat for the full life cycle stages of Yellow Perch.

3.5.1.5 FISH TISSUE

A total of 14 Northern Pike, 6 Walleye, 1 White Sucker and 18 Yellow Perch tissue samples were submitted for analysis from Genessee Lake from 2022 and 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww.

Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury concentrations in fish tissue ranged from 0.07 to 1.18 mg/kg, 0.24 to 0.51 mg/kg and 0.01 to 0.15 mg/kg for Northern Pike, Walleye, and Yellow Perch, respectively and all concentrations were less than the Ontario consumption guideline developed for the general population (1.8 mg/kg). Most samples were also less than the guideline for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg), except for two Northern Pike samples and one Walleye sample.
- Methylmercury concentrations ranged from 0.066 to 1.400 mg/kg, 0.152 to 0.379 and 0.029 to 0.156 mg/kg for Northern Pike, Walleye and Yellow Perch, respectively. All values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- Selenium concentration in tissue samples ranged from 0.34 to 1.03 mg/kg, 0.84 to 0.98 mg/kg and 0.36 to 1.47 mg/kg in Northern Pike, Walleye and Yellow Perch, respectively and all concentrations were less than the FEQG for whole body samples (6.7 mg/kg).

Total mercury and methylmercury concentrations at length are displayed in Appendix C (Figures C2-1 to C2-14). Northern Pike and Yellow Perch from Genessee Lake had increased total mercury and methylmercury with an increase TLEN. Indicating that larger Northern Pike and Yellow Perch have higher concentrations of total mercury and methylmercury in fish tissue. Regression plots for Walleye show most individuals sampled within Genessee Lake in 2022 were within a narrow range of TLENs and had similar corresponding tissue concentrations of total mercury and methylmercury.

3.5.1.6 WATER QUALITY

In-situ measurements were collected in the summer and fall 2022, and spring, summer and fall 2023 and 2024 field investigations. Water quality parameters remained consistent across all sampling years. Temperature ranged from 6.9°C to 23.7°C, DO ranged from 7.77 to 12.87 mg/L and pH ranged from 7.07 to 8.19 (Appendix A; Tables A1-2A and A1-2C). The DO and pH measurements met all PWQO and CWQG, except for the DO measurements taken from the fall sampling programs of 2022 and 2023.

Lake profiles were measured during summer and fall field programs in 2022 and spring, summer, and fall field programs in 2023, and the summer and fall programs in 2024 at Genessee Lake. The maximum recorded depth reached 11 m recorded in October 2022 (Appendix A; Figure A1-6). A thermocline was present during spring (June) 2023 at a depth of 3.5 m. Thermoclines were present during the summer (July) from 2022 to 2024 at depths ranging from 3.5 to 4.8 m. Fall (September) 2023 and 2024 thermoclines were present at depths 7.3 and 7.5 m, respectively. A temperature profile was conducted in October 2022, although a thermocline was not present at the time of survey, show by the temperature and DO measurements remaining consistent throughout the water column. DO concentrations met the CCME guideline for aquatic health (6.5 mg/L; CCME 1999) in October 2023 for water depths reaching up to 11 m as there was no thermocline present. Spring, summer, and fall water profiles from 2022 to 2024 were less than the guidelines at depths ranging from 5.0 to 7.5 m to lake substrate.

3.5.1.7 LOWER TROPHIC AND PRIMARY PRODUCTIVITY

Zooplankton samples were collected from Genessee Lake in October 2022, June, July, and September 2023, and June, July, and October 2024. Total biomass (ug/L), total density (#/L) and percent relative zooplankton density were analyzed graphically to determine trends (Appendix A; Tables A2-2 and A2-3, Figures A2-1 to A2-6). Ten orders of zooplankton were found, including *Bosminidae*, *Calanoida*, *Cyclopoida*, *Daphniidae*, *Diplostraca*, *Diptera*, *Flosculariaceae*, *Holopedidae*, *Ploima* and *Rotifera*. Biomass was highest in June 2023 (5182 ug/L). Relative zooplankton density was dominated by *Ploima* (93%) in fall 2022, and *Flosculariaceae* (48%) and *Ploima* (71%) for combined spring summer and fall sampling events in 2023 and 2024, respectively. Samples collected in 2023 and 2024 were evenly balanced between other orders including *Calanoida*, *Cyclopoida*, *Displostraca*, and *Holopedidae*.

3.5.1.8 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 8 m at Genessee Lake during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples contained high amounts of silt and fine sand with some coarse sand and clay.
- TOC was higher than the PSQG LEL at most stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic, chromium, copper, iron, manganese, and nickel.

3.5.1.9 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from GL during the fall 2022, 2023, and 2024 field programs from total water depths between 4.0 and 7.0 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-4), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- BIC metrics remained consistent between 2022 and 2023, with total abundance ranging from 266 to 300, richness ranging from 10 to 11, percent EPT approximately 4%, and percent Chironomids ranging from 22% to 28%. Midges (*Chironomidae*), phantom midges (*Chaoboridae*), and worms (*Tubificainae* and *Naididae*) dominated the BICs.
- Nearly all EPT taxa present among replicate stations were represented by the *Hexagenia* genus.
- In 2024, the community descriptors showed generally reduced values, with total abundance averaging 89 individuals, a richness of 4, no EPT taxa were collected; however, percent Chironomids increased to over 40%.

In 2022, differences between replicate stations in abundance and diversity were observed and are likely due to the substrate and depth of sample GL-B3. Substrate consisted of mostly fine sand over silt and a shallower depth likely resulted in changes to the benthic community. In 2023, this marked difference was not observed as all replicates remained relatively consistent across metrics.

It is uncertain why the 2024 community descriptors changed from the previous years; however it could be due to natural population fluctuations, or it may be attributed to lower overall water levels, as a dam at the lower end of the lake failed in spring 2024.

3.5.2 PAKWASH LAKE

3.5.2.1 FISH HABITAT

Pakwash Lake (PKL) is a large lake greater than 9,800 ha with a maximum measured depth of 17.4 m and average depth of 6.8 m (MNR 2024) consisting of habitat type C characteristics with multiple basins, islands, and embayment's (Table A1-1B, Figure 2-1). The Chukuni River confluence flows into a shallow (less than 4 m deep) north basin of Pakwash Lake which transitions into a large, deep center basin. The south basin is consistently deep (greater than 10 m) with the outlet (Chukuni River) draining into the English River system. The surrounding lake habitat mostly consists of exposed bedrock shorelines with boulders and mixed coniferous and deciduous forest. Most embayment's consist of shallow soft fine-grained sediments with submergent aquatic macrophytes (such as Coontail and Tape Grass) and emergent macrophytes consisting mostly of cattail. A fish sanctuary is located within Fishereman's Bay along the western shoreline, at the northern extent of Pakwash Provincial Park.

3.5.2.2 FISH COMMUNITY

Three full cycles of Broad-Scale Monitoring (BsM; Sandstrom et al. 2013) surveys were conducted by the MNR in Pakwash Lake in 2009, 2014, and 2019. A total of 20 species were identified with Walleye and Sauger representing the largest proportions of species captured (mean 20% and 18%, respectively), followed by Lake Whitefish at 15%. Walleye ranged from 180 to 1,110 mm, with most individuals

measuring between 300 to 500 mm. Summer (August) water temperature measurements in conjunction with the presence of fish species within the waterbody indicate the thermal guild classification for Pakwash Lake is a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Muskellunge was not caught during the BsM surveys, nor in any sampling within the Chukuni River, however is reported as present within the MNR Fish Online tool.

3.5.2.3 FISH TISSUE

A total of 20 Northern Pike, 30 Walleye and 10 White Sucker tissue samples were submitted for mercury analysis from Pakwash Lake during the MNR BsM surveys. The analytical results display total metals in mg/kg of ww.

Total mercury concentrations in fish tissue ranged from 0.24 to 1.6 mg/kg, 0.28 to 1.10 mg/kg and 0.04 to 0.22 mg/kg for Northern Pike, Walleye, and White Sucker, respectively; all concentrations were less than the Ontario consumption guideline developed for the general population (1.8 mg/kg). Most Northern Pike and Walleye tissue samples were greater than the guideline for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg).

3.5.2.4 LOWER TROPHIC AND PRIMARY PRODUCTIVITY

The 2024 periphyton sampling results were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.

3.5.2.5 SEDIMENT QUALITY

Sediment samples were collected from two locations consisting of five replicate stations with a maximum water depth of 5.75 m during the fall 2023 field investigations and were collected from four locations consisting of three stations each with a maximum water depth of 17.60 m during the fall 2024 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- The 2023 samples were collected near the Chukuni River outlet in a northern bay of Pakwash Lake. Stations were separated based on depth, with shallow (less than 3.5 m) and deep (greater than 3.5 m) stations to capture the sediment quality and BIC within the Chukuni River flow path into Pakwash Lake and in the surrounding sediment.
 - Sediment consisted of silt with moderate amounts of clay and fine sand in shallow and deep 2023 samples.
 - Concentrations greater than the PSQG LEL were noted for chromium, copper, and manganese in 2023.
 - No differences were detected in sediment quality or grain size between shallow and deep locations during 2023.
- The 2024 samples were collected from four locations around Pakwash Lake: north lake (PKL-N), central lake (PKL-C), south lake (PKL-S), and in the deep basin (PKL-D), each with three replicate stations. PKL-N stations matched with the deep location replicates collected in 2023 (S1 to S3).
 - PKL-D primarily consisted of clay with some silt.
 - PKL-N consisted of silt, with moderate amounts of clay and fine sand.
 - PKL-C replicates varied from clay, silt, and fine sand dominated and generally contained high percentages of the three grain sizes.
 - PKL-S was dominated by fine sand with some silt.
 - TOC was higher than the PSQG LEL at most stations.
 - Concentrations greater than the PSQG LEL were noted for arsenic, chromium, copper, iron, manganese, and nickel.

- Concentrations greater than the PSQG SEL were noted for chromium at all locations other than PKL-S and for copper in one replicate of PKL-C.

3.5.2.6 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from Pakwash Lake during the fall 2023 field program from two stratified locations, each with five replicates. The two locations were the same as those sampled for sediment quality; locations were separated by flow path from the Chukuni River, with the deep location replicates (greater than 3.5 m deep) collected within the river scour into Pakwash Lake, and shallow location replicates (less than 3.5 m deep) taken outside of the river scour.

In fall 2024, benthic invertebrate samples were collected concurrently with the sediment quality samples at the four locations listed above: PKL-N, PKL-C, PKL-S, and PKL-D. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- Total abundance and TID was approximately twice as high in the deep sampling location compared to the shallow location, however all other metrics (richness, diversity, evenness, percent EPT, and percent Chironomids) were similar between locations.
- Overall, in 2023 Pakwash Lake had a high percentage of EPT taxa (averaging 25% and 30% for deep and shallow locations, respectively) and high average taxa richness (n=9).
- Clams (*Sphaeriidae*), mayflies (*Ephemeroidea*), midges (*Chironomidae*), and worms (*Naididae*) were the families present in the highest abundance. In 2024 PKL-C had high numbers of phantom midges (*Chaoboridae*) as well.
- In 2024, average total abundance ranged from 80 to 124 individuals, density 1,200 to 1,800 individuals per square metre, and 10 to 11 taxonomic groups. Generally, Pakwash Lake had high EPT proportionate representation, ranging from 18% to 45% of sample, and lower percent Chironomid representation, ranging from 27% to 32%.

3.5.3 GULLROCK LAKE

3.5.3.1 FISH HABITAT

Gullrock Lake is a large lake greater than 6,400 ha with a maximum depth of 17.7 m and average depth of 7.8 m (MNR 2024) of habitat type C characteristics with multiple basins, islands, and embayment's (Table A1-1B, Figure 2-1). The outlet located in the south east basin of Gullrock Lake drains into the Chukuni River and is approximately 16 km upstream of CR-REF sampling location. The Chukuni River inlet flows into a basin located along the west basin of Gullrock Lake. The lake mostly consists of exposed bedrock shorelines with boulders and mixed coniferous and deciduous forest. Most embayment's consist of soft fine-grained sediments with submergent aquatic macrophytes (such as Coontail and Tape Grass) and emergent macrophytes consisting mostly of cattail.

3.5.3.2 FISH COMMUNITY

The results of one BsM survey conducted by the MNR in Gullrock Lake is available from 2019. A total of 15 species were identified with Walleye and Cisco representing the largest proportions of species captured (41% and 29%, respectively). Lake Whitefish represented 1% of the catch. Walleye ranged from 180 to 700 mm, with most individuals measuring between 300 to 400 mm. Summer (August) water temperature measurements in conjunction with the presence of fish species within the waterbody indicate the thermal guild classification for Gullrock Lake is a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.5.3.3 FISH TISSUE

A total of 23 Northern Pike, 36 Walleye, 6 Lake Whitefish and 2 Sauger tissue samples were submitted for mercury analysis from Gullrock Lake during the BsM surveys. The analytical results display total metals in mg/kg of wwt.

Total mercury concentrations in fish tissue ranged from 0.12 to 1.9 mg/kg, 0.11 to 1.2 mg/kg and 0.04 to 0.12 mg/kg for Northern Pike, Walleye and Lake Whitefish, respectively. Sauger total mercury concentrations measured 0.82 and 0.20 mg/kg. Most concentrations were less than the Ontario consumption guideline developed for the general population (1.8 mg/kg) with the exception of one Northern Pike. 10 Northern Pike and nine Walleye tissue samples were greater than the guideline for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg).

3.6 UNNAMED WATERBODIES

3.6.1 UNNAMED WATERBODY 1

3.6.1.1 FISH HABITAT

Unnamed Waterbody 1 (WB-1) is a shallow lake consisting of habitat type A characteristics, including a wide riparian habitat dominated by shrubs, grasses, and sedges along the margins and outlet drainage to WB-2 (Table A1-1B, Figure 2-1). The upland vegetation is mostly coniferous species such as Black Spruce. The substrate consists of soft fine-grained sediments with a uniform depth ranging from 0.5 to 1.0 m. The lake is dominated by an emergent aquatic macrophyte, Northern Wild Rice, which forms a dense cover across the entire wetted surface area.

3.6.1.2 FISH COMMUNITY

A total of 11 fish from 2 species (Central Mudminnow and Golden Shiner) were captured using gillnets, and baited minnow traps in WB-1 during the 2022 and 2023 field programs. Minnow traps were the most effective gear used, capturing all but one fish which was caught using a small mesh gillnet. Angling and dip nets were also used in WB-1, although no other fish were captured (Table 3.1 and Appendix B; Tables B1-1 to B1-10). WB-1 may contain Northern Pike due to the direct channel connectivity from WB-2 downstream and also identified as a species list for metabarcoding DNA analysis, however none have been sighted or captured in WB-1 (Table 3.1 and Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish indicate the thermal guild classification for WB-1 represents a cold to coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.6.1.3 WATER QUALITY

In-situ measurements were collected in the summer 2022, and spring and summer 2023 field investigations. Temperature ranged from 17.0°C to 29.6°C, DO measured 1.08 to 6.91 mg/L, and the pH was ranged from 5.34 to 6.5 (Appendix A; Tables A1-2A to A1-2C). All DO and pH measurements met the PWQO and CWQG, except for two pH measurements and one DO measurement in the spring 2023 field program.

Lake profiles were measured during the summer 2022 field program at WB-1 with a maximum recorded depth of 0.5 m (Appendix A; Figure A1-5). Due to the depth, in-situ measurements were collected thereafter. The DO met the CCME guideline for aquatic health (6.5 mg/L; CCME 1999).

3.6.1.4 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.4 m at WB-1 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples contained high amounts of silt with some coarse sand.
- TOC was higher than the PSQG LEL at all stations.
- Baseline concentrations greater than the PSQG LEL and CSQG ISQG were noted for arsenic and cadmium.

3.6.1.5 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WB-1 during the fall 2022 and 2023 field programs from total water depths between 0.1 and 0.3 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including estimations of benthic community descriptors. A summary of these findings is provided below.

- BIC metrics were generally similar between sampling years, however richness and diversity decreased from 2022 to 2023.
- Taxa richness decreased from 9 to 6, and diversity from decreased 0.6 to 0.4 between sampling years.
- Midges (*Chironomidae*) and clams (*Spaeriidae*) represented the majority of the benthic invertebrate community within both sampling years.
- Chironomid taxa averaged 57% (2022) and 73% (2023) of the total species across sampling years.
- EPT taxa were present in half the replicate samples across years but were observed in both 2022 and 2023.

Other BIC metrics in shallow lake and pond habitats throughout the Project area (WB-2, WB-3, WB-5, and WB-6) were similar to WB-1, however WB-1 had much higher total abundance and TID than any other location and had the highest taxa richness in 2022. WB-3 had relatively high levels of EPT taxa, whereas WB-1 had the highest percentage of Chironomid taxa. WB-2 had few species present in samples and generally had the lowest values of BIC metrics, likely due to the thick organic layer atop the substrate and low oxygen levels near bottom.

3.6.2 UNNAMED WATERBODY 2

3.6.2.1 FISH HABITAT

Unnamed Waterbody 2 (WB-2) is a small, deep-water lake with habitat type B characteristics (greater average depth than habitat type A lakes). WB-2 receives drainage from WB-1 and drains into WC-1 (Table A1-1B, Figure 2-1). The waterbody is surrounded by a mixed coniferous forest and a narrow, grass dominated riparian zone. The substrate consists of soft fine-grained sediments with occasional cobble and LWD within the margins. No aquatic vegetation was noted within WB-2.

3.6.2.2 BATHYMETRY

A bathymetric survey was conducted in WB-2 during the spring 2024 field program. The waterbody consisted of a gently sloping shoreline down to a deep (7 m) central basin (Figure A1-4).

3.6.2.3 FISH COMMUNITY

A total of 32 fish were captured from WB-2 during the 2022 and 2023 field programs, including Central Mudminnow, Golden Shiner, and Northern Pike (Table 3.1). Baited minnow traps, gillnets, dip netting, and angling efforts were utilized, with gillnets being the most effective sampling method, capturing over 50% of individuals. Golden Shiner represented the greatest proportion of fish species caught (Appendix B; Tables B1-1 to B1-10). Summer (July and August) water temperature measurements and the captured fish species indicate the thermal guild classification for WB-2 represents a warm to coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Metabarcoding analysis identified DNA from six species in water samples collected from WB-2 during spring, summer, and fall sampling. Species DNA included, Central Mudminnow, Fathead Minnow, Golden Shiner, Mimic Shiner, Northern Pike, and Spottail Shiner.

Of all waterbodies, the least species DNA was collected within WB-2. Given the size of the pond, this is expected when compared to other Project locations.

3.6.2.4 FISH LENGTH FREQUENCY AND AGE

One Northern Pike was submitted in 2022 and four in 2023 for age assessment and results are displayed in Appendix B (Tables B2-1 to B2-3). In 2022 the Northern Pike measured 475 mm TLEN and was three years old. In 2023, they ranged from 124 to 643 mm TLEN and from zero (YOY) to six years of age.

3.6.2.5 FISH TISSUE

A single Northern Pike tissue sample was submitted for analysis from WB-2 in 2022 and four in 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury concentrations ranged from 0.06 to 0.64 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), however were higher than those developed for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg).
- Methylmercury concentrations ranged from 0.041 to 0.323 mg/kg and all values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of consumers of aquatic biota.
- Selenium concentration in tissue ranged from 0.17 to 0.21 mg/kg and was less than the FEQG for whole body samples (6.7 mg/kg).

Data trends between total mercury concentration, total methylmercury concentration and TLEN could not be analyzed due to insufficient sample size.

3.6.2.6 WATER QUALITY

In-situ measurements were collected in the spring, summer, and fall of the 2022 and 2023, as well as the summer and fall 2024 field investigations. Temperature ranged from 4.8°C to 29.4°C, DO ranged from 3.96 to 12.87 mg/L and pH ranged from 4.55 to 7.50 (Appendix A; Tables A1-2A to A1-2C). DO measurements met all PWQO and CWQG criteria except for one measurement in 2023. Nearly all pH measurements were less than the guidelines (6.5).

Lake profiles were measured during the 2022 spring and summer, 2023 summer and fall, and summer 2024 field programs at WB-2 with a maximum recorded depth of 8 m (Appendix A; Figure A1-8). A subsurface thermocline was present during all profiles taken from 2022 to 2024 ranging depths from 0.5 to 1.5 m. Temperature and DO show a declining trend with depth, as expected. DO concentrations were less than the CCME guideline for aquatic health (6.5 mg/L; CCME 1999) at a depth of 8 m in May and at a depth of 2 m in July 2022. In 2023, the DO concentrations were less than the CCME guideline at depths of 1.5 m in August and September. DO concentrations were less than the CCME guideline taken at subsurface in summer 2024.

3.6.2.7 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 7 m at WB-2 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples contained silt with some clay and fine sand.
- TOC was higher than the PSQG LEL at all stations.

- Background concentrations greater than the PSQG LEL, CSQG ISQG, and CSQG PEL were noted for arsenic, cadmium, copper, and mercury.

3.6.2.8 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WB-2 during the fall 2022 and 2023 field programs from a maximum total water depth of 3.0 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including benthic invertebrate community descriptors. A summary of these findings is provided below.

- The lowest values of BIC metrics (diversity, total counts, diversity, and evenness) among sampling locations were observed at WB-2 across both sampling years.
- EPT taxa was not present at this sampling location.

Other shallow lake and pond habitat BIC metrics are described for WB-1, WB-3, WB-5, and WB-6, and provided more abundant and diverse benthic communities. Directly upstream of WB-2 (by approximately 200 m), WB-1, had the highest BIC metrics of those shallow lake and pond habitats listed. It is likely the thick organic layer atop the substrate and low oxygen levels near bottom in WB-2 contributes to the lower values of BIC metrics.

3.6.3 UNNAMED WATERBODY 3

3.6.3.1 FISH HABITAT

Unnamed Waterbody 3 (WB-3) is a medium sized lake consisting of habitat type B characteristics, including a greater water depth (Table A1-1B). The waterbody is surrounded by dense mixed coniferous and deciduous (such as Black Spruce, and Trembling Aspen) forest. Areas of muskeg and bedrock formations alternate around the perimeter while emergent vegetation, such as Hardstem Bulrush, lined the margins. The lake outflows to the north through a large beaver dam and a series of beaver ponds that ultimately drains into Gullrock Lake (Figure 2-1). The substrate consists of a mixture of fine-grained sediment to cobble with boulder, and LWD.

3.6.3.2 FISH COMMUNITY

A total of 1254 fish were captured from WB-3 during the 2022 and 2023 field programs, including Blacknose Shiner, Brook Stickleback, Fathead Minnow, Finescale Dace, Iowa Dater, Lake Chub, Northern Pearl Dace, Northern Redbelly Dace, White Sucker, and Yellow Perch (Table 3.1). Baited minnow traps were the only sampling method used. Finescale Dace represented the greatest proportion of fish species caught (greater than 65%) (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WB-3 represents a warm to coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.6.3.3 FISH LENGTH FREQUENCY AND AGE

A total of 60 Finescale Dace, 77 Lake Chub, 15 Northern Redbelly Dace, and 19 Yellow Perch from WB-3 were used to generate length frequency histograms. Of these, 4 Lake Chub were submitted for aging in 2022 and 10 in 2023. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8).

Lake Chub submitted for aging assessment were determined to be 1 to 6 years of age, with TLens ranging from 76 to 140 mm.

3.6.3.4 FISH TISSUE

Five Finescale Dace and nine Lake Chub composite samples were submitted for fish tissue analysis from WB-3 in 2022 and 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww. Results have also been presented in dw

for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Average total mercury and methylmercury concentrations for Finescale Dace were 0.06 mg/kg and 0.042 mg/kg in 2022 and 2023, respectively. Average total mercury and methylmercury concentrations for Lake Chub were 0.07 mg/kg and 0.084 mg/kg in 2022, and 0.07 mg/kg and 0.060 mg/kg in 2023, respectively. Finescale Dace and Lake Chub methylmercury concentrations were greater than the CCME (2000) guideline of 0.033 mg/kg for the protection of wildlife consumers of aquatic biota.
- Selenium concentrations averaged 1.59 mg/kg and 1.58 mg/kg for Finescale Dace and Lake Chub, respectively, and were less than the FEQG for whole body samples (6.7 mg/kg).

3.6.3.5 WATER QUALITY

In-situ measurements were collected in the summer 2022 and 2023 field investigations. Water quality parameters remained consistent between both years. Water temperature was 23.8°C and 23.6°C, DO was 8.42 mg/L and 9.21 mg/L, and pH was 7.24 and 7.66, respectively. All measurements met the PWQO and CWQG.

3.6.3.6 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.4 m at WB-3 during the fall 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of silt and clay.
- TOC was higher than the PSQG LEL at all stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic, copper, and manganese, and greater than the CSQG PEL for arsenic.

3.6.3.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WB-3 during the fall 2023 field program from total water depths between 0.1 and 0.3 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- WB-3 had the highest BIC metrics of all small waterbodies sampled, with relatively higher values of average richness (13), diversity (0.72), evenness (0.28), and percent EPT (15%). In particular, it is the only small waterbody with an average percent EPT taxa greater than 10%, with the next highest at 4% (WB-6).

WB-3 is at the top of its watershed, with only headwater streams and surface runoff feeding the lake. It is located above Genessee Lake atop an escarpment and flows north into Gullrock Lake. The higher values of BIC metrics are likely indicative of its location within the watershed and the higher levels of organics within the substrate sampled from the nearshore environment.

3.6.4 UNNAMED WATERBODY 4

3.6.4.1 FISH HABITAT

Unnamed Waterbody 4 (WB-4) is a small, beaver impounded pond north of the Project area with habitat type A characteristics (Figure 2-1). There is a wide (20 to 50 m) riparian zone consisting of grasses, and shrubs including raspberry, strawberry, alder, and willow, before the forest upland. Upland species was dominated by Black Spruce, Jack Pine, and Tamarack (Table A1-1B). The average depth of WB-4 is 1 m with an estimated maximum depth of 2 m. WB-4 is approximately 1.2 ha, measuring 100 m in width and 330 m in length.

3.6.4.2 FISH COMMUNITY

A total of 24 individuals were captured from WB-4 using baited minnow traps during spring 2022 (June). Species captured include Brook Stickleback, Central Mudminnow, Fathead Minnow, and Finescale Dace (Table 3.1 and Appendix B; Tables B1-1 to B1-10). Finescale Dace represented the greatest proportion of fish species caught, over 50%.

3.6.5 UNNAMED WATERBODY 5

3.6.5.1 FISH HABITAT

Unnamed Waterbody 5 (WB-5) is a small lentic pond with habitat type A characteristics, including a wide riparian floodplain consisting of shrubs, grasses, and sedges, with sparse Black Spruce to the west and mixed coniferous forest (such as Black Spruce, Tamarack, and White Spruce) to the east (Table A1-1B). Near-shore areas consist of floating fen mats dominated by *Sphagnum* moss and bog plant species. The substrate consists of a submerged layer of *Sphagnum* moss and underlying fine-grained sediments. An active beaver lodge was present during the 2022 field season; however no sightings were made in 2023.

3.6.5.2 FISH COMMUNITY

Fish were not captured from WB-5 during the 2022 and 2023 field seasons. Baited minnow traps and gillnets were utilized in 2022, and minnow traps were employed in spring, summer, and fall 2023 (Table 3.1 and Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements suggest the thermal guild classification for WB-5 represents a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.6.5.3 WATER QUALITY

In-situ measurements were collected in the spring and summer 2022 and the spring 2023 field investigations. Temperature ranged from 15.4°C to 23.0°C, DO ranged from 6.09 to 6.63 mg/L, and pH ranged from 3.75 to 4.37 (Appendix A; Tables A1-2A to A1-2B). All DO measurements met the PWQO and CWQG and all pH measurements were less than the criteria.

3.6.5.4 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.4 m at WB-5 during the fall 2022 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of coarse sand, fine sand, and silt in relatively even proportions.
- TOC was higher than the PSQG LEL at all stations.

3.6.5.5 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WB-5 during the fall 2022 field program from a maximum total water depth of 0.4 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- Worms (*Naidinae*, *Tubificinae*, and *Lumbriculidae*) and Midges (*Chironimidae*) comprised most of the benthic invertebrate community.
- Chironomid taxa averaged 39% of the total species across replicate stations and EPT taxa were only present in replicate stations B2 and B3, representing less than 1% of each replicate stations total composition.
- Total abundance was similar to other small lake and pond environments, and richness was comparatively high (ranging from 4 to 8 taxa).

Other shallow lake and pond habitats throughout the Project area (WB-1, WB-2, and WB-6) had similar BIC metrics to WB-05, however WB-05 had higher variability between replicate stations. EPT taxa were not present within the shallow lake and pond habitats sampled, but percent of chironomids were generally similar (approximately 30%, on average).

None had high levels of EPT taxa and WB-6 had similar Chironomid levels at 30%. Conversely, WB-2 had few benthic invertebrate species present in sampling and generally had the lowest BIC metrics, likely due to the thick organic layer atop the substrate and low oxygen levels near bottom.

3.6.6 UNNAMED WATERBODY 6

3.6.6.1 FISH HABITAT

Unnamed Waterbody 6 (WB-6) is a shallow lake characterized as habitat type A, including a wide riparian habitat comprised of grasses, sedges and shrubs along the northwest margin and outlet to Dixie Creek (Table A1-1B) (Figure 2-1). The upland vegetation is mostly coniferous species such as Black Spruce. The south shore consists of a steep gradient tree line comprised of large boulders and dead fall log cover within the lake margins. Submergent aquatic macrophytes such as pondweed were observed within the nearshore areas and in patches within the lake. The lake bottom consisted almost completely of silt with some clay and fine sand.

3.6.6.2 BATHYMETRY

A bathymetric survey was conducted in WB-6 during the fall 2022 field program. The lake consisted of a shallow water littoral zone in the east and west and a large uniform middle basin. The maximum recorded water depth was 1.78 m, with an average water depth of 1.26 m (Figure A1-1).

3.6.6.3 FISH COMMUNITY

A total of 440 fish were captured from WB-6 during the 2022 and 2023 field programs, including Blackchin Shiner, Blacknose Shiner, Fathead Minnow, Northern Pike and Yellow Perch (Table 3.1). Northern Pike represented the greatest proportion of fish species caught. Baited minnow traps, gillnets, seine nets and angling efforts were used, with gillnets being the most effective gear type, capturing 113 individuals. Gillnets varied in length and mesh size, from RIN to larger mesh gillnets, targeting and collecting multiple age classes from YOY to adult fish (Appendix B; Tables B1-1 to B1-10). Summer (July and August) water temperature measurements in conjunction with the presence of fish species within the waterbody indicate the thermal guild classification for WB-6 is a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Metabarcoding analysis identified DNA from seven species in water samples collected from WB-6 during spring, summer, and fall sampling. Species DNA included, Central Mudminnow, Fathead Minnow, Iowa Darter, Northern Pike, Mooneye, Shorthead Redhorse, and Yellow Perch.

Two species identified using conventional sampling techniques (seine nets) were not detected in eDNA samples. Given one composite sample was taken within the entirety of WB-6, it is expected that additional sampling would be required to capture the entirety of species DNA within the waterbody.

3.6.6.4 FISH LENGTH FREQUENCY AND AGE

Meristic data from a total of 51 Northern Pike and 90 Yellow Perch were obtained from captured individuals in WB-6 and used to generate length frequency histograms. Of the 37 Northern Pike captured in 2022, 10 were submitted for aging and 1 was submitted in 2023. Fish age results are displayed in Appendix B (Tables B2-1 and B2-2) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-2).

Northern Pike ranged from 48 to 658 mm TLEN with two distinct size classes present; 41% of fish were between 51 to 100 mm while 54% of the remaining individuals were greater than 401 mm. Northern Pike lethally sampled in the fall of 2022 and associated aging assessments had TLENs ranging from 520 to 591 mm and varied from two to four years of age. The size class separation and aging results suggest that the smaller sized fish (less than 100 mm) were either YOY or one year old. The greatest number and

proportion of younger age class (YOY and age one) Northern Pike were captured in WB-6 compared to all other sampling locations, suggesting that WB-6 provides suitable habitat for the rearing and survival of young.

Yellow Perch ranged from 22 to 210 mm total length with two distinct length classifications, indicating the presence of a YOY age class and at least one age 1+ age class.

3.6.6.5 FISH TISSUE

A total of 11 Northern Pike tissue samples were submitted for analysis from WB-6. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury concentrations ranged from 0.19 to 0.37 mg/kg and all samples were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg) and women of child-bearing age and children (0.5 mg/kg), and the Health Canada maximum contaminant concentration (0.5 mg/kg).
- Total methylmercury concentration ranged from 0.098 to 0.249 mg/kg with all values exceeding the CCME (2000) guideline of 0.033 mg/kg for the protection of wildlife consumers of aquatic biota.
- Selenium concentration in tissue samples ranged from 0.68 to 0.92 mg/kg and all values were less than the FEQG for whole body samples (6.7 mg/kg).

Regressions of total mercury and methylmercury against TLEN are presented in Appendix C (Figures C2-1 to C2-14). There was no relationship between total length and total mercury or methylmercury concentrations.

3.6.6.6 WATER QUALITY

In-situ surface water quality measurements were collected in the spring, summer, and fall in 2022 and 2023, and spring and summer 2024. Water quality parameters remained consistent across all sampling years. Water temperatures ranged from 4.8°C to 24.1°C, DO ranged from 7.81 to 14.84 mg/L, and pH ranged from 6.30 to 7.98 (Appendix A; Tables A1-2A to A1-2B). All measurements met the PWQO and CWQG for DO and pH except for one pH value (6.3; spring) and one DO value (10.45 mg/L; fall).

Lake profiles were measured during summer and fall 2022, spring, summer and fall 2023 and summer 2023 field programs. The maximum recorded depth for WB-6 was 2.5 m (Appendix A; Figure A1-9). Temperature and DO show a generally declining trend with depth.

3.6.6.7 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 1.5 m at WB-6 during the fall 2022, 2023, and 2024 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of silt and fine sand with some clay.
- TOC was higher than the PSQG LEL at all stations.
- Background concentrations greater than the PSQG LEL, SEL, and CSQG ISQG were noted for arsenic, cadmium, chromium, copper, mercury, and nickel.

3.6.6.8 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WB-6 during the fall 2022 to 2024 field programs from total water depths between 1.0 and 2.0 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including estimates of benthic invertebrate community descriptors. A summary of these findings is provided below.

- BIC metrics were similar between sampling years, with abundance ranging 207 to 263 individuals, richness from eight to 10 taxa, evenness from 0.2 to 0.5, and percent EPT from 0.9% to 3.5%.
- Clams (*Sphaeriidae*), midges (*Chironomidae*), and phantom midges (*Chaoboridae*) represented most of the benthic invertebrate community.
- The BIC of WB-6 was similar to other shallow lake and pond habitats throughout the Project area (WB-1, WB-2, and WB-5), but had higher taxa richness than both WB-2 and WB-5.

EPT taxa were not present at any shallow lake and pond habitats and Chironomids dominated BICs in WB-1 and WB-5.

3.7 UNNAMED WATERCOURSES

3.7.1 UNNAMED WATERCOURSE 1

3.7.1.1 FISH HABITAT

Unnamed Watercourse 1 (WC-1) is located within the outflow of WB-2, south of the Project area, and has characteristics of habitat type F (Table A1-1A, Figure 2-1). The stream reach has a steep gradient with moderate beaver activity creating alternating series of pools and impoundments that discharge into Dixie Creek. The stream is surrounded by a mixed deciduous and coniferous forest and thick alder, grasses, and sedges line the banks. The stream is wide with a moderate depth and flow. The substrate is comprised of sand and silt, with occasional gravel. Fallen trees, overhanging shrubs, and undercut banks provide habitat for small-bodied fish.

3.7.1.2 FISH COMMUNITY

A total of 25 fish were captured from WC-1 during the 2022 and 2023 field investigations, including Central Mudminnow, Golden Shiner, Northern Pike, Northern Pearl Dace, and White Sucker (Table 3.1). Baited minnow traps and electrofishing efforts were utilized, with electrofishing being the most effective gear type, capturing 23 of 25 fish (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-1 represents a warm to coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.1.3 FISH LENGTH FREQUENCY AND AGE

A total of three Northern Pike captured from WC-1 were submitted for age assessments. Fish age results are displayed in Appendix B (Table B2-3).

Northern Pike TLENs ranged from 145 to 163 mm and all assessed ages were zero years.

3.7.1.4 FISH TISSUE

A total of three Northern Pike tissue samples were submitted for analysis from WC-1. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury concentrations ranged from 0.056 to 0.102 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg).
- Methylmercury concentrations ranged from 0.044 to 0.080 mg/kg. All values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.

- Selenium concentration in tissue samples ranged from 1.12 to 1.24 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.1.5 WATER QUALITY

In-situ measurements were collected in the spring, summer, and fall 2022 and 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature ranged from 4.0°C to 28.0°C, DO ranged from 2.88 to 9.26 mg/L, and pH ranged from 5.52 to 6.67 (Appendix A; Tables A1-2A to A1-2B). Most DO and pH measurements met the PWQO and CWQG, with the exception of one DO measurement in fall 2023 and four pH measurements.

3.7.2 UNNAMED WATERCOURSE 1A

3.7.2.1 FISH HABITAT

Unnamed Watercourse 1A (WC-1A) flows into WB-1 from the west. It represents characteristics of habitat type G in its lower reaches, with a broad floodplain and floating herbaceous mats flowing into a narrow, low flow channel. The upper reaches are characteristic of habitat type D, emerging from groundwater springs and are ephemeral in nature (Table A1-1A). The banks are dominated by herbaceous and woody vegetation, grasses, *Sphagnum* mosses, alder, and Black Spruce, with overhanging branches and woody debris providing cover. The substrate consists mainly of organic debris.

3.7.2.2 FISH COMMUNITY

Fish were not captured during the 2022 and 2023 field investigations (Table 3.1). Electrofishing efforts were utilized in summer 2022 and spring 2023 (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements indicate the thermal guild classification for WC-1A represents a coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.2.3 WATER QUALITY

In-situ measurements were collected during the summer 2022 and summer and fall 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature values ranged from 8.6°C to 13.2°C, DO ranged from 1.84 to 6.12 mg/L, and pH values ranged from 5.09 to 6.07 (Appendix A; Tables A1-2A to A1-2B). Most DO measurements met the PWQO and CWQG, except for one measurement (summer 2022). All pH measurements did not meet the PWQO and CWQG criteria.

3.7.3 UNNAMED WATERCOURSE 1B

3.7.3.1 FISH HABITAT

Unnamed Watercourse 1B (WC-1B) is located north of WB-1 and consists of Habitat Type D and G characteristics (Table A1-1A). WC-1B has a swampy, braided network of shallow, slow flowing watercourses and beaver dams within a broad floodplain. The maximum depth is approximately 20 cm and most flow occurs underground. The surrounding area contains grasses, horsetail, *Sphagnum* mosses, spruce, alder and LWD. Substrate consists mainly of leaf litter.

3.7.3.2 FISH COMMUNITY

A total of 63 fish were caught from WC-1B immediately downstream of WB-4 (less than 100 m) during the spring 2022 field investigation, including Brook Stickleback, Central Mudminnow, and Finescale Dace. Fish were not captured during 2023 field investigations or farther downstream in 2022 (Table 3.1). Baited minnow traps were the only capture gear utilized and Central Mudminnow represented the greatest proportion of fish species caught (94%) (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-1B represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.3.3 WATER QUALITY

In-situ measurements were collected during the summer 2022 and 2023 field investigations. Temperature values were 14.5°C and 15.3 °C, DO values were 2.18 and 1.45 mg/L and pH values were 6.25 and 7.04, respectively (Appendix A; Tables A1-2A to A1-2B). Most DO and pH measurements did not meet the PWQO or CWQG, except for one pH measurement (summer 2023).

3.7.4 UNNAMED WATERCOURSE 1B-03

3.7.4.1 FISH HABITAT

Unnamed Watercourse 1B-03 (WC-1B-03) is located north of WB-1 and consists of Habitat Type D and G characteristics (Table A1-1A). WC-1B has a swampy, braided network of shallow, slow flowing watercourses within alternating forested and grassland habitat. The maximum depth is approximately 20 cm and most flow occurs underground. The section surrounding the sampling location contains grasses, horsetail, *Sphagnum* mosses, spruce, alder and LWD. Substrate consists mainly of leaf litter.

3.7.4.2 FISH COMMUNITY

A total of 10 individuals were captured from WC-1B-03 using baited minnow traps during spring 2022 (June) and electrofishing during the spring, summer, and fall 2023 field programs. Species captured include Brook Stickleback and Central Mudminnow (Table 3.1 and Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-1B represents a cool to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.4.3 WATER QUALITY

In-situ measurements were collected during the spring and summer 2023 field investigations. Temperature values were 12.1°C and 13.3 °C, DO values were 10.65 and 9.92 mg/L and pH values were 5.92 and 6.24, respectively (Appendix A; Tables A1-2A to A1-2B). Neither pH measurement met the PWQO or CWQG.

3.7.5 UNNAMED WATERCOURSE 2

3.7.5.1 FISH HABITAT

Unnamed Watercourse 2 (WC-2) is located east of WC-1 and has characteristics of habitat type E, transitioning to type F during 2023 (Table A1-1A). The stream is narrow and shallow, located within an alder dominated riparian and a dense mixed upland forest. The stream appears to be near dry with low flow during the summer months which is fed by a series of beaver created pools and impoundments near the top of the watercourse. Substrate is composed of silt and detritus with occasional large boulders. Overhanging grasses and shrubs, boulders, and undercut banks provide habitat for small-bodied fish.

3.7.5.2 FISH COMMUNITY

A total of 51 fish were captured from WC-2 during the 2022 and 2023 field investigations. Three species were caught, including Brook Stickleback, Central Mudminnow, Northern Redbelly Dace, and Slimy Sculpin (Table 3.1). Brook Stickleback represented the greatest proportion of fish species caught at approximately 60% (Appendix B; Tables B1-1 to B1-10). Electrofishing and baited minnow trap efforts were utilized during field investigations, with electrofishing capturing all fish in 2022. Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-2 represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.5.3 FISH LENGTH FREQUENCY AND AGE

A total of 31 Brook Stickleback and 1 Central Mudminnow were captured from WC-2 and used to generate length frequency figures. Of these, five Brook Stickleback and one Central Mudminnow were

submitted for age assessments. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and fish length frequency figures are presented in Appendix B (Figures C1-1 to C1-21).

Brook Stickleback TLENs were 43 to 70 mm and assessed ages were zero to one year. All Brook Stickleback 70 mm or greater were assessed to be one year. The Central Mudminnow measured 103 mm TLEN and was one year.

3.7.5.4 FISH TISSUE

A total of two Brook Stickleback composite samples were submitted for analysis from WC-2. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

Brook Stickleback total mercury concentrations were 0.14 and 0.13 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg). Methylmercury concentrations were 0.098 and 0.137 mg/kg. All values were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentration in tissue samples were 0.83 and 0.80 mg/kg and were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.5.5 WATER QUALITY

In-situ measurements were collected in the spring, summer, and fall 2022 and 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature ranged from 5.1°C to 26.0°C, DO ranged from 0.06 to 10.26 mg/L, and pH ranged from 6.2 to 7.3 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG, apart from three DO values in the summer 2022 and 2023 and fall 2023 (5.40, 0.06, and 2.88 mg/L) and one pH measurement in fall 2023 (6.17). The summer and fall 2023 DO values (0.06 and 2.88 mg/L) were a result of beavers damming the watercourse at the sample location between the spring and summer seasons.

3.7.6 UNNAMED WATERCOURSE 3

3.7.6.1 FISH HABITAT

Unnamed Watercourse 3 (WC-3) is located north and slightly east of the Project area and represents habitat type H characteristics (Table A1-1A). The stream is wide with a moderate depth, and occasional large pools within a dense mixed deciduous and coniferous forest (such as Black Spruce, White Spruce, and poplar) are present throughout the stream reach. The water is dark tea-stained colour and substrate is comprised predominantly of clay with sections of banks heavily eroded. The pool habitat has abundant coarse and fine wood debris, with soft, fine-grained sediments that support dense aquatic macrophytes. Riparian vegetation is mostly comprised of grasses and sedges with alder species further upland adjacent to mixed coniferous and deciduous forest. Overhanging grasses, shrubs, LWD, and ponded areas provide habitat for small-bodied fish.

3.7.6.2 FISH COMMUNITY

A total of 1,712 fish from seven different species were captured from WC-3 during the 2022 and 2023 field investigations, including Brook Stickleback, Central Mudminnow, Finescale Dace, Northern Redbelly Dace, Phoxinus Hybrid, Slimy Sculpin, and White Sucker (Table 3.1). Baited minnow traps, dip netting, and electrofishing efforts were utilized, with electrofishing being the most effective gear type (Appendix B; Tables B1-1 to B1-10). Summer (July and August) water temperature measurements and captured fish species indicate the thermal guild classification for WC-3 represents a warm to coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Metabarcoding analysis identified DNA from seven species in water samples collected from WC-3 during spring, summer, and fall sampling. Species DNA included, Burbot, Central Mudminnow, Northern Pike,

Mooneye, sculpin species, Walleye, and White Sucker. Of these, sculpin could only be identified to genus. The *Cottus* species in this sample location are most likely the Mottled and Slimy sculpins.

3.7.6.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 30 Brook Stickleback, 57 Central Mudminnow, 54 Finescale Dace, and 11 Northern Redbelly Dace were used to generate length frequency histograms. Of these, 13 Central Mudminnow and 10 Finescale Dace were submitted for age assessment. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8).

Brook Stickleback, and Northern Redbelly Dace TLENs ranged from 21 to 72 mm and 65 to 91 mm, respectively. Central Mudminnow TLENs ranged from 28 to 129 mm and assessed ages ranged from zero to two years. The individuals with TLENs greater than 90 mm were assessed to be one year or above. Finescale Dace TLENs ranged from 28 to 106 mm and assessed ages ranged from zero to six years.

3.7.6.4 FISH TISSUE

Five Central Mudminnow and five Finescale Dace composite samples, and two whole body White Sucker tissue samples were submitted for fish tissue analysis from WC-3. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury and methylmercury concentrations for all Central Mudminnow and Finescale Dace ranged from 0.02 to 0.12 mg/kg and 0.024 to 0.097 mg/kg, respectively. Six samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- Selenium concentrations for Central Mudminnow and Finescale Dace averaged 0.71 and 0.65 mg/kg, respectively. All samples were less than the FEQG for whole body samples (6.7 mg/kg).
- White Sucker total mercury concentrations were 0.04 and 0.08 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg). Total methylmercury concentrations were 0.030 and 0.060 mg/kg and were greater than the CCME (2000) guideline of 0.033 mg/kg for the protection of wildlife consumers of aquatic biota. Selenium concentrations for both samples were 0.53 mg/kg for both samples and were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.6.5 WATER QUALITY

In-situ measurements were collected in the spring, summer, and fall 2022 and 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature ranged from 5.0°C to 25.4 °C, DO ranged from 1.36 to 12.88 mg/L, and pH ranged from 6.57 to 7.15 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG, with one exception. The considerably low DO reading in summer 2022 (1.36 mg/L) is abnormal and could be attributed to the probe touching the bottom of the stream.

3.7.6.6 SEDIMENT QUALITY

Sediment samples were collected from two stations within WC-3 during the fall 2022 field investigations. Three stations were attempted but lack of suitable substrate within the sample reach prevented sampling at a third station, the two samples were within a water depth of 0.2 m. Laboratory chemical analyses of sediment quality are presented in Appendix D: Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- The two replicates varied in composition with WC-3-S01 being primarily composed of gravel and coarse sand and S03 was primarily coarse and fine sand.

- TOC was higher than the PSQG LEL at all stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic and greater than the PSQG LEL and SEL for manganese.

3.7.6.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-3 during the fall 2022 field program from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-3; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- Midges (*Chironomidae*) dominated the benthic community, averaging 70% of the total numbers.
- EPT taxa were present at only one replicate station at less than 1% of total abundance.
- Richness was relatively high, ranging from 10 to 13 taxa, and evenness was low (0.08).

The WC-3 BIC had low diversity and evenness compared to other Dixie Creek Tributary locations, likely due to the high Chironomid taxa counts. Compared to similar habitats in the other tributaries (WB-6 Tributaries, WC-7 tributaries, and WC-8 tributaries), WC-3 had a relatively low EPT taxa count.

3.7.7 UNNAMED WATERCOURSE 3A

3.7.7.1 FISH HABITAT

Unnamed Watercourse 3A (WC-3A) is a tributary of WC-3, similar to WC-3B, with its confluence farther upstream. The sample location is a short distance upstream of the confluence and has characteristics of habitat type E (Table A1-1A). The stream is narrow and shallow, within a dense mixed coniferous and deciduous forest, similar to WC-3B. The water is dark tea-stained colour and substrate is comprised predominantly of leaf litter and silt. Overhanging grasses and shrubs, undercut banks, and LWD provide habitat for small-bodied fish.

3.7.7.2 FISH COMMUNITY

A total of 149 fish were caught at WC-3A during the 2022 and 2023 field investigations, including Brook Stickleback, Central Mudminnow, and Northern Pike (Table 3.1). Baited minnow traps, dip nets, and electrofishing efforts were utilized, however only minnow traps successfully captured fish (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-3A represents a warm to coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.7.3 WATER QUALITY

In-situ measurements were collected in the spring and summer 2022 field investigations as the watercourse was dry or of insufficient depth to sample in 2023. Temperature measured 9.1°C and 16.0 °C, DO measures 7.7 and 9.68 mg/L and pH measured 5.78 and 6.71 (Appendix A; Tables A1-2A to A1-2B). All DO measurements met the PWQO and CWQG, while pH in spring (5.78) did not.

3.7.7.4 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.2 m in WC-3A during the fall 2022 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of silt with some clay, fine sand and coarse sand.
- TOC was higher than the PSQG LEL at all stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic, chromium, copper, iron, manganese, and nickel.

3.7.7.5 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-3A during the fall 2022 field program from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimation of benthic invertebrate community descriptors. A summary of these findings is provided below.

- Round worms (*Nemata*), worms (*Enchytraeidae*), seed shrimps (*Ostracoda*), biting midges (*Ceratopogonidae*), midges (*Chironomidae*), and clams (*Sphaeriidae*) were all prevalent throughout the replicate stations, showing a diverse community.
- The percentage of both EPT and Chironomids was low, at 1% and 12%, respectively.
- Taxa richness was comparatively high, ranging from 8 to 13.

The WC-3A BIC had high diversity compared to other Dixie Creek Tributary locations, likely due to the low Chironomid taxa counts. Compared to similar habitats in the other tributaries (WB-6 tributaries, WC-7 tributaries, and WC-8 tributaries), WC-3A had a low Chironomid and EPT taxa count and high diversity and evenness.

3.7.8 UNNAMED WATERCOURSE 3B

3.7.8.1 FISH HABITAT

Unnamed Watercourse 3B (WC-3B) is a tributary to WC-3, meeting the stream south of the WC-3 sample location. The WC-3B sample location is several kilometers north of the confluence and represents of habitat type E (Table A1-1A). The stream is narrow and shallow, within a dense mixed coniferous and deciduous forest, similar to WC-3. The water is dark tea-stained colour and substrate is comprised predominantly of clay with sections of banks heavily eroded. Overhanging grasses and shrubs, undercut banks, and LWD provide habitat for small-bodied fish.

3.7.8.2 FISH COMMUNITY

A total of 97 fish were captured from WC-3B during the 2022 and 2023 field investigations, including Brook Stickleback and Central Mudminnow, Finescale Dace, and Northern Redbelly Dace (Table 3.1). Baited minnow traps, dip nets, and electrofishing efforts were utilized during the field investigations, with baited minnow traps being the most effective gear type and capturing a total of 89 individuals. Dip netting did not capture any individuals (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-3B represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.8.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 44 Brook Stickleback and 40 Central Mudminnow from WC-3B were used to generate length frequency histograms. Length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8).

Brook Stickleback and Central Mudminnow TLENs ranged from 41 to 60 mm and 43 to 116 mm, respectively. An even distribution of TLEN measurements across length bins were noted for both species.

3.7.8.4 FISH TISSUE

One Brook Stickleback and four Central Mudminnow composite samples were submitted for fish tissue analysis from WC-3B in 2022. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww. Results have also been presented in dw for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury and methylmercury concentrations for all species ranged from 0.04 to 0.114 mg/kg and 0.06 to 0.146 mg/kg, respectively. All samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.

- Selenium concentrations for Brook Stickleback and Central Mudminnow measured 0.97 and 0.9 mg/kg, respectively. All samples were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.8.5 WATER QUALITY

In-situ measurements were collected in the spring and summer 2022 and spring, summer, and fall 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature values ranged from 9.3°C and 16.0°C, DO values ranged from 6.77 and 9.62 mg/L, and pH values ranged from 5.54 and 6.41 (Appendix A; Tables A1-2A to A1-2B). All DO measurements met the PWQO and CWQG, while all pH recordings did not, apart from spring 2023 (6.63).

3.7.8.6 SEDIMENT QUALITY

Sediment samples were collected from three stations in 2022 and two stations in 2023 with a maximum water depth of 0.4 m in WC-3B during the fall field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of silt with some fine sand.
- TOC was higher than the PSQG LEL at all stations.

3.7.8.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-3B during the fall 2022 and 2023 field programs from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- BIC metrics varied between sampling years, with lower total abundance, richness, diversity, and percent Chironomids, and higher evenness in 2023.
- Seed shrimps (*Ostracoda*), midges (*Chironomidae*), and clams (*Sphaeriidae*) represented most of the community abundance in 2022 while clams made up 67% of the community in 2023.
- No EPT taxa were identified in either sampling year.

Overall, the WC-3B BIC was similar to other Dixie Creek Tributary locations and to habitats in the other tributaries (WB-6 tributaries, WC-7 tributaries, and WC-8 tributaries).

3.7.9 UNNAMED WATERCOURSE 4

3.7.9.1 FISH HABITAT

Unnamed Watercourse 4 (WC-4) is located south and slightly west of the Project area and has characteristics of habitat type F (Table A1-1A). The stream is a narrow and shallow, located within a dense mixed deciduous/coniferous forest. The stream has a large gradient with alternating series of pools and impoundments that eventually discharges into Dixie Creek. The water is dark tea-stained colour and substrate is comprised of muck and silt. Overhanging grasses and shrubs and undercut banks provide habitat for small-bodied fish.

3.7.9.2 FISH COMMUNITY

A total of 129 fish were captured from WC-4 during the 2022 and 2023 field investigations, including Brook Stickleback, Central Mudminnow, Fathead Minnow, Northern Pike, Northern Redbelly Dace, Rock Bass, White Sucker, and Yellow Perch (Table 3.1) Baited minnow trap and electrofishing efforts were used, with similar effectiveness. Brook Stickleback represented the greatest proportion of fish species caught (greater than 50%) (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-4 represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.9.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 79 Brook Stickleback, eight Central Mudminnow, six Fathead Minnow and nine Northern Redbelly Dace from WC-4 were used to generate length frequency histograms. Of these, two Brook Stickleback, two Central Mudminnow, three Fathead Minnow, nine Northern Redbelly Dace and one Slimy Sculpin were submitted for age assessment. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8).

Brook Stickleback ranged from 23 to 72 mm and assessed ages were zero and one. Central Mudminnow TLEN ranged from 39 to 120 mm. The two Central Mudminnow sent for aging measured 62 and 78 mm TLEN and the assessed ages were zero and one year. Fathead Minnow ranged from 46 to 93 mm TLEN and assessed ages were one for all individuals. Northern Redbelly Dace ranged from 55 to 62 mm TLEN and assessed ages were two to three years. The Slimy Sculpin measured 76 mm TLEN and was assessed to be two years old.

3.7.9.4 FISH TISSUE

Three Brook Stickleback and one Central Mudminnow composite samples were submitted for fish tissue analysis from WC-4. The analytical results display total metals in mg/kg of ww, except for selenium which is discussed as mg/kg for comparison to the FEQG. Results are provided in Appendix C (Figures C1-1 to C1-21 and Tables C1-1 to C1-7).

- Total mercury and methylmercury concentrations for all species ranged from 0.08 to 0.129 mg/kg and 0.10 to 0.127 mg/kg, respectively. All samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- Selenium concentrations for Brook Stickleback and Central Mudminnow averaged 1.45 and 1.44 mg/kg, respectively. All samples were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.9.5 WATER QUALITY

In-situ measurements were collected in the spring, summer, and fall 2022 and 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature ranged from 5.0°C to 21.0°C, DO from 7.15 to 11.77 mg/L, and pH from 6.81 to 8.24 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG apart from two DO measurements in 2023 (summer and fall).

3.7.9.6 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.2 m in WC-4 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples were well mixed with coarse sand, silt, clay, fine sand, and gravel.
- TOC was higher than the PSQG LEL at most stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic, chromium, copper, iron, manganese, and nickel.

3.7.9.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-4 during the fall 2022 and 2023 field programs from total water depths between 1.2 and 1.8 m. The benthic invertebrate community data and results findings are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- BIC metrics were similar between sampling years, with biting midges (*Ceratopogonidae*) and midges (*Chironomidae*) being the dominant taxa.
- The percent Chironomids per replicate averaged 44% and 33% for 2022 and 2023, respectively.

- EPT taxa were present at all replicate stations, averaging 5% of total abundance in 2022 and increasing to nearly 15% in 2023.

WC-4 had the highest average taxa richness of all locations and higher TID and percent EPT taxa than other Dixie Creek Tributary locations. Compared to similar habitats in the other tributaries (WB-6 Tributaries, WC-7 Tributaries, and WC-8) WC-4 had high EPT taxa count and richness.

3.7.10 UNNAMED WATERCOURSE 5

3.7.10.1 FISH HABITAT

Unnamed Watercourse 5 (WC-5) is located south of the Project area and flows north into Dixie Creek. WC-5 has characteristics of habitat type F at the sampled location with a moderate to broad floodplain with shrubs and grasses lining the high banks (Table A1-1A). Several large beaver ponds collecting drainage are located upstream of the WC-5 location with upland areas consisting mainly mixed coniferous and deciduous dominated by Black Spruce, poplar, and Tamarack. The stream is moderate in width and depth with water dark tea-stained colour and substrate is comprised predominantly of muck and silt. Overhanging grasses and shrubs, undercut banks, LWD, and ponded areas provide habitat for small-bodied fish.

3.7.10.2 FISH COMMUNITY

A total of 2,238 individuals were caught from WC-5 during the 2022 and 2023 field investigations, including Brook Stickleback, Central Mudminnow, Fathead Minnow, Finescale Dace, Lake Chub, Northern Pearl Dace, Northern Redbelly Dace, and White Sucker (Table 3.1). Baited minnow traps and electrofishing efforts were both utilized, with minnow traps being the most effective gear type, capturing 2,100 out of 2,238 individuals (94%) (Appendix B; Tables B1-1 to B1-9). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-5 represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.10.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 50 Brook Stickleback, 145 Central Mudminnow, 29 Fathead Minnow, 187 Finescale Dace, and 48 Northern Redbelly Dace from WC-5 were used to generate length frequency histograms. Of these, 21 Central Mudminnow and 17 Finescale Dace were submitted for aging. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8).

Brook Stickleback TLENs ranged from 22 to 71 mm, Fathead Minnow TLENs ranged from 46 to 83 mm, and Northern Redbelly Dace TLENs ranged from 45 to 95 mm.

Central Mudminnow TLENs ranged from 34 to 120 mm and assessed ages ranged from zero to three years, with all YOY fish recorded under 50 mm TLEN. WC-5 accounted for 57% of Central Mudminnow captures within Dixie Creek tributaries.

Finescale Dace TLENs ranged from 28 to 105 mm and assessed ages ranged from zero to three years. One year old fish all were under 70 mm TLEN. WC-5 accounted for 78% of Finescale Dace captures within Dixie Creek tributaries.

3.7.10.4 FISH TISSUE

Ten Central Mudminnow and five Finescale Dace composite samples were submitted for fish tissue analysis from WC-5. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury and methylmercury concentrations for all species ranged from 0.02 to 0.041 mg/kg and 0.03 to 0.052 mg/kg, respectively. Nine of 15 composite samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.

Average selenium concentrations for Central Mudminnow and Finescale Dace measured 0.70 and 0.72 mg/kg, respectively. All samples were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.10.5 WATER QUALITY

In-situ measurements were collected in the spring, summer, and fall 2022 and 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature ranged from 2.1°C to 21.0°C, DO ranged from 5.53 to 9.54 mg/L, and pH ranged from 5.46 to 6.4 (Appendix A; Tables A1-2A to A1-2B). DO and pH measurements met the PWQO and CWQG criteria apart from two pH measurements (spring and fall 2023).

3.7.10.6 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.2 m in WC-4 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted primarily of silt and clay with some coarse sand.
- TOC was higher than the PSQG LEL at all stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic, chromium, copper, iron, manganese, and nickel.

3.7.10.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-5 during the fall 2022 and 2023 field programs from a maximum total water depth of 0.2 m. The benthic invertebrate community findings data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- BIC metrics were similar between sampling years, however 2023 had a decrease in total abundance and the percentage of Chironomids per sample.
- Clams (*Sphaeriidae*) and midges (*Chironomidae*) dominated the benthic community in both years, and EPT taxa were present in less than 1% of the samples.
- Taxa richness was high in both years, averaging 10 and 12 taxa in 2022 and 2023, respectively.

The WC-5 BIC had second highest TID of all locations but was otherwise similar to the other Dixie Creek tributary locations. Compared to similar habitats in the other tributaries (WB-6 tributaries, WC-7 tributaries, and WC-8 tributaries), WC-5 had a low EPT tax count.

3.7.11 UNNAMED WATERCOURSE 6A

3.7.11.1 FISH HABITAT

Unnamed Watercourse 6A (WC-6A) is a sampling location within a tributary discharging into WB-6, south of WC-6B-01. It consists of habitat type E, with a narrow, shallow stream surrounded by mixed coniferous and deciduous (Table A1-1A). Two locations were surveyed within WC-6A, the locations labelled WC-6A and WC-6A-US. Water is dark tea-stained colour and substrate is comprised of cobble, muck, and silt, similar to WC-6C. Overhanging alders, grasses, and shrubs on the banks are the dominant cover type, providing habitat for small-bodied fish.

3.7.11.2 FISH COMMUNITY

A total of 28 fish were captured from WC-6A during the 2022 and 2023 field investigations. Brook Stickleback and Central Mudminnow were captured using baited minnow traps and electrofishing efforts (Table 3.1) Electrofishing was the most effective capture gear and Central Mudminnow represented the greatest proportion of fish species caught (27 of 28 total) (Appendix B; Tables B1-1 to B1-10). Summer (July and August) water temperature measurements and captured fish species indicate the thermal guild

classification for WC-6A represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.11.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 20 Central Mudminnow from WC-6A-US were used to generate length frequency histograms. Of these, eight Central Mudminnow were submitted for aging. Fish age results are displayed in Appendix B (Tables B1-1 and B1-2) and length frequency histograms are displayed by species and sampling location in Appendix B (Figure B1-1 to B1-8).

Central Mudminnow ranged from 38 to 129 mm TLEN and assessed ages measured zero and two years of age. All fish aged zero were under 100 mm TLEN.

3.7.11.4 FISH TISSUE

One Central Mudminnow composite sample was submitted for fish tissue analysis from WC-6A-US in 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury and methylmercury concentrations measured 0.120 and 0.137 mg/kg, respectively, and was greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- The selenium concentration for Central Mudminnow measured 0.855 mg/kg and was less than the FEQG for whole body samples (6.7 mg/kg).

3.7.11.5 WATER QUALITY

In-situ measurements were collected at the WC-6A location in the summer and fall 2022 and spring, summer, and fall 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature values ranged from 4.0°C to 14.0°C, DO ranged from 3.28 to 7.96 mg/L, and pH values ranged from 6.02 to 7.67 (Appendix A; Tables A1-2A to A1-2B). Most DO and pH measurements met the PWQO and CWQG, except for two DO measurements and one pH measurement.

In-situ measurements at WC-6A-US were collected in the summer and fall 2023 field investigations. Temperature values measured 10.5°C and 15.1°C, DO measured 2.30 and 2.33 mg/L, and pH values measured 6.35 and 6.86 (Appendix A; Tables A1-2A to A1-2B). Both DO measurements and one pH value measured below the PWQO and CWQG criteria.

3.7.11.6 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.2 m in WC-6A at the WC-6A-US location during the fall 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted primarily of silt and clay with some fine sand.
- TOC was higher than the PSQG LEL at all stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic, chromium, copper, iron, manganese, nickel, and zinc.
- Manganese concentrations were greater than the PSQG SEL at two replicate stations.

3.7.11.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-6A at the WC-6A-US location during the fall 2023 field program from total water depths of 0.1 to 0.3 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- WC-6A had the highest average diversity (0.68) and lowest percentage of Chironomids (33%) of all WB-6 tributaries but was relatively consistent among other metrics.
 - The community was primarily composed of midges (*Chironomidae*), clams (*Sphaeriidae*), and seed shrimp (*Ostracoda*).
-

3.7.12 UNNAMED WATERCOURSE 6A-01

3.7.12.1 FISH HABITAT

Unnamed Watercourse 6A-01 (WC-6A-01) is a small, groundwater fed water source for WC-6A exhibiting habitat type D characteristics. No flow was present when surveyed, only wet depressions without a defined channel.

3.7.13 UNNAMED WATERCOURSE 6A-02

3.7.13.1 FISH HABITAT

Unnamed Watercourse 6A-02 (WC-6A-02) discharges into WC-6A, flowing south to north. It consists of habitat type D, with a narrow, shallow stream surrounded by mixed coniferous and deciduous trees (Table A1-1A). A complete loss of channel occurs downstream of the sampling location, and the location water enters WC-6A is undefined.

3.7.13.2 FISH COMMUNITY

Fish were not captured from WC-6A-02 during the 2023 spring, summer and fall field investigations, utilizing electrofishing as the capture method (Table 3.1 and Appendix B; Tables B1-1 to B1-9). Summer (August) water temperature measurements indicate the thermal guild classification for WC-6A-02 represents a coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.13.3 WATER QUALITY

In-situ measurements at the WC-6A-US location were collected in the spring, summer, and fall 2023 field investigations. Temperature values ranged from 9.1°C to 12.8°C, DO ranged from 1.28 to 3.74 mg/L, and pH values ranged from 6.74 to 7.67 (Appendix A; Tables A1-2A to A1-2B). All pH measurements met the PWQO and CWQG and all DO measurements did not.

3.7.14 UNNAMED WATERCOURSE 6B

3.7.14.1 FISH HABITAT

Unnamed Watercourse 6B (WC-6B) is a sampling location within WB-6 drainage, east of WC-6B-01. As with WC-6B-01, it consists of habitat type E and is located within a forested area (Table A1-1A). The tributary is narrow and shallow (less than 30 cm in depth) with undercut banks, and a silt and muck bottom with occasional large boulders. WC-6B is surrounded by dense mixed coniferous and deciduous mostly comprised of poplar, Black Spruce, and alder. Overhanging grasses and shrubs, boulders and banks provide habitat for small-bodied fish.

3.7.14.2 FISH COMMUNITY

A total of 206 fish were captured from WC-6B during the 2022 and 2023 field investigations, including Brook Stickleback and Central Mudminnow (Table 3.1) Baited minnow traps and electrofishing efforts were utilized during the spring, summer, and fall programs. Baited minnow traps were the most effective capture gear, collecting a total of 198 individuals, while electrofishing only captured one Brook Stickleback and seven Central Mudminnow (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-6B represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.14.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 72 Brook Stickleback and 79 Central Mudminnow from WC-6B were used to generate length frequency histograms. Of these, nine Brook Stickleback and eight Central Mudminnow were submitted for aging. Fish age results are displayed in Appendix B (Tables B1-1 and B1-2) and length frequency histograms are displayed by species and sampling location in Appendix B (Figure B1-1 to B1-8).

Brook Stickleback ranged from 43 to 54 mm TLEN and assessed ages range from zero to one year of age. Central Mudminnow ranged from 47 to 116 mm TLEN and assessed ages range from zero to three years of age. All fish aged zero were under 50 mm TLEN.

3.7.14.4 FISH TISSUE

Four Brook Stickleback and eight Central Mudminnow composite samples were submitted for fish tissue analysis from WC-6B in 2022 and 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury and methylmercury concentrations for all species ranged from 0.04 to 0.08 mg/kg and 0.046 to 0.090 mg/kg, respectively. All samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- Average selenium concentrations for Brook Stickleback and Central Mudminnow measured 0.79 and 0.58 mg/kg, respectively. All samples were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.14.5 WATER QUALITY

In-situ measurements were collected in the spring, summer, and fall 2022 and 2023 field investigations. Temperature ranged from 4.1°C to 17.3°C, DO ranged from 6.72 to 10.45 mg/L, and pH ranged from 5.45 to 7.21 (Appendix A; Tables A1-2A to A1-2B). All DO measurements met the PWQO and CWQG, while pH readings in the spring (5.45) and fall (6.47) of 2022 and fall (6.07) 2023 did not.

3.7.14.6 SEDIMENT QUALITY

Sediment samples were collected from two stations due to unsuitable substrate (boulder/larger rock) with a maximum water depth of 0.2 m in WC-4 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples contained large percentages of coarse and fine sand with some silt.
- TOC was higher than the PSQG LEL at all stations.
- Background concentrations greater than the PSQG LEL and SEL and CSQG PEL were noted for arsenic and manganese.

3.7.14.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-6B during the fall 2022 and 2023 field programs from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- No EPT taxa were found in samples collected in 2022 or 2023, but percent chironomids was relatively high in both sampling years.
- Diversity increased from 0.3 to 0.5, and taxa richness dropped from 11 to 7, from 2022 to 2023.
- Midges (*Chironomidae*) and clams (*Spaeriidae*) represented most of the benthic invertebrate community.

WC-6B had the highest average proportion of Chironomid taxa in samples of all WB-6 tributary locations and the second lowest value of diversity in 2022. Of the WB-6 Tributaries, it was most similar to WC-6B-01 while WC-6C had much fewer Chironomids, and higher values of evenness and diversity. These BIC metrics are similar to the other tributaries (Dixie Creek Tributaries, WC-7 tributaries, and WC-8 tributaries), with high Chironomid taxa counts and low values of percent EPT taxa.

3.7.15 UNNAMED WATERCOURSE 6B-01

3.7.15.1 FISH HABITAT

Unnamed Watercourse 6B-01 (WC-6B-01) is a sampling location within the WB-6 drainage, east of the Project area. WC-6B-01 consists of habitat type E, with lower flow and a small floodplain (Table A1-1A). The stream is forested and shallow (less than 30 cm in depth), with undercut banks (Table A1-1A). The substrate at the tributary bottom consists of silt and muck with occasional large boulders. WC-6B-01 is surrounded by dense mixed coniferous and deciduous mostly comprised of poplar, Black Spruce, and alder. In-stream, LWD, boulders, and undercut banks provide habitat for small-bodied fish.

3.7.15.2 FISH COMMUNITY

A total of 185 fish were captured from WC-6B-01 during the 2022 and 2023 field investigations. Brook Stickleback and Central Mudminnow were the only species captured (Table 3.1) Baited minnow traps and electrofishing efforts were utilized during the spring, summer, and fall, with minnow traps capturing all fish (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-6B-01 represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.15.3 WATER QUALITY

In-situ measurements were collected in the spring, summer, and fall 2022 and 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature ranged from 5.2°C to 14.9°C, DO ranged from 6.75 to 8.65 mg/L, and pH ranged from 5.57 to 6.95 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG criteria, except for two pH values in 2023 (spring and summer).

3.7.15.4 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.6 m in WC-6B-01 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of coarse and fine sand with clay.
- TOC was higher than the PSQG LEL at all stations.
- Background concentrations greater than the PSQG LEL and CSQG ISQG were noted for chromium, copper, iron, manganese, and nickel.

3.7.15.5 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-6B-01 during the fall 2022 and 2023 field programs from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimates of benthic invertebrate community descriptors. A summary of these findings is provided below.

- BIC metrics were similar between sampling years, with high abundance, TID, and richness.
- The percentage of Chironomids was relatively high (53%) in 2023 but decreased from 81% the year previous.
- Midges (*Chironomidae*) and clams (*Spaeriidae*) represented most of the benthic invertebrate community.

- EPT taxa were present, but at low percentages (less than 2%) of total numbers.

BIC metrics were similar to the other tributaries (Dixie Creek tributaries, WC-7 tributaries and WC-8 tributaries), with high percentages of Chironomid taxa and low percent of EPT taxa, however WC-6B-01 still had a comparatively high TID score.

3.7.16 UNNAMED WATERCOURSE 6B-02

3.7.16.1 FISH HABITAT

Unnamed Watercourse 6B-02 (WC-6B-02) is flows into WC-6B, before exiting into WB-6. The stream heavily impounded with beaver dams and consistent with habitat type F (Table A1-1A). It is narrow and shallow, located within an alder dominated riparian and a dense mixed upland forest. The stream appears to be near dry during low flow conditions and is fed by a series of beaver created pools and impoundments throughout the watercourse. Substrate is composed of silt and detritus.

3.7.16.2 FISH COMMUNITY

A total of 256 fish were captured from WC-6B-02 during the 2023 field investigations. Brook Stickleback and Central Mudminnow were the only species captured (Table 3.1). Baited minnow traps and electrofishing efforts were utilized during the spring, summer, and fall with minnow traps capturing all fish (Appendix B; Tables B1-1 to B1-10).

3.7.16.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 140 Brook Stickleback, 110 Central Mudminnow, 15 Finescale Dace, and 10 Northern Redbelly Dace were used to generate length frequency histograms. Of these, four Brook Stickleback, and 21 Central Mudminnow were submitted for aging. Fish age results are displayed in Appendix B (Tables B1-1 and B1-2) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8).

Captured Brook Stickleback ranged from 32 to 73 mm TLEN and assessed ages ranged from zero to one year. Central Mudminnow ranged from 30 to 130 mm TLEN and assessed ages ranged from zero to four years of age. Individuals aged greater than one year consistently had a TLEN greater than 60 mm. Finescale Dace and Northern Redbelly from WC-6C ranged from 48 to 78 mm TLEN and 53 to 62 mm TLEN, respectively.

3.7.16.4 FISH TISSUE

Seven Brook Stickleback and nine Central Mudminnow composite samples were submitted for fish tissue analysis from WC-6C. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury and methylmercury concentrations for all species ranged from 0.07 to 0.17 mg/kg and 0.050 to 0.209 mg/kg, respectively. All samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
 - Average selenium concentrations for Brook Stickleback and Central Mudminnow measured 1.01 and 0.97 mg/kg, respectively. All samples were less than the FEQG for whole body samples (6.7 mg/kg).
-

3.7.17 UNNAMED WATERCOURSE 6C

3.7.17.1 FISH HABITAT

Unnamed Watercourse 6C (WC-6C) is a sampling location within WB-6 drainage, east of WC-6B. WC-6B consists of habitat type E flowing into habitat type F with large, beaver constructed pool complexes (Table A1-1A). The stream begins with overhanging alders and leads toward a beaver impounded

wetland surrounded by mixed coniferous and deciduous. Water is dark tea-stained colour and substrate is comprised of muck and silt. Overhanging grasses and shrubs, boulders and banks provide habitat for small-bodied fish.

3.7.17.2 FISH COMMUNITY

A total of 823 fish were captured from WC-6C during the 2022 and 2023 field investigations, including Brook Stickleback, Central Mudminnow, Finescale Dace and Northern Redbelly Dace (Table 3.1). Baited minnow traps and electrofishing efforts were utilized, with minnow traps being the most effective capture gear, collecting a total of 776 individuals (96%) (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-6C represents a warm to coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.17.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 140 Brook Stickleback, 110 Central Mudminnow, 15 Finescale Dace, and 10 Northern Redbelly Dace were used to generate length frequency histograms. Of these, 4 Brook Stickleback, and 21 Central Mudminnow were submitted for aging. Fish age results are displayed in Appendix B (Tables B1-1 and B1-2) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8).

Captured Brook Stickleback ranged from 32 to 73 mm TLEN and assessed ages ranged from zero to one year. Central Mudminnow ranged from 30 to 130 mm TLEN and assessed ages ranged from zero to four years of age. Individuals aged greater than one year consistently had a TLEN greater than 60 mm. Finescale Dace and Northern Redbelly from WC-6C ranged from 48 to 78 mm TLEN and 53 to 62 mm TLEN, respectively.

3.7.17.4 FISH TISSUE

Seven Brook Stickleback and nine Central Mudminnow composite samples were submitted for fish tissue analysis from WC-6C. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury and methylmercury concentrations for all species ranged from 0.07 to 0.17 mg/kg and 0.050 to 0.209 mg/kg, respectively. All samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.

Average selenium concentrations for Brook Stickleback and Central Mudminnow measured 1.01 and 0.97 mg/kg, respectively. All samples were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.17.5 WATER QUALITY

In-situ measurements were collected in the spring, summer, and fall 2022 and 2023 field investigations. Temperature ranged from 8.1°C to 21.3°C, DO ranged from 4.07 to 10.8 mg/L, and pH ranged from 6.17 to 7.51 (Appendix A; Tables A1-2A to A1-2B). All DO and pH measurements met the PWQO and CWQG, except for pH in spring of 2022 (6.17) and two DO values in summer and fall 2023 (4.85 and 4.07, respectively).

3.7.17.6 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.2 m in WC-6C during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of silt and clay with some fine sand.
- TOC was higher than the PSQG LEL at most stations.
- Background concentrations greater than the PSQG LEL and CSQG PEL were noted for arsenic, chromium, copper, iron, manganese, and nickel.

3.7.17.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-6C during the fall 2022 and 2023 field programs from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- BIC metrics were similar between sampling years, however lower total abundance in the 2023 samples was observed.
- The percentage of Chironomids increased from 34% to 42% and the percentage of EPT taxa increased to 6% in 2023 from less than 1% in 2022.
- Worms (Tubificinae), seed shrimps (Ostracoda), biting midges (Ceratopogonidae), midges (Chironomids), and clams (Sphaeriidae) had high counts within replicates.

Compared to similar habitats in the other tributaries (Dixie Creek Tributaries, WC-7 tributaries and WC-8 tributaries) WC-6C had low percentages of Chironomid and EPT taxa, and high TID and total abundance.

3.7.18 UNNAMED WATERCOURSE 7

3.7.18.1 FISH HABITAT

Unnamed Watercourse 7 (WC-7) is a moderate flowing, wide riverine section of creek with habitat type H characteristics such as a broad floodplain and frequent, strong meander bends (Table A1-1A). The location is located south of the Project area and discharges into Dixie Creek. This section of creek is similar to DC-04, consisting of a broad floodplain dominated by alder with grasses and sedges along the riparian. The substrate consists mostly of soft fine-grained sediments with occasional boulder, and emergent macrophytes such as Broadleaf Arrowhead within the margins.

3.7.18.2 FISH COMMUNITY

A total of eight fish were caught from WC-7 during the 2022 and 2023 field investigations, five Northern Pike and three Yellow Perch (Table 3.1). Baited minnow traps and gillnets were utilized, with gillnets being the most effective capture gear (Appendix B; Tables B1-1 to B1-10). Summer (August) water temperature measurements and captured fish species indicate the thermal guild classification for WC-7 represents a coolwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

Metabarcoding analysis identified DNA from 24 species in water samples collected from WC-7 during spring, summer, and fall sampling. Species DNA included, Blacknose Shiner, Burbot, Central Mudminnow, Common Shiner, Fathead Minnow, Finescale Dace, Golden Shiner, Iowa Darter, Johnny Darter, Lake Chub, Lake Whitefish, Mimic Shiner, Mooneye, Northern Pearl Dace, Northern Pike, sculpin species, Shorthead Redhorse, Silver Redhorse, Smallmouth Bass, Spottail Shiner, Trout-perch, Walleye, White Sucker, and Yellow Perch. Of these, sculpin could only be identified to genus. The *Cottus* species in this sample location are most likely the Mottled and Slimy sculpins.

Consistent with location DC-04, WC-7 detected a high number of species DNA. Given the WC-7 location is a short distance upstream of DC-04 and has similar habitat, it is likely species from the Chukuni River will utilize habitat within WC-7.

3.7.18.3 FISH LENGTH FREQUENCY AND AGE

A total of three Northern Pike and one Yellow Perch samples were submitted for age assessment. Fish age results are displayed in Appendix B (Tables B1-1 and B1-2).

The Northern Pike ranged from 330 to 360 mm TLEN and all three were assessed to be one year in age. The Yellow Perch measured 100 mm TLEN and was assessed to be one year old.

3.7.18.4 FISH TISSUE

Three Northern Pike and one Yellow Perch tissue samples were submitted for analysis from WC-7. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

Total mercury concentration in the Northern Pike fish tissue samples ranged from 0.25 to 0.54 mg/kg and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg), except for one sample collected in 2023. The methylmercury concentrations ranged from 0.152 to 0.357 mg/kg and all samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentration in tissue samples ranged from 0.65 to 0.71 mg/kg and was less than the FEQG for whole body samples (6.7 mg/kg).

Yellow Perch total mercury and methylmercury concentrations measured 0.06 and 0.054 mg/kg, respectively, and were less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), as well as those developed for women of child-bearing age and children (0.5 mg/kg) and the Health Canada maximum contaminant concentration (0.5 mg/kg). The methylmercury concentration was higher than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. The selenium concentration measured 0.77 mg/kg and was less than the FEQG for whole body samples (6.7 mg/kg).

Data trends between total mercury concentration, total methylmercury concentration, and TLEN were not analyzed due to insufficient sample size.

3.7.18.5 WATER QUALITY

In-situ measurements were collected in the fall 2022 and spring, summer, and fall 2023 field investigations. Water temperature ranged from 7.0°C to 19.7°C, DO ranged from 5.98 to 12.52 mg/L, and pH ranged from 6.7 to 7.0 (Appendix A; Tables A1-3A and A1-3B). All DO and pH measurements met the PWQO and CWQG in both years.

3.7.18.6 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 1.5 m in WC-7 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of silt with some fine sand and clay.
- TOC was higher than the PSQG LEL at all stations and the PSQG SEL at one station in 2022.
- Background concentrations greater than the PSQG LEL and SEL were noted for chromium, copper, iron, manganese, and nickel.

3.7.18.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-7 during the fall 2022 and 2023 field programs from total water depths between 1.1 and 1.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- BIC metrics generally increased from 2022 to 2023, with greater total abundance, TID, richness, diversity, but lower percentage of Chironomids.
- EPT taxa were present at all replicates, averaging 11% in 2022 and 7% in 2023.
- Midges (*Chironomidae*), clams (*Sphaeriidae*), and snails (*Hydrobiidae*) were the dominant taxa at this location.

3.7.19 UNNAMED WATERCOURSE 7A-03

3.7.19.1 FISH HABITAT

Unnamed Watercourse 7A-03 (WC-7A-03) is a sampling location within a tributary of WC-7, located south and east of the Project area. WC-7A-03 has characteristics of habitat type E consisting of a shallow, narrow stream with a series of pools and impoundments both upstream and downstream of the sampling location (Table A1-1A). It's located within a mixed coniferous and deciduous forest dominated by alder riparian. The water is a dark, tea-stained colour and substrate is comprised predominantly of silt and gravel. Overhanging grasses and shrubs, detritus, undercut banks, large pools, and LWD are present.

3.7.19.2 FISH COMMUNITY

There were no fish caught at WC-7A-03 during the 2022 or 2023 field investigations (Table 3.1). Baited minnow traps and electrofishing efforts were utilized in spring, summer, and fall (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements indicate the thermal guild classification for WC-7A-03 represents a coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.19.3 WATER QUALITY

In-situ measurements were collected in the summer and fall 2022 and spring, summer and fall 2023 field investigations. Water quality parameters remained consistent across sampling years. Water temperature values were 4.5°C and 14.4°C, DO values were 3.56 and 8.08 mg/L, and pH values were 5.42 and 6.4 (Appendix A; Tables A1-2A to A1-2B). All pH measurements and three DO measurements were less than the PWQO and CWQG.

3.7.19.4 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.2 m in WC-7A-03 during the fall 2022 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of silt and coarse sand.
- TOC was higher than the PSQG LEL at all stations.

3.7.19.5 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-7A-03 during the fall 2022 field program from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- Clams (*Sphaeriidae*) and midges (*Chironomidae*) were the most prevalent taxa, but diversity was relatively high (0.71).
- WC-7A-03 had relatively high EPT proportions (5%), diversity, and evenness compared to the other WC-7 tributary locations and similar habitats in the other tributaries (WB-6 tributaries, Dixie Creek Tributaries, and WC-8).

3.7.20 UNNAMED WATERCOURSE 7A-07

3.7.20.1 FISH HABITAT

Unnamed Watercourse 7A-07 (WC-7A-07) is a sampling location within a tributary of WC-7, located east of WC-7A-03. WC-7A-07 has characteristics of habitat type E consisting of a shallow, narrow stream within a mixed coniferous and deciduous forest dominated by alder riparian (Table A1-1A). The water is a dark, tea-stained colour and substrate comprised predominantly of silt. Sections of stream become

flooded and stagnant during summer months. Overhanging grasses and shrubs, undercut banks, and fallen logs provide habitat for small-bodied fish.

3.7.20.2 FISH COMMUNITY

A total of 158 fish were captured from WC-7A-07 during the 2022 and 2023 field investigations, including Brook Stickleback, Central Mudminnow, and Golden Shiner (Table 3.1). Baited minnow traps and electrofishing efforts were utilized, with minnow traps being the most effective capture gear, collecting a total of 146 individuals. Central Mudminnow represented the greatest proportion of fish species caught (98%) (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-7A-07 represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.20.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 121 Central Mudminnow from WC-7A-07 were used to generate length frequency histograms. Of these, 15 were submitted for aging. Fish age results are displayed in Appendix B (Tables B2-1 to B2-3) and length frequency histograms are displayed by species and sampling location in Appendix B (Figures B1-1 to B1-8).

Central Mudminnow TLENs ranged from 35 to 128 mm and assessed ages ranged from zero to four years.

3.7.20.4 FISH TISSUE

Five Central Mudminnow composite samples were submitted for fish tissue analysis from WC-7A-07 in 2022. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Average total mercury and methylmercury concentrations measured 0.05 mg/kg and 0.059 mg/kg, respectively. All composite samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- Average selenium concentrations for Central Mudminnow measured 0.92 mg/kg, respectively, and were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.20.5 WATER QUALITY

In-situ measurements were collected in the summer and fall 2022 and spring, summer, and fall 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature values ranged from 1.9°C to 15.5 °C, DO values ranged from 3.12 to 7.43 mg/L, and pH values ranged from 6.34 to 6.49 (Appendix A; Tables A1-2A to A1-2B). Most DO and pH measurements were less than the PWQO and CWQG.

3.7.20.6 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.2 m in WC-7A-07 during the fall 2022 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of silt with some coarse sand and clay.
- TOC was higher than the PSQG LEL at all stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic, copper, iron, manganese, and nickel, manganese was greater than the PSQG SEL at one replicate station, and chromium was greater than the CSQG ISQG at all replicate stations.

3.7.20.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-7A-07 during the fall 2022 field program from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- Midges (*Chironomidae*) dominated the community, averaging 67% of the total numbers.
 - WC-7A-07 had relatively low EPT proportions compared to the other WC-7 tributary locations and similar habitats in the other tributaries (WB-6 tributaries, Dixie Creek tributaries, and WC-8).
 - Total abundance (452), TID (6,550), and richness (10) values were comparable to other locations.
-

3.7.21 UNNAMED WATERCOURSE 7A-08

3.7.21.1 FISH HABITAT

Unnamed Watercourse 7A-08 (WC-7A-08) is a sampling location within a tributary of WC-7, located east of WC-7A-07 and has characteristics of habitat type E (Table A1-1A). WC-7A-08 is a shallow stream with a large drainage pool and impoundment upstream of the sampling location. The stream is located within alder dominated riparian and mixed coniferous and deciduous upland forest. The water is a dark, tea-stained colour and substrate comprised predominantly of silt. Overhanging grasses and shrubs, large pools, and undercut banks provide habitat for small-bodied fish.

3.7.21.2 FISH COMMUNITY

A total of 163 individuals were captured from WC-7A-08, including Brook Stickleback, Central Mudminnow, Finescale Dace, and Northern Pike (Table 3.1). Baited minnow traps and electrofishing efforts were utilized, with minnow traps being the most effective capture gear. Central Mudminnow represented the greatest proportion of fish species caught (Appendix B; Tables B1-1 to B1-10).

3.7.21.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 43 Central Mudminnow and 10 Northern Pike from WC-7A-08 were used to generate length frequency histograms. Of these, two Central Mudminnow were submitted for age assessment. Central Mudminnow ranged from 39 to 116 mm TLENs. The individual Central Mudminnow measured 39 and 113 mm TLEN and were assessed to be zero and two years, respectively. Northern Pike TLENs measured 84 to 140 mm with an even distribution across TLEN bins.

3.7.21.4 FISH TISSUE

Three Central Mudminnow composite samples were submitted for fish tissue analysis from WC-7A-08 in 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) ww. Results have also been presented in dw for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Average total mercury and methylmercury concentrations measured 0.03 mg/kg and 0.028 mg/kg, respectively. One composite sample was greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- Average selenium concentrations for Central Mudminnow measured 0.75 mg/kg, respectively and were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.21.5 WATER QUALITY

In-situ measurements were collected in the summer and fall 2022 and spring, summer and fall 2023 field investigations. Water quality parameters remained consistent across sampling years. Temperature values ranged from 2.9°C to 16.0 °C, DO values ranged from 6.01 to 11.95 mg/L, and pH values ranged from

5.47 to 6.82 (Appendix A; Tables A1-2A to A1-2B). All pH and DO measurements met the PWQO and CWQG apart from spring and fall 2023 pH measurements (5.95 and 5.47, respectively).

3.7.21.6 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.2 m in WC-7A-08 during the fall 2022 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of silt with some coarse sand and clay.
- TOC was higher than the PSQG LEL at all stations and the SEL at two stations.
- Background concentrations greater than the PSQG LEL were noted for arsenic, iron, manganese, and nickel, while chromium was greater than the CSQG ISQG at all replicate stations.

3.7.21.7 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WC-7A-08 during the fall 2022 field program from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- Midges (*Chironomidae*) dominated the community, averaging 65% of the total numbers.
- WC-7A-08 had relatively low EPT proportions compared to the other WC-7 tributary locations and similar habitats in the other tributaries (WB-6 tributaries, Dixie Creek tributaries, and WC-8).
- Total abundance (518), TID (7,512), and richness (8) values were comparable to other locations.

3.7.22 UNNAMED WATERCOURSE 8

3.7.22.1 FISH HABITAT

Unnamed Watercourse 8 (WC-8) is a sampling location within a tributary of Gullrock Lake, located north of the Project area and represents habitat type F (Table A1-1A). WC-8 is a shallow stream with high, eroded banks located within alder dominated riparian with mixed coniferous and deciduous forest. The water is a dark, tea-stained colour and substrate comprised predominantly of clay. Overhanging grasses and shrubs, LWD, and undercut banks provide habitat for small-bodied fish.

3.7.22.2 FISH COMMUNITY

A total of 753 fish were captured from WC-8 during the 2022 field investigations, including Brook Stickleback, Burbot, Central Mudminnow, Fathead Minnow, Finescale Dace, Northern Pearl Dace, Northern Redbelly Dace, and White Sucker (Table 3.1) Baited minnow traps and electrofishing efforts were utilized, with minnow traps being the most effective capture gear, capturing 750 individuals. Finescale Dace represented the greatest proportion of fish species caught at 92%. Electrofishing was the only capture gear employed in 2023 and was unsuccessful at capturing fish (Appendix B; Tables B1-1 to B1-10). Summer (July) water temperature measurements and captured fish species indicate the thermal guild classification for WC-8 represents a warm to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.22.3 WATER QUALITY

In-situ measurements were collected in the spring, summer and fall 2023 field investigations. Temperature values ranged from 7.8°C to 15.5°C, DO values ranged from 2.18 to 3.49 mg/L, and pH values ranged from 6.49 to 7.0 (Appendix A; Tables A1-2A to A1-2B). All pH and DO measurements fell below the PWQO and CWQG apart from summer pH measurements (7.0).

3.7.22.4 SEDIMENT QUALITY

Sediment samples were collected from three stations with a maximum water depth of 0.18 m in WC-8 during the fall 2022 and 2023 field investigations. Laboratory chemical analyses of sediment quality are presented in Appendix D; Tables D1-1 to D1-3 as well as grain size analyses in Tables D1-4 to D1-6.

- Samples consisted predominantly of fine sand with some silt.
- TOC was higher than the PSQG LEL at all stations in 2022.

3.7.22.5 BENTHIC INVERTEBRATE COMMUNITY

Benthic invertebrate samples were collected from WB-5 during the fall 2022 and 2023 field programs from a maximum total water depth of 0.2 m. The benthic invertebrate community data and results are provided in Appendix D (Tables D2-1 to D2-38; Figures D2-1 to D2-6), including estimations of benthic invertebrate community descriptors. A summary of these findings is provided below.

- BIC metrics were similar between sampling years, however diversity doubled from 0.33 to 0.66, likely due to the percentage of Chironomid taxa dropping from 81% to 52%.
- Midges (*Chironomidae*), seed shrimp (*Ostracoda*), caddis flies (*Lepidostomatidae*), biting midges (*Ceratopogonidae*), and worms (*Nemata*) represented most of the benthic invertebrate community.
- EPT taxa represented 6% and 7% of samples from 2022 and 2023, respectively.

With the increase in diversity and decrease in Chironomids, the BIC at WC-8 was similar to other small stream locations in 2023, however was low in diversity in 2022.

3.7.23 UNNAMED WATERCOURSE 8B

3.7.23.1 FISH HABITAT

Unnamed Watercourse 8B (WC-8B) is a tributary of WC-8, with high gradient drops in the upper reaches and series of beaver impounded pools in lower gradient areas corresponding with habitat type F (Table A1-1A). It flows within a mixed coniferous and deciduous forest dominated by alder riparian. The water is a dark, tea-stained colour and substrate is comprised predominantly of silt and gravel, except for higher gradient areas which include larger cobble and boulder substrate. Overhanging grasses and shrubs, detritus, undercut banks, large pools, and LWD are present.

3.7.23.2 FISH COMMUNITY

A total of 284 individuals were captured from WC-8B during the 2023 field investigations, utilizing baited minnow traps and electrofishing. Species captured include Brook Stickleback, Finescale Dace, Northern Pearl Dace, and Northern Redbelly Dace (Table 3.1). Minnow traps captured all fish (Appendix B; Tables B1-1 to B1-10). Summer (August) water temperature measurements and captured fish species indicate the thermal guild classification for WC-8B represents a cool to coldwater fish habitat (Coker et al. 2001; Hasnain et al. 2010).

3.7.23.3 FISH LENGTH FREQUENCY AND AGE

Meristic data from 99 Brook Stickleback and 27 Northern Redbelly Dace from WC-8B were used to generate length frequency histograms. Of these, 10 Brook Stickleback were submitted for age assessment in 2023. Brook Stickleback ranged from 45 to 72 mm TLENs and were assessed to be between zero and two years. Brook Stickleback assessed to be one year and over consistently measured greater than 50 mm and accounted for over 89% of captured Brook Stickleback. WC-8B had the highest number of Brook Stickleback over 60 mm TLEN from all sample locations. Northern Redbelly Dace TLENs measured 51 to 88 mm with most (74%) of captured individuals measuring greater than 70 mm.

3.7.23.4 FISH TISSUE

Five Brook Stickleback and five Northern Redbelly Dace composite samples were submitted for fish tissue analysis from WC-8B in 2023. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Laboratory results described in text and presented in tables and figures are displayed as total metals in milligrams per kilogram (mg/kg) wwt. Results have also been presented in dwt for Selenium to support comparison to the relevant quality criteria. Results are provided in Appendix C (Tables C1-1 to C1-4 and Figures C1-1 to C1-21).

- Total mercury and methylmercury concentrations for all species ranged from 0.07 to 0.23 mg/kg and 0.077 to 0.247 mg/kg, respectively. All composite samples were greater than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
- Average selenium concentrations for Brook Stickleback and Northern Redbelly Dace measured 0.73 and 0.83 mg/kg, respectively and were less than the FEQG for whole body samples (6.7 mg/kg).

3.7.23.5 WATER QUALITY

In-situ measurements were collected in the spring and summer 2023 field investigations. Temperature values ranged from 13.5°C to 13.9°C, DO values ranged from 6.49 to 7.29 mg/L, and pH values ranged from 5.74 to 6.94 (Appendix A; Tables A1-2A to A1-2B). All pH and DO measurements met the PWQO and CWQG apart from the spring pH measurement (5.74).

3.8 QUALITY ASSURANCE AND QUALITY CONTROL

3.8.1 2022 SEDIMENT QUALITY ANALYSIS

Field duplicates met the data quality objective (DQO) for most sediment quality parameters (93%) collected during fall 2022 field investigations (Appendix E; Table E1-1), with five relative percent difference values greater than 30% including silicon, uranium, total Kjeldahl nitrogen (TKN), total molybdenum, and silicon. However, the difference for molybdenum was observed at concentrations less than five times the detection limit, and as such are within the acceptable range of difference. The remaining parameter differences may be attributable to heterogeneous split samples from the field and do not represent data quality issues from the laboratory.

3.8.2 2023 SEDIMENT QUALITY ANALYSIS

Field duplicates met the DQO for most sediment quality parameters (95%) collected during fall 2023 field investigations (Appendix E; Table E1-2) with relative percent difference values greater than 30% including aluminum, barium, beryllium, chromium, cobalt, copper, lead, magnesium, manganese, nickel, potassium, sodium, thallium, TKN, and vanadium. Most concentrations (69%) occurred in SED-DUP-06, collected at the DC-01-S3 sample location, which had high (approximately 60%) clay composition, likely influencing in field homogenization of the sample.

3.8.3 2024 SEDIMENT QUALITY ANALYSIS

Field duplicates met the DQO for most sediment quality parameters (96%) collected during fall 2024 field investigations (Appendix E; Table E1-3), with six relative percent difference values greater than 30% including arsenic, barium, cadmium, lead, manganese, and total molybdenum. All differences occurred in SED-DUP-01, collected at the CR-DS-S3 sample location, which had high (35%) clay composition in relation to other CR-DS sample locations (S1, S2, S4, and S5; 5.8% to 11.2%), likely influencing in field homogenization of the sample.

3.8.4 ENVIRONMENTAL DNA

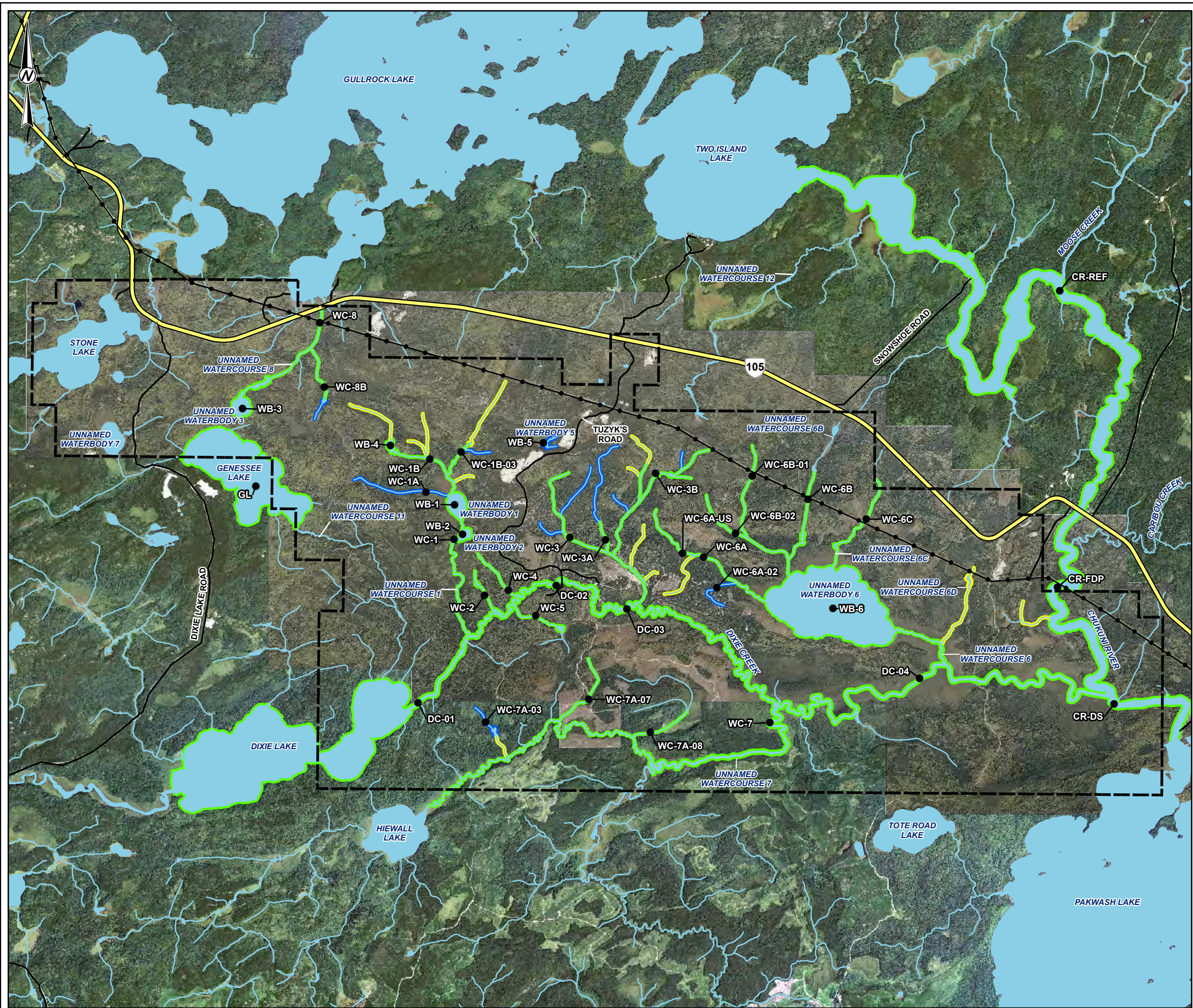
Metabarcoding is a qualitative rather than quantitative process meaning detection quantities cannot be linked between samples and controls. As such, the trace contamination in the negative controls limits interpretation of the results. While not all controls experienced contamination, removal of any species detected in the controls from other samples during the same sampling round was done to prevent false positive detections. Sampling for eDNA using multiple replicates at each location, and sampling each location across different points in time, creates a robust data set capable of withstanding any sample removal from contamination concerns.

A total of three negative control samples, in triplicate (nine total replicates), were taken across all three sampling events. Most negative control replicates were absent of any fish DNA, however two replicates in spring and one in summer experienced trace level contamination. During spring, one replicate tested positive for White Sucker DNA and another for Walleye DNA – these species were removed from consideration from spring results. During summer, one replicate tested positive for Yellow Perch DNA, as such summer Yellow Perch results were not included. Additionally, two sample locations (WB-2 and WB-6) during the October sampling round had suspect DNA detections, detecting nearly double the previously recorded number of species, and fall results from these locations were not included.

Several species within the metabarcoding analysis were only able to be identified to genus. The majority of which only have one extant species in Ontario or the Project area, these include: *Coregonus*, *Couesius*, *Hiodon*, *Luxilus*, and *Margariscus*. These correspond with Lake Whitefish, Lake Chub, Mooneye, Common Shiner, and Northern Pearl Dace, respectively. Two other genus we identified, but may contain two or more species, *Cottus* and *Rhinichthys*. *Cottus* species in this area are most likely to include the Mottled Sculpin and Slimy Sculpin, while the *Rhinichthys* species would include the Eastern Blacknose Dace or Longnose Dace.

A species identified frequently throughout the Project area, but which didn't appear in final metabarcoding results, is the Brook Stickleback. Previous work in areas with Brook Stickleback found limitations with the metabarcoding analysis used through the Nature Metrics laboratory, frequently identifying them as the Ninespine Stickleback. It is expected that this is a deficiency with the analysis and Brook Stickleback were not identified in the output as a result.

The internal laboratory QA/QC process is described within Appendix B2.



LEGEND

- PROPERTY BOUNDARY
- FISHERIES RESOURCE ASSESSMENT LOCATION
- POWER LINE
- HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- WATERBODY

FISH FREQUENTED WATERCOURSES AND WATERBODIES

- CONFIRMED FISH FREQUENTED
- NOT FISH FREQUENTED
- POTENTIALLY FISH FREQUENTED



NOTE(S)
 1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
 1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
 2. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
 3. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

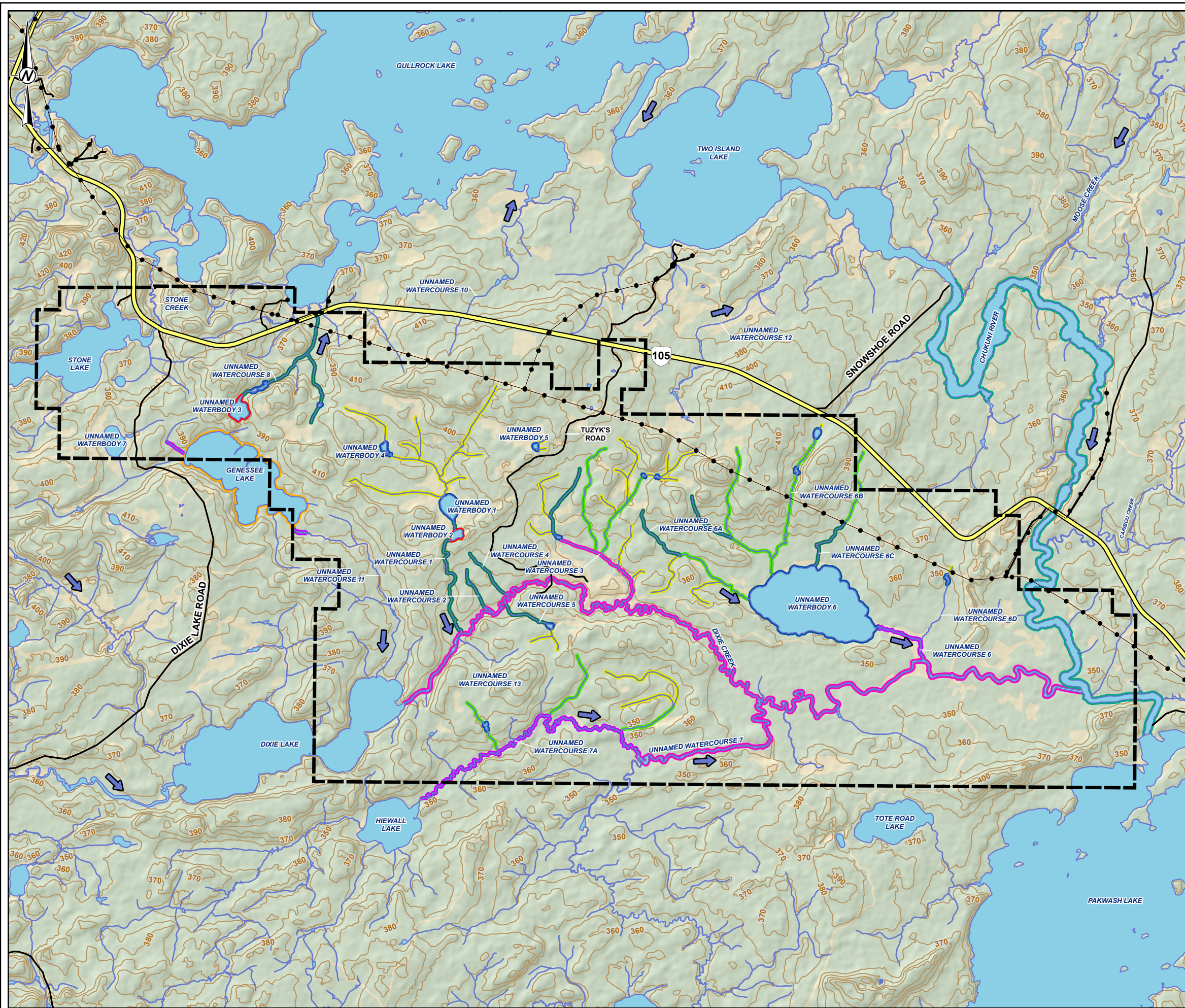
PROJECT
GREAT BEAR PROJECT

TITLE
FISH FREQUENTED WATERCOURSES AND WATERBODIES

CONSULTANT	YYYY-MM-DD	2025-03-10
	DESIGNED	---
	PREPARED	MD
	REVIEWED	---
	APPROVED	---

PROJECT NO. CA0031272	CONTROL 0001	REV. A	FIGURE 3-2
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 IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

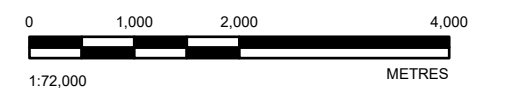


LEGEND

- PROPERTY BOUNDARY
- HIGHWAY
- LOCAL ROAD
- POWER LINE
- WATERCOURSE (NOT ASSESSED FOR FISH HABITAT TYPE)
- WATERBODY (NOT ASSESSED FOR FISH HABITAT TYPE)
- CONTOURS (10 M INTERVAL)

FISH HABITAT TYPE

- A
- B
- C
- D
- E
- F
- G
- H
- I



NOTE(S)
 1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
 1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
 2. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
 3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
FISH HABITAT TYPE BY WATERBODY

CONSULTANT	YYYY-MM-DD	2025-03-10
	DESIGNED	---
	PREPARED	MD
	REVIEWED	---
	APPROVED	---

PROJECT NO. CA0031272 CONTROL 0001 REV. A FIGURE 3-3

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

4 SUMMARY OF MAIN FINDINGS

This report documents the existing conditions measured during the 2022, 2023, and 2024 multi-season field investigations within the Project area watercourses and waterbodies. The following subsections provide the key findings by sampling location.

4.1 DIXIE CREEK

4.1.1 DC-01

- DC-01 is the farthest west (upstream) sampling location in Dixie Creek, directly downstream of the Dixie Lake outlet.
 - Three fish species were captured from DC-01 including Northern Pike, Spottail Shiner, and Yellow Perch.
 - All composite tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration.
 - All measurements of DO and pH met the PWQO and CWQG.
 - The lower trophic, 2024 periphyton sampling results, were not available for inclusion in this report and will be added as an addendum or update to the report under a revised cover.
 - Baseline concentrations greater than the sediment quality guidelines were noted for TOC in both 2022 and 2023. Total arsenic, chromium, cobalt, and nickel concentrations were greater than the sediment quality guideline at one location in 2023.
 - DC-01 had the highest benthic invertebrate TID of all locations and consistently high richness and diversity. Total invertebrate numbers at DC-01 were approximately ten times greater than downgradient Dixie Creek locations. This is likely due to upstream lake influence from Dixie Lake as the DC-01 sample location is immediately downstream (approximately 100 m) from the outlet.
-

4.1.2 DC-02

- The DC-02 sampling location is located at a bridge crossing of Dixie Creek within the Project area.
- Four fish species were captured from DC-02 including Burbot, Northern Pike, White Sucker, and Yellow Perch.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- One Northern Pike tissue sample measured greater than the consumption guidelines for total methylmercury concentrations for the protection of wildlife that consume fish.
- Two DO measurements were less than the PWQG and CWQG in 2023.
- Baseline concentrations greater than the sediment quality guidelines were noted for chromium, copper, and nickel in 2022. TOC was greater than the guidelines in both 2022 and 2023.
- DC-02 had lower BIC metrics than other Dixie Creek locations.
- There are potential Lake Whitefish and Walleye spawning areas 100 to 500 m downstream of the DC-02 location.

4.1.3 DC-03

- DC-03 is east and downstream of DC-02 within Dixie Creek.
- Eight fish species were captured from DC-03 including Brook Stickleback, Burbot, Iowa Darter, Johnny Darter, Mooneye, Northern Pike, Rock Bass, and Yellow Perch.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- Two DO measurements fell below the CWQG in 2023.
- Background concentrations greater than sediment quality guidelines were noted for chromium, copper, manganese, and nickel in 2022. TOC was greater than the sediment quality guidelines in both 2022 and 2023.
- DC-03 had lower BIC metrics than other Dixie Creek locations.

4.1.4 DC-04

- DC-04 is the furthest downstream Dixie Creek sample location, west of the Dixie Lake Road bridge.
- Five fish species were captured including Northern Pike, Rock Bass, Walleye, White Sucker, and Yellow Perch.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury apart from one Northern Pike sample for total mercury.
- One pH measurement did not meet the PWQG and CWQG guidelines in 2023.
- Background concentrations greater than sediment quality guidelines were noted for TOC, chromium, and nickel in both years.
- DC-04 had consistent BIC metrics between 2022 and 2023, unlike DC-02 and DC-03.
- A potential Lake Whitefish and Walleye spawning location is located several kilometers upstream of the DC-04 location.

4.2 CHUKUNI RIVER

4.2.1 CR-REF

- CR-REF is the farthest upstream Chukuni River sample location, north of Highway 105.
- The CR-REF sampling location was moved farther upstream in 2024 to increase similarity with the CR-FDP location.
- Changing dam levels had significant impact upon sampling, changing water levels up to two meters. Periphyton, boat electrofishing, and other near-shore sampling had reduced effectiveness as a result.
- Eight fish species were captured from CR-REF including Burbot, Emerald Shiner, Johnny Darter, Northern Pike, Rock Bass, Spottail Shiner, Walleye, and Yellow Perch.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- Fall pH measurements were less than the PWQO and CWQG in both years.
- Background concentrations greater than sediment quality guidelines were noted for TOC, arsenic, chromium, copper, and nickel in 2022 and 2023.

- In 2024, background concentrations greater than the PSQG LEL were only noted for TOC, arsenic, and nickel.
 - CR-REF had the greatest overall percentage of EPT taxa of any location (53%) and overall had high BIC metrics in 2022, however was consistent with other Chukuni River locations in 2023. In 2024, CR-REF was significantly stronger in several BIC metrics than CR-DS.
-

4.2.2 CR-FDP

- CR-FDP is located near the proposed final effluent discharge location and was assessed with multi-season habitat assessments, including bathymetric measurements of structure. This section of river consisted of a shallow water littoral zone margins and a deep U-shaped basin. The maximum recorded water depth was 13.9 m, with an average water depth of 4.7 m throughout the reach.
 - Boat electrofishing in summer 2024 found an abundance of species using the nearshore littoral zone, including a very strong population of YOY Yellow Perch.
 - A total of 12 fish species were captured from CR-FDP including Blacknose Shiner, Emerald Shiner, Lake Whitefish, Mooneye, Northern Pike, Rock Bass, Shorthead Redhorse, Silver Redhorse, Smallmouth Bass, Spottail Shiner, Walleye, and Yellow Perch.
 - All fish tissue samples were less than the Ontario consumption guidelines developed for the general population. Three Northern Pike and one Walleye sample had concentrations that were higher than those developed for women of child-bearing age and children, and the Health Canada maximum contaminant concentration for total mercury.
 - Background concentrations greater than sediment quality guidelines were noted for TOC, arsenic, copper, and nickel concentrations.
 - The CR-FDP BIC was similar to CR-REF and CR-DS with no statistical differences in 2022 and 2023. In 2024, it was higher in taxa richness, evenness, and percent EPT than CR-DS.
-

4.2.3 CR-DS

- CR-DS is the furthest downstream Chukuni River location, a short distance upstream of Pakwash Lake.
- Boat electrofishing in summer 2024 found an abundance of species using the nearshore littoral zone, including a very strong population of YOY Yellow Perch.
- A total of 11 fish species were captured from CR-DS including Emerald Shiner, Lake Whitefish, Mooneye, Northern Pike, Rock Bass, Shorthead Redhorse, Silver Redhorse, Spottail Shiner, Walleye, White Sucker, and Yellow Perch.
- Three Walleye fish tissue samples had concentrations higher than the guideline for women of child-bearing age and children, and the Health Canada maximum contaminant concentration.
- Background concentrations greater than sediment quality guidelines were noted for TOC and arsenic.
- The CR-DS BIC was similar to CR-REF and CR-FDP with no statistical differences in 2022 and 2023 but was significantly lower than CR-REF and CR-FDP in several metrics during 2024.

4.3 LAKES

4.3.1 GENESSEE LAKE

- Genessee Lake is a large, deep lake (greater than 10 m) consisting of multiple basins and embayment's and a diverse shoreline with varying substrate and habitats. A bathymetric survey was completed in 2024.
 - Genessee Lake zooplankton samples collected in June 2023 had the greatest biomass of all sample locations and showed the most species diversity with ten orders identified.
 - A total of 14 fish species were captured from GL, including Blacknose Shiner, Brook Stickleback, Cisco, Emerald Shiner, Golden Shiner, Iowa Darter, Johnny Darter, Mottled Sculpin, Northern Pike, Northern Redbelly Dace, Rock Bass, Spottail Shiner, Walleye, and Yellow Perch.
 - Northern Pike in Genessee Lake had the greatest length distribution of all sampling locations.
 - Two Northern Pike and one Walleye tissue samples had concentrations higher than the guideline for women of child-bearing age and children, and Health Canada maximum contaminant concentration for total mercury.
 - Lake profile data show a maximum measured depth of 11 m.
 - Background concentrations greater than sediment quality guidelines were noted for copper, iron, manganese, and nickel concentrations in 2022. TOC and arsenic concentrations were higher than sediment quality guidelines in 2022 and 2023.
 - The BIC richness and diversity of Genessee Lake was relatively high, however total abundance decreased from 2022 to 2023. Further decreases occurred into 2024 with a significant reduction on all metrics except for percent composition of Chironomids.
-

4.3.2 PAKWASH LAKE

- In 2023, sediment quality did not vary between deep and shallow locations, but concentrations greater than guidelines were noted for TOC, arsenic, chromium, copper, manganese, and nickel.
 - The BIC community did not vary between deep and shallow locations and was very high in EPT taxa.
 - Grain size differed across lake locations sampled in 2024 and concentrations greater than guidelines were noted of TOC, arsenic, chromium, copper, iron, manganese, and nickel.
 - The PKL-N BIC had greater scores in most metrics than other locations in Pakwash Lake, but PKL-S had the highest percentage of EPT taxa.
-

4.4 UNNAMED WATERBODIES

4.4.1 UNNAMED WATERBODY 1

- The WB-1 multi-season habitat assessments documented low water levels (less than 0.5 m) during spring, summer and fall 2022 and 2023 field investigations.
- Dense growth of Northern Wild Rice covers most of the surface area and would likely limit habitat use to small-body fish that can navigate the rice stems.

- Two fish species were captured from WB-1, including Central Mudminnow and Golden Shiner; however, it is possible juvenile and early life stage Northern Pike may access this area from WB-2 which is directly connected to WB-1.
 - Background concentrations greater than sediment quality guidelines were noted for cadmium, and total mercury concentrations in 2022. One location had TOC concentrations higher than the PSQG SEL for TOC, and all samples were higher than the PSQG LEL for arsenic in both years.
 - The BIC was similar to other shallow lake and pond habitats throughout the Project area (WB-2, WB-5, and WB-6); however, it contained higher total abundance and TID than any other location and had the greatest taxa richness value.
-

4.4.2 UNNAMED WATERBODY 2

- WB-2 is a small, deep-water lake approximately 200 m south of WB-1. A bathymetric survey of WB-2 was conducted in 2024.
 - Three fish species; Central Mudminnow, Golden Shiner, and Northern Pike, were captured in WB-2.
 - The Northern Pike tissue sample submitted in 2022 was less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
 - Two in-situ pH measurements were less than the PWQO and CWQG in both 2022 and 2023.
 - Lake profiles recorded a maximum depth of 8 m.
 - Background concentrations greater than sediment quality guidelines were noted for TOC, arsenic, cadmium, copper, and mercury concentrations in both years.
 - BIC metrics showed the lowest values relative to all other sampled locations and did not contain any EPT taxa.
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4.4.3 UNNAMED WATERBODY 3

- WB-3 is a small lake north and upgradient of Genessee Lake that flows north into Gullrock Lake.
 - Ten fish species were identified including: Blacknose Shiner, Brook Stickleback, Fathead minnow, Finescale Dace, Iowa Dater, Lake Chub, Northern Pearl Dace, Northern Redbelly Dace, White Sucker, and Yellow Perch.
 - All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
 - All Lake Chub and Finescale Dace fish tissue composites were higher than the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.
 - The BIC of WB-3 had relatively high values of n taxa richness and diversity.
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4.4.4 UNNAMED WATERBODY 4

- WB-4 is a small, beaver impounded pond north of the Project area.
- Fish community in WB-4 was assessed by Northern Bioscience in 2022 with baited minnow traps set along the margin of the waterbody.
- Four fish species were captured, including: Brook Stickleback, Central Mudminnow, Fathead Minnow, and Finescale Dace.

4.4.5 UNNAMED WATERBODY 5

- WB-5 is a small, shallow lake with a wide riparian floodplain north of Tuzyk's Road.
- Fishing efforts did not capture any fish from WB-5.
- In-situ pH measurements did not meet the PWQO and CWQG in either year, ranging from 3.75 to 4.37.
- Background concentrations greater than sediment quality guidelines for TOC in sediments was noted in both years.
- The BIC was similar to other shallow lake and pond habitats throughout the Project area (WB-1, WB-2, WB-6).

4.4.6 UNNAMED WATERBODY 6

- The lake is composed of a shallow water littoral zone in the east and west, and has a large, uniform middle basin. Maximum measured depth was 1.78 m and bathymetry data collected in fall 2022 showed an average depth of 1.26 m throughout the lake.
- Five fish species were captured within WB-6: Blackchin Shiner, Blacknose Shiner, Fathead Minnow, Northern Pike, and Yellow Perch.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- One water quality measurement of pH and DO were less than the PWQG and CWQG in 2022.
- Background concentrations greater than sediment quality guidelines for TOC, arsenic, cadmium, chromium, copper, mercury, and nickel were observed.
- The BIC was similar to other shallow lake and pond habitats throughout the Project area (WB-1, WB-2, and WB-5), however showed higher richness than both WB-2 and WB-5.

4.5 UNNAMED WATERCOURSES

4.5.1 WC-1

- WC-1 is a small, forested stream flowing south into Dixie Creek from WB-2.
- Five fish species were captured, including: Central Mudminnow, Golden Shiner, Northern Pike, Northern Pearl Dace, and White Sucker.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- One in-situ DO, and four pH measurements were less than PWQO and CWQG.

4.5.2 WC-1A

- WC-1A is a small, groundwater originating stream flowing east into WB-1.
- Fish were not captured at WC-1A.
- All pH measurements were below the PWQO and CWQG.

4.5.3 WC-1B

- WC-1B is a small, forested stream north of WB-1.
- Three fish species were captured, including: Brook Stickleback, Central Mudminnow, and Finescale Dace.
- Most in-situ DO, and pH measurements were below the PWQO and CWQG.

4.5.4 WC-1B-03

- WC-1B-03 is a small, forested stream flowing into WC-1B.
- Two fish species were captured, including: Brook Stickleback and Central Mudminnow.

4.5.5 WC-2

- WC-2 is a small, forested stream flowing south into Dixie Creek.
- Three fish species were captured, including: Brook Stickleback, Central Mudminnow, and Slimy Sculpin.
- All composite tissue samples were greater than the CCME (2000) methylmercury guideline for the protection of wildlife consumers of aquatic biota.
- Three in-situ DO, and one pH measurement were less than PWQO and CWQG criteria.

4.5.6 WC-3

- WC-3 is a small, forested stream flowing south into Dixie Creek.
- Six fish species were captured, including: Brook Stickleback, Central Mudminnow, Finescale Dace, Northern Redbelly Dace, Slimy Sculpin, and White Sucker.
- All large-body fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- Background concentrations greater than sediment quality guidelines were noted for TOC in both years and for arsenic and manganese in 2022.
- The WC-3 BIC had low diversity and evenness compared to other Dixie Creek tributary locations, and a low EPT taxa count in relation to similar habitats in the other unnamed watercourses.

4.5.7 WC-3A

- WC-3A is a small, forested stream flowing south into the larger WC-3 system and eventually flowing into Dixie Creek.
- Three fish were captured, including: a Brook Stickleback, Central Mudminnow, and Northern Pike.
- In-situ pH measurements were less than PWQO and CWQG criteria in spring 2022.
- Background concentrations greater than sediment quality guidelines were noted for TOC, arsenic, chromium, copper, iron, manganese, and nickel.
- The WC-3A BIC had high diversity and evenness in relation to other Dixie Creek tributary locations, likely due to the low Chironomid taxa counts. Compared to similar habitats in the other unnamed watercourses, WC-3A had a low Chironomid and EPT taxa count and high diversity and evenness.

4.5.8 WC-3B

- WC-3B is a small, forested stream flowing south into the larger WC-3 system and eventually flowing into Dixie Creek.
- Two fish species were captured, including: Brook Stickleback and Central Mudminnow.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- Most in-situ pH measurements were less than the PWQO and CWQG criteria.
- Background concentrations greater than sediment quality guidelines were noted for TOC in both years.
- The WC-3B BIC was similar to other Dixie Creek tributary locations and to similar habitats in the other unnamed watercourses. All BIC metrics were within the ranges of these other unnamed watercourses.

4.5.9 WC-4

- WC-4 is a small, forested stream flowing south into Dixie Creek.
- Eight fish species were captured, including: Brook Stickleback, Central Mudminnow, Fathead Minnow, Northern Pike, Northern Redbelly Dace, Rock Bass, White Sucker, and Yellow Perch.
- All samples were greater than the CCME (2000) methylmercury guideline for the protection of wildlife consumers of aquatic biota.
- Two DO measurements in 2023 were less than the PWQO and CWQG criteria.
- TOC, chromium, copper, iron, manganese, and nickel was found in concentrations greater than sediment quality guidelines.
- WC-4 had the highest average taxa richness of all locations and higher TID and percent EPT taxa compared to other Dixie Creek tributaries.

4.5.10 WC-5

- WC-5 is a small, forested stream flowing north into Dixie Creek.
- Eight fish species were captured, including: Brook Stickleback, Central Mudminnow, Fathead Minnow, Finescale Dace, Northern Pearl Dace, Lake Chub, White Sucker, and Northern Redbelly Dace.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- Two pH measurements in 2023 were below the PWQO and CWQG criteria.
- Background concentrations greater than sediment quality guidelines were noted for TOC, arsenic, chromium, copper, iron, manganese, and nickel.
- The WC-5 BIC had a high TID and a low EPT taxa count but was generally similar to the other Dixie Creek tributary locations.

4.5.11 WC-6A

- WC-6A is a small, forested stream east of the Project area consisting of two sample locations: WC-6A and WC-6A-US.
- Two fish species were captured, including: Brook Stickleback and Central Mudminnow.

- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
 - Two in-situ DO measurements, and one pH measurement were less than the PWQO and CWQG at both sample locations.
 - WC-6A had similar BIC metrics to other WB-6 tributaries.
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4.5.12 WC-6B

- WC-6B is a small, forested stream east of the Project area.
 - Two fish species were captured, including: Brook Stickleback and Central Mudminnow.
 - All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
 - Three in-situ pH measurements were below the PWQO and CWQG.
 - Background concentrations greater than sediment quality guidelines were noted for TOC, arsenic, and manganese.
 - BIC metrics are similar to the other unnamed watercourses, with high Chironomid taxa counts and low EPT scores; however, WB-6B had a relatively low average diversity.
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4.5.13 WC-6B-01

- WC-6B-01 is a small, forested stream east of the Project area.
 - Two fish species were captured, including: Brook Stickleback and Central Mudminnow.
 - Spring and summer 2023 pH values were higher than the PWQO and CWQG criteria.
 - Background concentrations greater than sediment quality guidelines were noted for TOC in both years. Background concentrations were greater than the PSQG LEL and CSQG ISQG were noted in 2023 for total chromium, copper, iron, manganese, and nickel concentrations.
 - WC-6B-01 had a greater average TID value than most locations and was similar in BIC metrics to WC 6B.
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4.5.14 WC-6B-02

- WC-6B-02 is a small, forested stream east of the Project area.
 - Two fish species were captured, including: Brook Stickleback and Central Mudminnow.
 - All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
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4.5.15 WC-6C

- WC-6C is a small, forested stream east of the Project area located within a series of beaver dams creating several large pools both upstream and downstream of the sample location.
- Four fish species were captured, including: Brook Stickleback, Central Mudminnow, Finescale Dace and Northern Redbelly Dace.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- In-situ pH measurements were below the PWQO and CWQG during spring 2022 and DO measurements were below the PWQO and CWQG during summer and fall 2023.

- Background concentrations greater than sediment quality guidelines were noted for TOC, chromium, copper, iron, manganese, and nickel in both years.
 - The BIC in WC-6C was similar to other tributary locations throughout the Project area, however, was comparatively higher in BIC metrics than other WB-6 tributaries.
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4.5.16 WC-7

- WC-7 is a large tributary of Dixie Creek, accessed by boating upstream of DC-04 and into the tributary.
 - Northern Pike and Yellow Perch were the only species captured within WC-7.
 - One Northern Pike tissue sample was less than the Ontario consumption guidelines developed for the general population but were higher than the guideline developed for women of child-bearing age and children, and the Health Canada maximum contaminant concentration for total mercury.
 - Background concentrations greater than sediment quality guidelines were noted for TOC, chromium, copper, iron, manganese, and nickel in both years.
 - All BIC metrics were similar to those observed within the other unnamed watercourses.
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4.5.17 WC-7A-03

- WC-7A-03 is a small, forested stream flowing south into WC-7.
 - Fish were not captured at WC-7A-03.
 - All in-situ pH measurements and three DO readings were less than PWQO and CWQG criteria.
 - Background concentrations greater than sediment quality guidelines were noted for TOC in both years.
 - The WC-7A-03 BIC had high EPT proportions, diversity, and evenness compared to the other unnamed watercourses.
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4.5.18 WC-7A-07

- WC-7A-07 is a small, forested stream flowing south into WC-7.
 - Three fish species were captured, including: Brook Stickleback, Central Mudminnow, and Golden Shiner.
 - All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
 - Most in-situ DO, and pH measurements were less than PWQO and CWQG criteria.
 - Background concentrations greater than sediment quality guidelines were noted for TOC, arsenic, chromium, copper, iron, manganese, and nickel.
 - The WC-7A-07 BIC had low EPT proportions compared to the other unnamed watercourses.
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4.5.19 WC-7A-08

- WC-7A-08 is a small, forested stream flowing south into WC-7.
- Four fish species were captured, including: Brook Stickleback, Central Mudminnow, Finescale Dace, and Northern Pike.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.

- Two pH readings were less than the PWQO and CWQG criteria.
 - Background concentrations greater than sediment quality guidelines were noted for TOC, arsenic, chromium, iron, manganese, and nickel.
 - All BIC metrics were similar to those observed within the other unnamed watercourses.
 - WC-8 is a small, forested stream flowing north into Gullrock Lake through the powerline right of way and underneath Highway 105.
 - Seven fish species were captured, including: Brook Stickleback, Central Mudminnow, Fathead Minnow, Finescale Dace, Northern Pearl Dace, Northern Redbelly Dace, and White Sucker.
 - Most pH and DO readings were less than the PWQO and CWQG criteria.
 - Background concentrations greater than sediment quality guidelines were noted for TOC in 2022.
 - The WC-8 BIC had low diversity and evenness compared to the other unnamed watercourses, likely due to the high Chironomid taxa counts.
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4.5.20 WC-8B

- WC-8B is a small, forested stream flowing north into WC-8.
- Four fish species were captured, including: Brook Stickleback, Finescale Dace, Northern Pearl Dace, and Northern Redbelly Dace.
- All fish tissue samples were less than the general and sensitive Ontario population consumption guidelines, and the Health Canada maximum contaminant concentration for total mercury.
- One pH measurement was less than the PWQO and CWQG criteria.
- The WC-8 BIC had high richness in comparison to the other unnamed watercourses.

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Appendix A
Fish Habitat and Catch Record, Lake
Profiles, and Lower Trophic Assessment

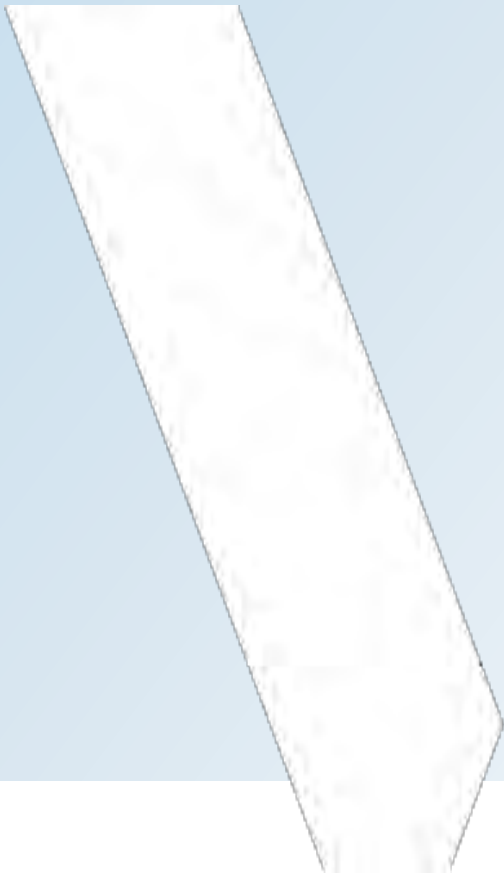




Table A1-1A: Fish Habitat Transect Location and Characteristics for Watercourses

Watercourse	Location ID	Year	Season	Date (dd/mm/yy)	Transect	Easting	Northing	Watercourse Width and Depth (m)				Course Classification
								Bankfull width	Bankfull depth (max)	Wetted width	Wetted depth (max)	
Dixie Creek	DC-02	2023	Fall	29-09-23	T1	455,987	5,633,934	12.00	-	8.80	>1.0	Creek
Dixie Creek	DC-02	2023	Fall	29-09-23	T2	455,987	5,633,934	12.20	-	8.60	>1.0	Creek
Unnamed Watercourse 1	WC-1	2023	Spring	08-06-23	T1	454,075	5,634,652	5.12	0.34	1.16	0.11	Tributary
Unnamed Watercourse 1	WC-1	2023	Spring	08-06-23	T2	454,120	5,634,651	3.85	0.46	2.29	0.08	Tributary
Unnamed Watercourse 1	WC-1	2023	Spring	08-06-23	T3	454,138	5,634,654	2.50	0.36	1.70	0.19	Tributary
Unnamed Watercourse 1	WC-1	2023	Summer	28-07-23	T1	454,075	5,634,652	1.65	0.35	0.95	0.09	Tributary
Unnamed Watercourse 1	WC-1	2023	Summer	28-07-23	T2	454,120	5,634,651	1.55	0.46	2.01	0.06	Tributary
Unnamed Watercourse 1	WC-1	2023	Summer	28-07-23	T3	454,138	5,634,654	2.85	0.55	1.61	0.16	Tributary
Unnamed Watercourse 1	WC-1	2023	Fall	08-09-23	T1	454,075	5,634,652	3.80	0.49	0.85	0.05	Tributary
Unnamed Watercourse 1	WC-1	2023	Fall	08-09-23	T2	454,120	5,634,651	3.60	0.58	1.60	0.60	Tributary
Unnamed Watercourse 1	WC-1	2023	Fall	08-09-23	T3	454,138	5,634,654	2.40	0.94	1.60	0.15	Tributary
Unnamed Watercourse 1B-03	WC-1B-03	2023	Summer	28-07-23	T1	454,152	5,636,204	1.20	0.25	0.43	0.28	Tributary
Unnamed Watercourse 1B-03	WC-1B-03	2023	Summer	28-07-23	T2	454,225	5,636,271	1.00	0.08	0.49	0.16	Tributary
Unnamed Watercourse 1B-03	WC-1B-03	2023	Summer	28-07-23	T3	454,243	5,636,322	2.15	0.35	0.81	0.10	Tributary
Unnamed Watercourse 1B-03	WC-1B-03	2023	Fall	10-09-23	T1	454,152	5,636,204	-	-	-	-	Tributary
Unnamed Watercourse 1B-03	WC-1B-03	2023	Fall	10-09-23	T2	454,225	5,636,271	1.20	0.49	0.35	0.19	Tributary
Unnamed Watercourse 1B-03	WC-1B-03	2023	Fall	10-09-23	T3	454,243	5,636,322	0.60	0.57	0.40	0.06	Tributary
Unnamed Watercourse 2	WC-2	2023	Spring	13-06-23	T1	454,647	5,633,634	2.10	0.27	0.45	0.07	Tributary
Unnamed Watercourse 2	WC-2	2023	Spring	13-06-23	T2	454,632	5,633,661	1.65	0.23	0.90	0.10	Tributary
Unnamed Watercourse 2	WC-2	2023	Spring	13-06-23	T3	454,626	5,633,670	2.25	0.28	0.90	0.07	Tributary
Unnamed Watercourse 3	WC-3	2023	Spring	11-06-23	T1	456,065	5,634,930	1.70	0.21	1.05	0.21	Tributary
Unnamed Watercourse 3	WC-3	2023	Spring	11-06-23	T2	456,066	5,634,949	1.30	0.21	0.63	0.24	Tributary
Unnamed Watercourse 3	WC-3	2023	Spring	11-06-23	T3	456,072	5,634,962	2.00	0.19	0.66	0.23	Tributary
Unnamed Watercourse 3	WC-3	2023	Summer	25-07-23	T1	456,065	5,634,930	1.90	0.35	Dry	Dry	Tributary
Unnamed Watercourse 3	WC-3	2023	Summer	25-07-23	T2	456,066	5,634,949	1.40	0.56	Dry	Dry	Tributary
Unnamed Watercourse 3	WC-3	2023	Summer	25-07-23	T3	456,072	5,634,962	2.50	0.54	Dry	Dry	Tributary
Unnamed Watercourse 3	WC-3	2023	Fall	15-09-23	T1	456,065	5,634,930	1.30	0.47	0.30	0.09	Tributary
Unnamed Watercourse 3	WC-3	2023	Fall	15-09-23	T2	456,066	5,634,949	2.50	0.44	1.00	0.14	Tributary
Unnamed Watercourse 3	WC-3	2023	Fall	15-09-23	T3	456,072	5,634,962	1.60	0.31	0.55	0.25	Tributary
Unnamed Watercourse 3A	WC-3A	2023	Spring	11-06-23	T1	456,840	5,634,710	1.00	0.24	0.76	0.18	Tributary
Unnamed Watercourse 3A	WC-3A	2023	Spring	11-06-23	T2	456,853	5,634,631	1.10	0.17	0.51	0.12	Tributary
Unnamed Watercourse 3A	WC-3A	2023	Summer	01-08-23	T1	456,845	5,634,709	1.50	0.32	0.64	0.09	Tributary
Unnamed Watercourse 3A	WC-3A	2023	Summer	01-08-23	T2	456,829	5,634,717	1.70	0.33	Dry	Dry	Tributary
Unnamed Watercourse 3A	WC-3A	2023	Summer	01-08-23	T3	456,808	5,634,724	1.40	0.37	0.52	0.19	Tributary
Unnamed Watercourse 3A	WC-3A	2023	Fall	11-09-23	T1	456,845	5,634,709	1.50	0.40	Dry	Dry	Tributary
Unnamed Watercourse 3A	WC-3A	2023	Fall	11-09-23	T2	456,829	5,634,717	1.70	0.31	Dry	Dry	Tributary
Unnamed Watercourse 3A	WC-3A	2023	Fall	11-09-23	T3	456,808	5,634,724	1.40	0.55	Dry	Dry	Tributary
Unnamed Watercourse 3B	WC-3B	2023	Summer	27-07-23	T1	457,680	5,635,745	2.90	0.39	1.30	0.13	Tributary



Table A1-1A: Fish Habitat Transect Location and Characteristics for Watercourses

Watercourse	Location ID	Year	Season	Date (dd/mm/yy)	Transect	Easting	Northing	Watercourse Width and Depth (m)				Course Classification
								Bankfull width	Bankfull depth (max)	Wetted width	Wetted depth (max)	
Unnamed Watercourse 3B	WC-3B	2023	Summer	27-07-23	T2	457,724	5,635,842	2.31	0.40	1.30	0.16	Tributary
Unnamed Watercourse 3B	WC-3B	2023	Summer	27-07-23	T3	457,804	5,635,881	1.15	0.49	0.50	0.17	Tributary
Unnamed Watercourse 3B	WC-3B	2023	Fall	12-09-23	T1	457,680	5,635,745	3.20	0.56	Dry	Dry	Tributary
Unnamed Watercourse 3B	WC-3B	2023	Fall	12-09-23	T2	457,724	5,635,842	2.40	0.55	0.50	0.03	Tributary
Unnamed Watercourse 3B	WC-3B	2023	Fall	12-09-23	T3	457,804	5,635,881	1.10	0.62	0.10	0.00	Tributary
Unnamed Watercourse 4	WC-4	2023	Spring	13-06-23	T1	455,098	5,633,698	1.50	0.31	0.80	0.11	Tributary
Unnamed Watercourse 4	WC-4	2023	Spring	13-06-23	T2	455,057	5,633,740	1.55	0.42	0.55	0.11	Tributary
Unnamed Watercourse 4	WC-4	2023	Spring	13-06-23	T3	455,052	5,633,746	2.15	0.48	0.80	0.14	Tributary
Unnamed Watercourse 4	WC-4	2023	Summer	27-07-23	T1	455,098	5,633,698	1.62	0.43	0.51	0.11	Tributary
Unnamed Watercourse 4	WC-4	2023	Summer	27-07-23	T2	455,057	5,633,740	1.35	0.43	0.61	0.13	Tributary
Unnamed Watercourse 4	WC-4	2023	Summer	27-07-23	T3	455,052	5,633,746	1.55	0.34	0.46	0.12	Tributary
Unnamed Watercourse 4	WC-4	2023	Fall	11-09-23	T1	455,098	5,633,698	1.60	0.39	0.40	0.12	Tributary
Unnamed Watercourse 4	WC-4	2023	Fall	11-09-23	T2	455,057	5,633,740	1.40	0.42	0.55	0.12	Tributary
Unnamed Watercourse 4	WC-4	2023	Fall	11-09-23	T3	455,052	5,633,746	1.40	0.33	0.30	0.13	Tributary
Unnamed Watercourse 5	WC-5	2023	Spring	06-06-23	T1	455,613	5,633,247	4.30	0.50	0.80	0.12	Tributary
Unnamed Watercourse 5	WC-5	2023	Spring	06-06-23	T2	455,621	5,633,245	2.35	0.35	0.47	0.35	Tributary
Unnamed Watercourse 5	WC-5	2023	Spring	06-06-23	T3	455,632	5,633,231	2.60	0.36	2.10	0.13	Tributary
Unnamed Watercourse 5	WC-5	2023	Summer	25-07-23	T1	455,613	5,633,247	2.40	0.48	0.45	0.01	Tributary
Unnamed Watercourse 5	WC-5	2023	Summer	25-07-23	T2	455,621	5,633,245	1.85	0.39	0.15	0.01	Tributary
Unnamed Watercourse 5	WC-5	2023	Summer	25-07-23	T3	455,632	5,633,231	2.40	0.45	0.20	0.05	Tributary
Unnamed Watercourse 5	WC-5	2023	Fall	06-09-23	T1	455,613	5,633,247	2.70	0.39	0.70	0.09	Tributary
Unnamed Watercourse 5	WC-5	2023	Fall	06-09-23	T2	455,621	5,633,245	1.90	0.35	0.40	0.08	Tributary
Unnamed Watercourse 5	WC-5	2023	Fall	06-09-23	T3	455,632	5,633,231	2.40	0.42	0.50	0.05	Tributary
Unnamed Watercourse 6A	WC-6A	2023	Spring	14-06-23	T1	458,625	5,634,333	1.15	0.23	0.75	0.17	Tributary
Unnamed Watercourse 6A	WC-6A	2023	Spring	14-06-23	T2	458,617	5,634,344	2.30	0.30	0.60	0.10	Tributary
Unnamed Watercourse 6A	WC-6A	2023	Spring	14-06-23	T3	458,601	5,634,364	1.60	0.20	0.60	0.16	Tributary
Unnamed Watercourse 6A	WC-6A	2023	Summer	01-08-23	T1	458,625	5,634,333	1.20	0.22	0.73	0.12	Tributary
Unnamed Watercourse 6A	WC-6A	2023	Summer	01-08-23	T2	458,617	5,634,344	2.40	0.35	0.61	0.08	Tributary
Unnamed Watercourse 6A	WC-6A	2023	Summer	01-08-23	T3	458,601	5,634,364	1.84	0.21	0.80	0.12	Tributary
Unnamed Watercourse 6A	WC-6A	2023	Fall	10-09-23	T2	458,617	5,634,344	2.00	0.34	0.90	0.12	Tributary
Unnamed Watercourse 6A	WC-6A	2023	Fall	10-09-23	T3	458,601	5,634,364	1.90	0.24	0.80	0.10	Tributary
Unnamed Watercourse 6A	WC-6A-02	2023	Fall	10-09-23	T1	458,796	5,633,744	1.00	0.14	0.43	0.13	Tributary
Unnamed Watercourse 6A-02	WC-6A-02	2023	Spring	15-06-23	T1	458,796	5,633,744	1.10	0.17	0.40	0.19	Tributary
Unnamed Watercourse 6A-02	WC-6A-02	2023	Spring	15-06-23	T2	458,803	5,633,754	1.00	0.17	0.35	0.04	Tributary
Unnamed Watercourse 6A-02	WC-6A-02	2023	Spring	15-06-23	T3	458,812	5,633,765	1.05	0.15	0.40	0.07	Tributary
Unnamed Watercourse 6A-02	WC-6A-02	2023	Summer	12-08-23	T1	458,796	5,633,744	1.10	0.17	0.35	0.08	Tributary
Unnamed Watercourse 6A-02	WC-6A-02	2023	Summer	12-08-23	T2	458,803	5,633,754	1.10	0.18	0.30	0.02	Tributary
Unnamed Watercourse 6A-02	WC-6A-02	2023	Summer	12-08-23	T3	458,812	5,633,765	1.00	0.16	0.50	0.06	Tributary



Table A1-1A: Fish Habitat Transect Location and Characteristics for Watercourses

Watercourse	Location ID	Year	Season	Date (dd/mm/yy)	Transect	Easting	Northing	Watercourse Width and Depth (m)				Course Classification
								Bankfull width	Bankfull depth (max)	Wetted width	Wetted depth (max)	
Unnamed Watercourse 6A-02	WC-6A-02	2023	Fall	10-09-23	T2	458,803	5,633,754	1.00	0.19	0.35	0.02	Tributary
Unnamed Watercourse 6A-02	WC-6A-02	2023	Fall	10-09-23	T3	458,812	5,633,765	1.00	0.10	0.50	0.08	Tributary
Unnamed Watercourse 6A-02	WC-6A-US	2023	Fall	09-09-23	T1	458,325	5,634,422	1.10	0.29	0.40	0.17	Tributary
Unnamed Watercourse 6A-US	WC-6A-US	2023	Summer	02-08-23	T1	458,325	5,634,422	1.10	0.31	0.50	0.18	Tributary
Unnamed Watercourse 6A-US	WC-6A-US	2023	Summer	02-08-23	T2	458,298	5,634,426	1.40	0.31	0.54	0.03	Tributary
Unnamed Watercourse 6A-US	WC-6A-US	2023	Summer	02-08-23	T3	458,257	5,634,419	1.40	0.25	0.27	0.04	Tributary
Unnamed Watercourse 6A-US	WC-6A-US	2023	Fall	09-09-23	T2	458,298	5,634,426	1.45	0.33	0.60	0.05	Tributary
Unnamed Watercourse 6A-US	WC-6A-US	2023	Fall	09-09-23	T3	458,257	5,634,419	1.90	0.24	0.40	0.07	Tributary
Unnamed Watercourse 6B	WC-6B	2023	Summer	26-07-23	T1	460,518	5,635,335	1.90	0.38	0.40	0.56	Tributary
Unnamed Watercourse 6B	WC-6B	2023	Summer	26-07-23	T2	460,524	5,635,363	1.90	0.55	0.59	0.24	Tributary
Unnamed Watercourse 6B	WC-6B	2023	Summer	26-07-23	T3	460,534	5,635,374	2.40	0.51	1.38	0.16	Tributary
Unnamed Watercourse 6B	WC-6B	2023	Fall	14-09-23	T1	460,518	5,635,335	2.80	0.61	0.35	0.30	Tributary
Unnamed Watercourse 6B	WC-6B	2023	Fall	14-09-23	T2	460,524	5,635,363	1.90	0.63	Dry	Dry	Tributary
Unnamed Watercourse 6B	WC-6B	2023	Fall	14-09-23	T3	460,534	5,635,374	2.50	0.54	1.50	0.13	Tributary
Unnamed Watercourse 6B-02	WC-6B-02	2023	Spring	15-06-23	T1	459,180	5,634,802	1.10	0.36	0.30	0.04	Tributary
Unnamed Watercourse 6B-02	WC-6B-02	2023	Spring	15-06-23	T2	459,168	5,634,811	0.80	0.28	0.20	0.20	Tributary
Unnamed Watercourse 6B-02	WC-6B-02	2023	Spring	15-06-23	T3	459,153	5,634,817	1.15	0.37	0.50	0.10	Tributary
Unnamed Watercourse 6B-02	WC-6B-02	2023	Summer	26-07-23	T1	459,180	5,634,802	1.40	0.30	0.80	0.05	Tributary
Unnamed Watercourse 6B-02	WC-6B-02	2023	Summer	26-07-23	T2	459,168	5,634,811	1.10	0.26	0.38	0.09	Tributary
Unnamed Watercourse 6B-02	WC-6B-02	2023	Summer	26-07-23	T3	459,153	5,634,817	3.30	0.39	0.73	0.11	Tributary
Unnamed Watercourse 6B-02	WC-6B-02	2023	Fall	14-09-23	T1	459,180	5,634,802	2.10	0.35	0.30	0.03	Tributary
Unnamed Watercourse 6B-02	WC-6B-02	2023	Fall	14-09-23	T2	459,168	5,634,811	3.65	0.43	0.80	0.07	Tributary
Unnamed Watercourse 6B-02	WC-6B-02	2023	Fall	14-09-23	T3	459,153	5,634,817	0.90	0.26	0.35	0.05	Tributary
Unnamed Watercourse 6C	WC-6C	2023	Spring	08-06-23	T1	461,616	5,635,081	1.50	0.15	0.65	0.18	Tributary
Unnamed Watercourse 6C	WC-6C	2023	Spring	08-06-23	T2	461,388	5,634,908	1.15	0.22	0.56	0.05	Tributary
Unnamed Watercourse 6C	WC-6C	2023	Spring	08-06-23	T3	461,350	5,634,819	2.35	0.27	0.83	0.16	Tributary
Unnamed Watercourse 6C	WC-6C	2023	Summer	26-07-23	T1	461,346	5,634,803	2.60	0.22	0.80	0.14	Tributary
Unnamed Watercourse 6C	WC-6C	2023	Summer	26-07-23	T2	461,350	5,634,820	1.70	0.22	0.67	0.14	Tributary
Unnamed Watercourse 6C	WC-6C	2023	Summer	26-07-23	T3	461,385	5,634,908	1.25	0.31	0.11	0.01	Tributary
Unnamed Watercourse 6C	WC-6C	2023	Fall	16-09-23	T1	461,350	5,634,820	1.15	0.06	0.65	0.24	Tributary
Unnamed Watercourse 6C	WC-6C	2023	Fall	16-09-23	T2	461,385	5,634,908	1.50	0.24	0.40	0.10	Tributary
Unnamed Watercourse 6C	WC-6A	2023	Fall	10-09-23	T1	458,625	5,634,333	1.50	0.24	0.80	0.09	Tributary
Unnamed Watercourse 7A-03	WC-7A-03	2023	Fall	17-09-23	T1	454,616	5,631,327	1.70	0.31	0.50	0.13	Tributary
Unnamed Watercourse 7A-03	WC-7A-03	2023	Spring	07-06-23	T1	454,616	5,631,327	1.72	0.08	0.75	0.38	Tributary
Unnamed Watercourse 7A-03	WC-7A-03	2023	Spring	07-06-23	T2	454,593	5,631,350	1.70	0.07	1.15	0.20	Tributary
Unnamed Watercourse 7A-03	WC-7A-03	2023	Spring	07-06-23	T3	454,585	5,631,386	2.10	0.16	0.59	0.24	Tributary
Unnamed Watercourse 7A-03	WC-7A-03	2023	Summer	26-07-23	T1	454,616	5,631,327	1.00	1.00	0.70	0.29	Tributary
Unnamed Watercourse 7A-03	WC-7A-03	2023	Summer	26-07-23	T2	454,593	5,631,350	1.70	0.17	1.10	0.19	Tributary



Table A1-1A: Fish Habitat Transect Location and Characteristics for Watercourses

Watercourse	Location ID	Year	Season	Date (dd/mm/yy)	Transect	Easting	Northing	Watercourse Width and Depth (m)				Course Classification
								Bankfull width	Bankfull depth (max)	Wetted width	Wetted depth (max)	
Unnamed Watercourse 7A-03	WC-7A-03	2023	Summer	26-07-23	T3	454,585	5,631,386	2.20	0.22	0.70	0.14	Tributary
Unnamed Watercourse 7A-03	WC-7A-03	2023	Fall	17-09-23	T2	454,593	5,631,350	1.70	0.16	0.70	0.11	Tributary
Unnamed Watercourse 7A-03	WC-7A-03	2023	Fall	17-09-23	T3	454,585	5,631,386	1.90	0.26	0.30	0.09	Tributary
Unnamed Watercourse 7A-07	WC-7A-07	2023	Spring	06-06-23	T1	456,490	5,631,720	1.00	0.15	0.40	0.07	Tributary
Unnamed Watercourse 7A-07	WC-7A-07	2023	Spring	06-06-23	T2	456,498	5,631,737	2.80	0.20	0.34	0.39	Tributary
Unnamed Watercourse 7A-07	WC-7A-07	2023	Spring	06-06-23	T3	456,516	5,631,746	3.10	0.28	0.40	0.31	Tributary
Unnamed Watercourse 7A-07	WC-7A-07	2023	Summer	25-07-23	T1	456,490	5,631,720	1.70	0.17	0.55	0.04	Tributary
Unnamed Watercourse 7A-07	WC-7A-07	2023	Summer	25-07-23	T2	456,498	5,631,737	1.70	0.18	0.50	0.16	Tributary
Unnamed Watercourse 7A-07	WC-7A-07	2023	Summer	25-07-23	T3	456,516	5,631,746	2.00	0.30	0.50	0.05	Tributary
Unnamed Watercourse 7A-07	WC-7A-07	2023	Fall	07-09-23	T1	456,490	5,631,720	1.10	0.26	Dry	Dry	Tributary
Unnamed Watercourse 7A-07	WC-7A-07	2023	Fall	07-09-23	T2	456,498	5,631,737	1.05	0.22	0.45	0.09	Tributary
Unnamed Watercourse 7A-07	WC-7A-07	2023	Fall	07-09-23	T3	456,516	5,631,746	1.50	0.28	0.35	0.03	Tributary
Unnamed Watercourse 7A-08	WC-7A-08	2023	Spring	07-06-23	T1	457,623	5,631,150	3.40	0.24	2.05	0.17	Tributary
Unnamed Watercourse 7A-08	WC-7A-08	2023	Spring	07-06-23	T2	457,635	5,631,154	3.00	0.18	1.10	0.18	Tributary
Unnamed Watercourse 7A-08	WC-7A-08	2023	Spring	07-06-23	T3	457,653	5,631,157	2.25	0.24	1.28	0.22	Tributary
Unnamed Watercourse 7A-08	WC-7A-08	2023	Summer	28-07-23	T1	457,623	5,631,150	3.10	0.21	1.40	0.24	Tributary
Unnamed Watercourse 7A-08	WC-7A-08	2023	Summer	28-07-23	T2	457,635	5,631,154	2.70	0.17	1.80	0.21	Tributary
Unnamed Watercourse 7A-08	WC-7A-08	2023	Summer	28-07-23	T3	457,653	5,631,157	2.10	0.23	1.20	0.30	Tributary
Unnamed Watercourse 7A-08	WC-7A-08	2023	Fall	07-09-23	T1	457,623	5,631,150	3.10	0.31	0.80	0.14	Tributary
Unnamed Watercourse 7A-08	WC-7A-08	2023	Fall	07-09-23	T2	457,635	5,631,154	2.40	0.27	1.00	0.11	Tributary
Unnamed Watercourse 7A-08	WC-7A-08	2023	Fall	07-09-23	T3	457,653	5,631,157	2.00	0.30	1.00	0.10	Tributary
Unnamed Watercourse 8	WC-8	2023	Spring	17-06-23	T1	451,531	5,638,783	1.70	0.11	0.61	0.15	Tributary
Unnamed Watercourse 8	WC-8	2023	Spring	17-06-23	T2	451,529	5,638,758	2.42	0.20	0.91	0.19	Tributary
Unnamed Watercourse 8	WC-8	2023	Spring	17-06-23	T3	451,541	5,638,737	1.80	0.10	0.87	0.14	Tributary
Unnamed Watercourse 8	WC-8	2023	Summer	26-07-23	T1	451,531	5,638,783	1.40	0.14	0.72	0.19	Tributary
Unnamed Watercourse 8	WC-8	2023	Summer	26-07-23	T2	451,529	5,638,758	1.80	0.19	0.85	0.10	Tributary
Unnamed Watercourse 8	WC-8	2023	Summer	26-07-23	T3	451,541	5,638,737	2.00	0.16	0.90	0.18	Tributary
Unnamed Watercourse 8	WC-8	2023	Fall	11-09-23	T1	451,531	5,638,783	1.60	0.44	1.00	0.16	Tributary
Unnamed Watercourse 8	WC-8	2023	Fall	11-09-23	T2	451,529	5,638,758	1.20	0.47	0.75	0.11	Tributary
Unnamed Watercourse 8	WC-8	2023	Fall	11-09-23	T3	451,541	5,638,737	1.15	0.71	0.40	0.18	Tributary
Unnamed Watercourse 8B	WC-8B	2023	Spring	16-06-23	T1	451,684	5,637,518	2.15	0.43	0.60	0.12	Tributary
Unnamed Watercourse 8B	WC-8B	2023	Spring	16-06-23	T2	451,698	5,637,511	2.40	0.35	1.30	0.15	Tributary
Unnamed Watercourse 8B	WC-8B	2023	Spring	16-06-23	T3	451,704	5,637,498	2.10	0.56	1.10	0.23	Tributary
Unnamed Watercourse 8B	WC-8B	2023	Summer	12-08-23	T1	451,684	5,637,518	2.20	0.55	0.90	0.22	Tributary
Unnamed Watercourse 8B	WC-8B	2023	Summer	12-08-23	T2	451,698	5,637,511	2.30	0.29	1.50	0.21	Tributary
Unnamed Watercourse 8B	WC-8B	2023	Summer	12-08-23	T3	451,704	5,637,498	2.05	0.51	0.60	0.10	Tributary
Unnamed Watercourse 8B	WC-8B	2023	Fall	12-09-23	T1	451,684	5,637,518	2.30	0.66	0.20	0.15	Tributary
Unnamed Watercourse 8B	WC-8B	2023	Fall	12-09-23	T2	451,698	5,637,511	2.30	0.38	1.48	0.18	Tributary



Table A1-1A: Fish Habitat Transect Location and Characteristics for Watercourses

Watercourse	Location ID	Year	Season	Date (dd/mm/yy)	Transect	Easting	Northing	Watercourse Width and Depth (m)				Course Classification
								Bankfull width	Bankfull depth (max)	Wetted width	Wetted depth (max)	
Unnamed Watercourse 8B	WC-8B	2023	Fall	12-09-23	T3	451,704	5,637,498	2.10	0.51	0.35	0.04	Tributary



Table A1-1B: Fish Habitat Transect Location and Characteristics for Waterbodies

Waterbody	Location ID	Transect	Easting	Northing	Year	Date (dd/mm/yy)	Season	Waterbody Width and Depth (m)					Course Classification
								Length (m)	Width (m)	Average Depth (m)	Max Depth (m)	Area (ha)	
Unnamed Waterbody 1	WB-1	NA	454,089	5,635,318	2023	NA	Spring	450	300	0.60	1.00	10	Lake
Unnamed Waterbody 1	WB-1	NA	454,089	5,635,318	2023	NA	Summer	450	300	0.60	1.00	10	Lake
Unnamed Waterbody 1	WB-1	NA	454,089	5,635,318	2023	NA	Fall	450	300	0.60	1.00	10	Lake
Unnamed Waterbody 2	WB-2	NA	454,235	5,634,765	2023	NA	Spring	270	166	3.00	8.10	3	Pond
Unnamed Waterbody 2	WB-2	NA	454,235	5,634,765	2023	NA	Summer	270	166	3.00	8.10	3	Pond
Unnamed Waterbody 2	WB-2	NA	454,235	5,634,765	2023	NA	Fall	270	166	3.00	8.10	3	Pond
Unnamed Waterbody 3	WB-3	NA	450,207	5,637,057	2023	NA	Spring	469	336	<1.5	<2	9	Pond
Unnamed Waterbody 3	WB-3	NA	450,207	5,637,057	2023	NA	Summer	469	336	<1.5	<2	9	Pond
Unnamed Waterbody 3	WB-3	NA	450,207	5,637,057	2023	NA	Fall	469	336	<1.5	<2	9	Pond
Unnamed Waterbody 4	WB-4	NA	452,924	5,636,400	2023	NA	Spring	328	104	1.00	2.00	1	Pond
Unnamed Waterbody 4	WB-4	NA	452,924	5,636,400	2023	NA	Summer	328	104	1.00	2.00	1	Pond
Unnamed Waterbody 4	WB-4	NA	452,924	5,636,400	2023	NA	Fall	328	104	1.00	2.00	1	Pond
Unnamed Waterbody 5	WB-5	NA	455,697	5,636,432	2023	NA	Spring	245	75	1.50	2.00	1	Pond
Unnamed Waterbody 5	WB-5	NA	455,697	5,636,432	2023	NA	Summer	245	75	1.50	2.00	1	Pond
Unnamed Waterbody 5	WB-5	NA	455,697	5,636,432	2023	NA	Fall	245	75	1.50	2.00	1	Pond
Unnamed Waterbody 6	WB-6	NA	460,880	5,633,497	2023	NA	Spring	4,882	2,938	1.26	1.78	222	Lake
Unnamed Waterbody 6	WB-6	NA	460,880	5,633,497	2023	NA	Summer	4,882	2,938	1.26	1.78	222	Lake
Unnamed Waterbody 6	WB-6	NA	460,880	5,633,497	2023	NA	Fall	4,882	2,938	1.26	1.78	222	Lake



Table A1-2A: 2022 In-Situ Surface Water Quality Measurements

Waterbody	ID	Season	Sample Date (dd/mm/yy)	YSI Depth (m)	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Dissolved Oxygen
			Unit	m	°C	-	mS/cm°	%	mg/L
Dixie Creek-01	DC01	Fall	27-10-22	0.50	4.8	7.1	0.074	113	12.4
Dixie Creek-02	DC02	Summer	29-07-22	0.10	22.7	6.8	0.065	66	5.7
		Spring	29-05-22	0.15	14.5	6.1	0.034	74	7.6
Dixie Creek-03	DC03	Summer	18-07-22	1.00	24.0	7.2	0.068	77	6.5
Dixie Creek-04	DC04	Spring	05-06-22	0.30	15.3	6.2	0.019	64	6.4
		Fall	25-10-22	0.30	5.3	6.8	0.137	107	13.6
Chukuni River-Reference	CR-REF	Spring	05-06-22	0.30	10.3	6.6	0.037	100	11.2
		Fall	29-10-22	0.50	5.8	6.4	0.052	102	12.4
Chukuni River-Final Discharge Pipe	CR-FDP	Spring	05-06-22	0.20	10.1	6.7	0.037	101	11.4
		Fall	28-10-22	0.50	6.2	7.0	0.102	108	10.6
Chukuni River-Downstream	CR-DS	Spring	05-06-22	0.30	11.1	6.7	0.027	98	10.8
		Fall	29-10-22	0.50	6.5	6.9	0.111	120	14.0
Genessee Lake	GL	Summer	12-07-22	0.50	21.7	8.1	0.064	103	9.1
		Fall	26-10-22	0.50	6.9	7.5	0.042	111	12.9
Unnamed Waterbody 1	WB-1	Summer	16-07-22	0.50	29.6	6.5	0.043	91	6.9
Unnamed Waterbody 2	WB-2	Summer	16-07-22	0.50	29.4	6.5	0.038	96	7.3
		Spring	27-05-22	1.00	4.8	4.6	0.026	84	9.1
		Fall	27-10-22	0.50	6.9	7.5	0.042	111	12.9
Unnamed Waterbody 3	WB-3	Summer	12-07-22	0.50	23.8	7.2	0.026	100	8.4
Unnamed Waterbody 5	WB-5	Summer	15-07-22	1.00	23.0	4.4	0.032	71	6.1
		Spring	28-05-22	0.50	16.8	4.3	0.028	-	6.2
Unnamed Waterbody 6	WB-6	Spring	05-06-22	0.20	14.0	6.3		89	9.2
		Summer	22-07-22	0.50	22.4	7.5	0.074	90	7.8
		Fall	26-10-22	0.50	4.8	7.1	0.096	116	14.8
Unnamed Watercourse 1	WC-1	Summer	16-07-22	0.10	28.4	6.4	0.030	83	6.4
		Spring	27-05-22	0.20	17.1	5.5	0.030	89	8.6
		Fall	27-10-22	0.20	4.7	6.1	0.034	76	9.3
Unnamed Watercourse 1A	WC-1A	Summer	14-07-22	0.10	13.6	5.4	0.047	18	1.8
Unnamed Watercourse 1B	WC-1B	Summer	18-07-22	0.10	14.5	6.3	0.086	22	2.2
Unnamed Watercourse 2	WC-2	Summer	11-07-22	0.10	14.5	7.6	0.243	78	7.9
		Summer	18-07-22	0.10	26.0	7.3	0.234	67	5.4
		Fall	25-10-22	0.20	5.1	7.3	0.247	85	10.3
		Spring	30-05-22	0.20	18.1	7.0	0.037	104	9.8
Unnamed Watercourse 3	WC-3	Summer	16-07-22	0.10	25.4	7.0	0.202	17	1.4
		Fall	25-10-22	0.20	5.0	6.8	0.061	89	10.7
		Spring	29-05-22	0.20	14.6	6.6	0.036	126	12.9
Unnamed Watercourse 3A	WC-3A	Spring	04-06-22	0.20	9.1	5.8	0.022	84	9.7
		Summer	18-07-22	0.10	16.0	6.7	0.084	78	7.7



Table A1-2A: 2022 In-Situ Surface Water Quality Measurements

Waterbody	ID	Season	Sample Date (dd/mm/yy)	YSI Depth (m)	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Dissolved Oxygen
			Unit	m	°C	-	mS/cm°	%	mg/L
Unnamed Watercourse 3B	WC-3B	Spring	02-06-22	0.20	9.3	5.5	0.013	84	9.6
		Summer	18-07-22	0.10	15.7	6.4	0.079	68	6.8
Unnamed Watercourse 4	WC-4	Summer	18-07-22	0.10	20.9	7.8	0.263	80	7.2
		Fall	22-10-22	0.50	5.1	7.3	0.089	92	11.8
		Spring	30-05-22	0.20	9.9	6.8	0.046	85	9.6
Unnamed Watercourse 5	WC-5	Spring	01-06-22	0.20	13.6	6.2	0.017	92	9.5
		Summer	14-07-22	0.10	21.0	6.4	0.076	85	7.6
		Fall	22-10-20	0.20	2.1	6.4	0.028	49	6.8
Unnamed Watercourse 6A	WC-6A	Summer	13-07-22	0.10	14.6	6.5	0.103	31	3.3
		Fall	25-10-22	0.20	4.6	6.6	0.132	66	8.0
Unnamed Watercourse 6b	WC-6b	Spring	16-05-22	0.20	8.7	5.5	0.052	80	9.3
		Summer	22-07-22	0.10	16.4	6.6	0.123	69	6.7
		Fall	23-10-22	0.20	4.1	6.5	0.051	80	10.5
Unnamed Watercourse 6b-1	WC-6b-1	Spring	16-05-22	0.20	6.5	6.5	0.015	70	8.7
		Summer	22-07-22	0.10	14.8	5.6	0.039	62	6.8
		Fall	23-10-22	0.20	5.2	7.0	0.022	57	7.2
Unnamed Watercourse 6C	WC-6C	Spring	16-05-22	0.20	10.7	6.2	0.063	78	8.7
		Summer	22-07-22	0.10	20.9	7.2	0.277	78	6.9
		Fall	24-10-22	0.20	8.1	6.7	0.255	98	10.8
Unnamed Watercourse 7	WC-7	Fall	24-10-22	0.30	7.0	6.7	0.218	106	12.5
Unnamed Watercourse 7A-03	WC-7A-03	Summer	14-07-22	0.10	13.9	5.6	0.043	35	3.6
		Fall	20-10-22	0.20	2.9	6.8	0.036	89	12.0
Unnamed Watercourse 7A-07	WC-7A-07	Summer	15-07-22	0.10	15.5	6.5	0.098	31	3.1
		Fall	20-10-22	0.20	4.5	6.4	0.064	63	8.1
Unnamed Watercourse 7A-08	WC-7A-08	Summer	16-07-22	0.10	16.0	6.8	0.079	73	7.2
		Fall	20-10-22	0.20	1.9	6.5	0.059	54	7.4

Notes:

"-" represents no measurement taken

	pH below PWQO and CWQG level (6.5)
	DO % below PWQO (47%)
	DO mg/L below CWQG (5.5 - 9.5 mg/L)
	DO mg/L above CWQG (5.5 - 9.5 mg/L)



Table A1-2B: 2023 In-Situ Surface Water Quality Measurements

Waterbody	ID	Season	Sample Date (dd/mm/yy)	YSI Depth (m)	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Dissolved Oxygen
			Unit	m	°C	-	mS/cm°	%	mg/L
Dixie Creek-01	DC01	Spring	12-06-23	0.50	20.0	7.2	0.078	77	7.0
		Summer	29-07-23	0.50	22.1	7.8	0.083	90	7.8
Dixie Creek-02	DC02	Spring	17-06-23	0.50	18.2	7.0	0.131	54	5.0
		Summer	27-07-23	0.50	19.3	7.3	0.147	61	5.6
		Fall	07-09-23	0.50	15.7	6.7	0.267	45	4.3
Dixie Creek-03	DC03	Spring	16-06-23	0.50	17.0	7.3	0.132	63	5.8
		Summer	27-07-23	0.50	18.8	7.2	0.158	55	5.1
		Fall	28-09-23	0.50	14.6	6.6	343.4*	47	4.6
Dixie Creek-04	DC04	Spring	15-06-23	0.50	18.9	7.3	0.131	75	7.0
		Summer	02-08-23	0.50	22.4	7.1	0.181	81	6.7
		Fall	29-09-23	0.50	15.1	6.4	248.5*	84	8.1
Chukuni River-Reference	CR-REF	Spring	13-06-23	0.50	21.1	7.7	0.08	106	9.4
		Summer	31-07-23	0.50	23.3	8.3	0.0102	110	9.3
		Fall	26-09-23	0.50	16.0	6.1	0.087	92	8.7
Chukuni River-Final Discharge Pipe	CR-FDP	Spring	14-06-23	0.50	20.1	7.6	0.081	99	9.0
		Summer	08-02-23	0.50	23.2	7.9	0.0918	107	8.8
		Fall	23-09-28	0.50	16.2	7.6	89.6*	96	9.1
Chukuni River-Downstream	CR-DS	Spring	06-12-23	0.50	21.1	7.7	0.080	106	9.4
		Summer	08-02-23	0.50	23.5	7.4	0.096	107	8.7
		Fall	30-09-23	0.50	15.7	7.6	76*	79	7.6
Genessee Lake	GL	Spring	11-06-23	0.50	20.7	7.7	0.070	102	9.2
		Summer	30-07-23	0.50	21.2	8.2	0.078	97	8.7
		Fall	16-09-23	0.50	16.2	7.1	64.9*	112	10.6
Pakwash Lake	PKD	Fall	01-10-23	0.20	16.0	7.5	85.4*	98	9.2
Pakwash Lake	PKS	Fall	30-09-23	0.20	17.4	8.0	71.3*	112	10.5



Table A1-2B: 2023 In-Situ Surface Water Quality Measurements

Waterbody	ID	Season	Sample Date (dd/mm/yy)	YSI Depth (m)	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Dissolved Oxygen
			Unit	m	°C	-	mS/cm°	%	mg/L
Unnamed Waterbody 1	WB-1	Spring	07-06-23	0.20	21.4	5.3	0.041	84	1.1
		Summer	29-07-23	0.50	17.0	5.8	0.032	67	6.2
Unnamed Waterbody 2	WB-2	Spring	10-06-23	0.50	18.2	5.0	0.038	114	10.3
		Summer	01-08-23	0.50	19.6	6.6	0.045	84	7.7
		Fall	27-09-23	0.50	17.4	5.8	37.3*	90	8.3
Unnamed Waterbody 3	WB-3	Summer	31-07-23	0.50	23.6	7.7	0.031	109	9.2
Unnamed Waterbody 5	WB-5	Spring	09-06-23	0.50	15.4	3.8	0.029	69	6.6
Unnamed Waterbody 6	WB-6	Spring	15-06-23	0.50	20.5	7.6	0.075	89	8.0
		Summer	03-08-23	0.50	21.9	8.0	0.111	100	8.7
		Fall	02-10-23	0.50	15.9	7.6	111.9*	95	9.0
Unnamed Watercourse 1	WC-1	Spring	08-06-23	0.20	16.4	6.7	0.042	90	8.3
		Summer	28-07-23	0.20	21.7	6.5	0.085	95	8.0
		Fall	26-09-23	0.20	9.4	6.2	0.235	26	2.9
Unnamed Watercourse 1A	WC-1A	Summer	29-07-23	0.20	10.3	6.1	0.044	52	5.6
		Fall	27-09-23	0.20	8.2	5.1	67.4*	54	6.1
Unnamed Watercourse 1B	WC-1B	Summer	29-07-23	0.20	15.3	7.0	0.049	15	1.5
Unnamed Watercourse 1B-03	WC-1B-03	Spring	09-06-23	0.20	12.1	5.9	0.037	104	10.7
		Summer	28-07-23	0.20	13.3	6.2	0.043	99	9.9
Unnamed Watercourse 2	WC-2	Spring	13-06-23	0.20	20.1	7.3	0.248	84	9.0
		Summer	31-07-23	0.20	15.7	7.5	0.241	6	0.1
		Fall	12-09-23	0.20	9.4	6.2	0.235	26	2.9
Unnamed Watercourse 3	WC-3	Spring	11-06-23	0.20	14.1	7.0	0.109	96	8.9
		Summer	01-08-23	0.20	22.4	7.1	0.181	81	6.7
		Fall	14-09-23	0.20	13.0	7.2	220.9*	64	7.0



Table A1-2B: 2023 In-Situ Surface Water Quality Measurements

Waterbody	ID	Season	Sample Date (dd/mm/yy)	YSI Depth (m)	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Dissolved Oxygen
			Unit	m	°C	-	mS/cm°	%	mg/L
Unnamed Watercourse 3B	WC-3B	Spring	09-06-23	0.20	13.2	6.6	0.062	82	8.6
		Summer	29-07-23	0.20	16.0	6.0	0.556	81	7.6
		Fall	13-09-23	0.20	9.4	6.0	0.088	81	8.8
Unnamed Watercourse 4	WC-4	Spring	13-06-23	0.20	15.2	7.8	0.252	83	7.9
		Summer	31-07-23	0.20	12.7	8.2	0.246	97	9.9
		Fall	11-09-23	0.20	7.7	6.8	0.244	98	11.3
Unnamed Watercourse 5	WC-5	Spring	08-06-23	0.20	20.1	5.5	0.039	92	7.5
		Summer	29-07-23	0.20	17.3	6.5	0.064	51	5.5
		Fall	07-09-23	0.10	12.4	5.8	0.077	73	7.5
Unnamed Watercourse 6A	WC-6A	Spring	15-06-23	0.20	9.1	6.8	0.186	34	3.7
		Summer	01-08-23	0.20	12.9	7.1	0.120	60	6.4
		Fall	10-09-23	0.20	9.5	6.0	0.123	55	6.1
Unnamed Watercourse 6A - Upstream	WC-6A-US	Spring	15-06-23	0.20	9.1	6.8	0.186	34	3.7
		Summer	01-08-23	0.20	12.8	7.7	0.344	13	1.3
		Fall	10-09-23	0.20	10.2	6.7	0.376	19	2.0
Unnamed Watercourse 6A-2	WC-6A-02	Summer	01-08-23	0.20	15.1	6.9	0.295	24	2.3
		Fall	09-09-23	0.20	10.5	6.4	0.304	22	2.3
Unnamed Watercourse 6B	WC-6B	Spring	08-06-23	0.20	14.4	7.2	0.144	85	8.7
		Summer	26-07-23	0.20	17.3	6.6	0.140	71	6.5
		Fall	15-09-23	0.20	12.7	6.1	0.190	91	9.2
Unnamed Watercourse 6B-01	WC-6B-01	Spring	08-06-23	0.20	14.4	5.8	0.035	77	7.9
		Summer	26-07-23	0.20	14.9	5.6	0.048	70	6.8
		Fall	16-09-23	0.20	10.0	6.0	45.1*	73	7.8
Unnamed Watercourse 6C	WC-6C	Spring	09-06-23	0.20	18.9	7.5	0.143	98	9.2
		Summer	27-07-23	0.20	21.3	7.2	0.320	58	4.9
		Fall	14-09-23	0.20	12.9	7.0	0.469	41	4.1



Table A1-2B: 2023 In-Situ Surface Water Quality Measurements

Waterbody	ID	Season	Sample Date (dd/mm/yy)	YSI Depth (m)	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Dissolved Oxygen
			Unit	m	°C	-	mS/cm°	%	mg/L
Unnamed Watercourse 7	WC-7	Spring	16-06-23	0.50	16.9	7.0	0.127	74	7.1
		Summer	01-08-23	0.50	19.7	6.9	0.159	67	6.0
		Fall	29-09-23	0.50	16.2	6.7	213.6*	89	8.4
Unnamed Watercourse 7A-03	WC-7A-03	Spring	12-06-23	0.20	11.5	5.4	0.039	58	6.0
		Summer	26-07-23	0.20	14.4	5.5	0.046	38	3.9
		Fall	15-09-23	0.20	-	5.9	47.4*	38	3.9
Unnamed Watercourse 7A-07	WC-7A-07	Spring	09-06-23	0.20	15.0	6.5	0.068	73	7.4
		Summer	29-07-23	0.20	14.5	6.3	0.079	50	5.1
		Fall	07-09-23	0.20	10.9	5.9	0.090	44	4.6
Unnamed Watercourse 7A-08	WC-7A-08	Spring	12-06-23	0.20	12.9	6.0	0.064	87	8.7
		Summer	28-07-23	0.20	15.3	6.6	0.074	66	6.6
		Fall	09-09-23	0.20	12.5	5.5	0.059	59	6.0
Unnamed Watercourse 8	WC-8	Spring	17-06-23	0.20	12.9	6.5	0.131	35	3.5
		Summer	26-07-23	0.20	15.5	7.0	0.112	24	2.2
		Fall	11-09-23	0.20	7.8	-	80.3*	-	-
Unnamed Watercourse 8B	WC-8B	Spring	16-06-23	0.20	13.9	5.7	0.075	70	6.5
		Summer	02-08-23	0.20	13.5	6.9	0.051	73	7.3

Notes:

*** denotes conductivity values presented as µS/cm

"-" represents no measurement taken

	pH below PWQO and CWQG level (6.5)
	DO % below PWQO (47%)
	DO mg/L below CWQG (5.5 - 9.5 mg/L)
	DO mg/L above CWQG (5.5 - 9.5 mg/L)



Table A1-2C: 2024 In-Situ Surface Water Quality Measurements

Waterbody	ID	Season	Sample Date (dd/mm/yy)	YSI Depth (m)	Water Temperature	pH	Specific Conductivity	Dissolved Oxygen	Dissolved Oxygen
			Unit	m	°C	-	mS/cm°	%	mg/L
Genessee Lake	GL	Spring	15-06-24	0.50	17.8	7.2	0.074	96	9.1
		Summer	28-07-24	0.50	23.7	7.8	0.065	102	8.6
		Fall	21-09-24	0.50	18.4	7.5	0.068	83	7.8
Pakwash Lake	PKL-N	Spring	14-06-24	0.20	16.7	6.8	0.074	95	9.2
		Summer	27-07-24	0.50	23.5	7.5	0.085	92	7.8
		Fall	20-09-24	0.50	18.7	7.2	0.094	83	7.8
	PKL-C	Fall	20-09-24	0.50	19.0	7.7	0.088	91	8.5
	PKL-S	Fall	20-09-24	0.50	18.8	7.6	0.088	90	8.4
	PKL-D	Fall	24-10-24	0.50	9.9	7.7	88.9*	93	10.5
	PKL-D	Fall	24-10-24	0.50	9.9	7.7	88.9*	93	10.5
Unnamed Waterbody 2	WB-2	Spring	11-06-24	0.20	16.4	5.7	0.036	77	7.5
		Summer	25-07-24	0.50	19.4	5.9	0.044	44	4.0
Unnamed Waterbody 4	WB-4	Spring	13-06-24	0.20	14.7	5.9	0.048	41	4.2
Unnamed Waterbody 6	WB-6	Spring	13-06-24	0.20	18.3	7.8	0.083	98	9.2
		Summer	25-07-24	0.50	24.1	7.8	0.091	103	8.7

Notes:

*** denotes conductivity values presented as $\mu\text{S}/\text{cm}$

"-" represents no measurement taken

	pH below PWQO and CWQG level (6.5)
	DO % below PWQO (47%)
	DO mg/L below CWQG (5.5 - 9.5 mg/L)
	DO mg/L above CWQG (5.5 - 9.5 mg/L)



Table A2-1: Periphyton Stable Isotopes

Waterbody	Station ID	C13	N15	C:N
Dixie Creek	DC-02	-30.18	1.76	11.75
Chukuni River	CR-REF	-14.42	-0.56	8.09
Chukuni River	CR-FDP	-18.74	0.70	10.73
Chukuni River	CR-DS	-19.31	0.20	8.91



Table A2-2: 2022 and 2023 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2022	Genessee Lake	October	Fall	Calanoida	Epischura lacustris S.A. Forbes	0.0	1.22
2022	Genessee Lake	October	Fall	Calanoida	Diaptomus oregonensis Marsh	0.3	11.59
2022	Genessee Lake	October	Fall	Cyclopoida	Tropocyclops prasinus mexicanus Kiefer	0.1	0.36
2022	Genessee Lake	October	Fall	Cyclopoida	Acanthocyclops vernalis Fischer	0.3	8.32
2022	Genessee Lake	October	Fall	Cyclopoida	Cyclops bicuspidatus thomasi S.A.Forbes	0.0	0.07
2022	Genessee Lake	October	Fall	Cyclopoida	Mesocyclops edax S.A.Forbes	0.3	3.58
2022	Genessee Lake	October	Fall	Holopedidae	Holopedium gibberum Zaddach	0.1	22.93
2022	Genessee Lake	October	Fall	Daphniidae	Daphnia galeata mendotae Birge	0.1	14.16
2022	Genessee Lake	October	Fall	Daphniidae	Daphnia retrocurva Forbes	0.0	0.44
2022	Genessee Lake	October	Fall	Bosminidae	Bosmina longirostris O.F.Muller	0.1	0.10
2022	Genessee Lake	October	Fall	Ploima	Kellicottia sps	1.4	0.29
2022	Genessee Lake	October	Fall	Ploima	Keratella sps	15.1	2.37
2022	Genessee Lake	October	Fall	Ploima	Polyarthra sps	0.5	0.41
2022	Genessee Lake	October	Fall	Ploima	Gastropus sps	1.4	0.39
2022	Genessee Lake	October	Fall	Ploima	Lecane sps	0.5	0.30
2022	Genessee Lake	October	Fall	Ploima	Brachionus sps	0.5	0.20
2023	Genessee Lake	June	Spring	Diplostraca	Bosminidae indet.	61.2	355.00
2023	Genessee Lake	June	Spring	Diplostraca	Daphnia sp.	23.5	699.00
2023	Genessee Lake	June	Spring	Diplostraca	Holopedium sp.	40.5	2060.00
2023	Genessee Lake	June	Spring	Calanoida	Diaptomidae indet.	2.8	74.60
2023	Genessee Lake	June	Spring	Calanoida	Calanoida indet.	14.1	320.00
2023	Genessee Lake	June	Spring	Calanoida	Calanoida indet.	60.3	48.70
2023	Genessee Lake	June	Spring	Cyclopoida	Mesocyclops edax	3.8	490.00
2023	Genessee Lake	June	Spring	Cyclopoida	Mesocyclops edax	1.9	42.60
2023	Genessee Lake	June	Spring	Cyclopoida	Cyclopoida indet.	86.6	966.00
2023	Genessee Lake	June	Spring	Cyclopoida	Cyclopoida indet.	45.2	19.50
2023	Genessee Lake	June	Spring	Cyclopoida	Cyclopoida indet.	0.9	20.20
2023	Genessee Lake	June	Spring	Flosculariaceae	Conochilus sp.	437.0	52.20
2023	Genessee Lake	June	Spring	Ploima	Kellicottia longispina	3.8	0.33
2023	Genessee Lake	June	Spring	Ploima	Keratella sp. 2	7.5	2.32
2023	Genessee Lake	June	Spring	Ploima	Ascomorpha ecaudis	3.8	0.78
2023	Genessee Lake	June	Spring	Ploima	Polyarthra sp.	33.9	23.70
2023	Genessee Lake	June	Spring	Ploima	Trichocerca sp.	3.8	1.88
2023	Genessee Lake	July	Summer	Diplostraca	Bosminidae indet.	4.3	10.10
2023	Genessee Lake	July	Summer	Diplostraca	Ceriodaphnia sp.	0.2	1.24
2023	Genessee Lake	July	Summer	Diplostraca	Daphnia sp.	0.9	14.70
2023	Genessee Lake	July	Summer	Diplostraca	Holopedium sp.	1.1	19.50
2023	Genessee Lake	July	Summer	Diplostraca	Diaphanosoma sp.	0.2	0.65



Table A2-2: 2022 and 2023 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2023	Genessee Lake	July	Summer	Calanoida	Skistodiaptomus oregonensis	0.7	28.90
2023	Genessee Lake	July	Summer	Calanoida	Skistodiaptomus oregonensis	0.3	13.80
2023	Genessee Lake	July	Summer	Calanoida	Calanoida indet.	1.8	28.50
2023	Genessee Lake	July	Summer	Calanoida	Calanoida indet.	6.3	3.96
2023	Genessee Lake	July	Summer	Cyclopoida	Mesocyclops edax	0.1	10.80
2023	Genessee Lake	July	Summer	Cyclopoida	Mesocyclops edax	0.2	2.47
2023	Genessee Lake	July	Summer	Cyclopoida	Cyclopoida indet.	1.5	16.60
2023	Genessee Lake	July	Summer	Cyclopoida	Cyclopoida indet.	2.1	1.21
2023	Genessee Lake	July	Summer	Cyclopoida	Cyclopoida indet.	0.2	1.25
2023	Genessee Lake	July	Summer	Diptera	Chaoborus sp.	0.1	112.00
2023	Genessee Lake	July	Summer	Flosculariaceae	Conochilus sp.	6.7	0.60
2023	Genessee Lake	July	Summer	Flosculariaceae	Pompholyx sulcata	2.5	0.48
2023	Genessee Lake	July	Summer	Ploima	Kellicottia bostoniensis	3.4	0.18
2023	Genessee Lake	July	Summer	Ploima	Kellicottia longispina	1.3	0.11
2023	Genessee Lake	July	Summer	Ploima	Keratella sp. 1	18.8	5.30
2023	Genessee Lake	July	Summer	Ploima	Ascomorpha ecaudis	0.4	0.07
2023	Genessee Lake	July	Summer	Ploima	Gastropodidae indet.	0.4	0.18
2023	Genessee Lake	July	Summer	Ploima	Gastropus sp.	1.7	0.29
2023	Genessee Lake	July	Summer	Ploima	Polyarthra sp.	2.5	1.28
2023	Genessee Lake	July	Summer	Ploima	Synchaetidae indet.	5.4	1.78
2023	Genessee Lake	July	Summer	Ploima	Trichocerca similis	0.4	0.10
2023	Genessee Lake	July	Summer	Rotifera	Rotifera indet.	4.2	0.93
2023	Genessee Lake	September	Fall	Diplostraca	Bosminidae indet.	0.4	1.91
2023	Genessee Lake	September	Fall	Diplostraca	Ceriodaphnia sp.	0.1	0.21
2023	Genessee Lake	September	Fall	Diplostraca	Daphnia sp.	7.1	149.00
2023	Genessee Lake	September	Fall	Diplostraca	Holopedium sp.	0.1	13.60
2023	Genessee Lake	September	Fall	Calanoida	Diaptomidae indet.	0.1	1.19
2023	Genessee Lake	September	Fall	Calanoida	Calanoida indet.	2.1	45.60
2023	Genessee Lake	September	Fall	Calanoida	Calanoida indet.	3.2	2.49
2023	Genessee Lake	September	Fall	Cyclopoida	Mesocyclops edax	0.1	8.69
2023	Genessee Lake	September	Fall	Cyclopoida	Orthocyclops modestus	0.1	1.42
2023	Genessee Lake	September	Fall	Cyclopoida	Orthocyclops modestus	0.3	2.02
2023	Genessee Lake	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	0.1	0.33
2023	Genessee Lake	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	0.1	0.32
2023	Genessee Lake	September	Fall	Cyclopoida	Cyclopoida indet.	3.5	45.60
2023	Genessee Lake	September	Fall	Cyclopoida	Cyclopoida indet.	3.2	1.32
2023	Genessee Lake	September	Fall	Flosculariaceae	Conochilus sp.	0.4	1.14
2023	Genessee Lake	September	Fall	Flosculariaceae	Conochilus sp.	0.8	0.07



Table A2-2: 2022 and 2023 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2023	Genessee Lake	September	Fall	Flosculariaceae	Pompholyx sulcata	3.8	0.55
2023	Genessee Lake	September	Fall	Ploima	Kellicottia bostoniensis	3.2	0.14
2023	Genessee Lake	September	Fall	Ploima	Kellicottia longispina	3.6	0.29
2023	Genessee Lake	September	Fall	Ploima	Keratella sp. 1	3.6	1.07
2023	Genessee Lake	September	Fall	Ploima	Ascomorpha ecaudis	1.0	0.12
2023	Genessee Lake	September	Fall	Ploima	Gastropus stylifer	3.2	0.53
2023	Genessee Lake	September	Fall	Ploima	Monostyla sp.	0.8	0.17
2023	Genessee Lake	September	Fall	Ploima	Polyarthra sp.	0.2	0.09
2023	Genessee Lake	September	Fall	Ploima	Trichocerca sp.	0.4	0.40
2023	Unnamed Waterbody 6	August	Summer	Diplostraca	Bosminidae indet.	158.4	246.00
2023	Unnamed Waterbody 6	August	Summer	Diplostraca	Chydorus sphaericus	3.8	7.60
2023	Unnamed Waterbody 6	August	Summer	Diplostraca	Ceriodaphnia sp.	0.8	2.96
2023	Unnamed Waterbody 6	August	Summer	Calanoida	Calanoida indet.	5.4	1.69
2023	Unnamed Waterbody 6	August	Summer	Cyclopoida	Tropocyclops prasinus mexicanus	0.8	2.25
2023	Unnamed Waterbody 6	August	Summer	Cyclopoida	Cyclopoida indet.	6.9	37.30
2023	Unnamed Waterbody 6	August	Summer	Cyclopoida	Cyclopoida indet.	26.9	7.68
2023	Unnamed Waterbody 6	August	Summer	Flosculariaceae	Conochilus sp.	5.4	74.40
2023	Unnamed Waterbody 6	August	Summer	Flosculariaceae	Conochilus sp.	220.6	34.70
2023	Unnamed Waterbody 6	August	Summer	Ploima	Kellicottia longispina	5.4	0.55
2023	Unnamed Waterbody 6	August	Summer	Ploima	Keratella sp. 1	247.5	65.50
2023	Unnamed Waterbody 6	August	Summer	Ploima	Gastropus stylifer	10.8	1.86
2023	Unnamed Waterbody 6	August	Summer	Ploima	Monostyla sp.	70.0	13.00
2023	Unnamed Waterbody 6	August	Summer	Ploima	Ploesoma sp.	26.9	8.69
2023	Unnamed Waterbody 6	August	Summer	Ploima	Polyarthra sp.	139.9	52.30
2023	Unnamed Waterbody 6	August	Summer	Ploima	Trichocerca rousseleti	5.4	0.20
2023	Unnamed Waterbody 6	August	Summer	Ploima	Trichocerca sp.	10.8	7.98
2023	Unnamed Waterbody 6	October	Fall	Diplostraca	Bosminidae indet.	23.4	66.60
2023	Unnamed Waterbody 6	October	Fall	Diplostraca	Chydorus sphaericus	1.6	5.81
2023	Unnamed Waterbody 6	October	Fall	Calanoida	Calanoida indet.	0.3	2.84
2023	Unnamed Waterbody 6	October	Fall	Calanoida	Calanoida indet.	4.3	5.19
2023	Unnamed Waterbody 6	October	Fall	Cyclopoida	Cyclopoida indet.	5.0	39.60
2023	Unnamed Waterbody 6	October	Fall	Cyclopoida	Cyclopoida indet.	8.6	6.77
2023	Unnamed Waterbody 6	October	Fall	Cyclopoida	Cyclopoida indet.	0.1	0.96
2023	Unnamed Waterbody 6	October	Fall	Flosculariaceae	Conochilus sp.	25.8	5.71
2023	Unnamed Waterbody 6	October	Fall	Ploima	Asplanchna sp.	2.2	27.20
2023	Unnamed Waterbody 6	October	Fall	Ploima	Kellicottia longispina	4.3	0.40
2023	Unnamed Waterbody 6	October	Fall	Ploima	Keratella sp. 1	221.7	64.10
2023	Unnamed Waterbody 6	October	Fall	Ploima	Gastropus stylifer	2.2	0.43



Table A2-2: 2022 and 2023 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2023	Unnamed Waterbody 6	October	Fall	Ploima	Polyarthra sp.	32.3	11.30
2023	Unnamed Waterbody 2	September	Fall	Diplostraca	Bosminidae indet.	0.3	1.25
2023	Unnamed Waterbody 2	September	Fall	Calanoida	Skistodiaptomus oregonensis	0.3	28.53
2023	Unnamed Waterbody 2	September	Fall	Calanoida	Skistodiaptomus oregonensis	0.2	16.24
2023	Unnamed Waterbody 2	September	Fall	Calanoida	Calanoida indet.	0.1	2.13
2023	Unnamed Waterbody 2	September	Fall	Cyclopoida	Cyclopoida indet.	0.1	0.89
2023	Unnamed Waterbody 2	September	Fall	Cyclopoida	Chaoborus sp.	0.3	103.12
2023	Unnamed Waterbody 2	September	Fall	Diptera	Conochiloides sp.	0.0	4.90
2023	Unnamed Waterbody 2	September	Fall	Flosculariaceae	Conochilus sp.	17.3	0.97
2023	Unnamed Waterbody 2	September	Fall	Flosculariaceae	Orthocyclops modestus	0.3	0.36
2023	Unnamed Waterbody 2	September	Fall	Flosculariaceae	Hexarthra sp.	0.5	0.03
2023	Unnamed Waterbody 2	September	Fall	Flosculariaceae	Keratella sp. 1	0.5	1.87
2023	Unnamed Waterbody 2	September	Fall	Ploima	Gastropodidae indet.	6.5	0.16
2023	Unnamed Waterbody 2	September	Fall	Ploima	Ploesoma sp.	0.5	0.09
2023	Unnamed Waterbody 2	September	Fall	Ploima	Polyarthra sp.	0.3	2.35
2023	Unnamed Waterbody 2	September	Fall	Ploima	Gastropus stylifer	3.6	0.62
2023	Unnamed Waterbody 2	September	Fall	Rotifera	Rotifera indet.	0.5	0.42
2023	Unnamed Waterbody 2	September	Fall	Diplostraca	Daphnia sp.	0.6	0.64
2023	Unnamed Waterbody 2	September	Fall	Diplostraca	Diaphanosoma sp.	0.0	0.03



Table A2-2: 2024 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2024	Genessee Lake	June	Spring	Diplostraca	Bosmina longirostris	0.4	3.47
2024	Genessee Lake	June	Spring	Diplostraca	Daphnia sp.	1.3	45.27
2024	Genessee Lake	June	Spring	Diplostraca	Holopedium gibberum	1.4	83.56
2024	Genessee Lake	June	Spring	Calanoida	Skistodiaptomus oregonensis	0.4	24.34
2024	Genessee Lake	June	Spring	Calanoida	Skistodiaptomus oregonensis	0.1	4.61
2024	Genessee Lake	June	Spring	Calanoida	Calanoida indet.	7.3	133.84
2024	Genessee Lake	June	Spring	Cyclopoida	Mesocyclops edax	0.1	21.92
2024	Genessee Lake	June	Spring	Cyclopoida	Mesocyclops edax	0.3	8.12
2024	Genessee Lake	June	Spring	Cyclopoida	Cyclopoida indet.	6.6	76.16
2024	Genessee Lake	June	Spring	Calanoida	Calanoida indet.	6.6	3.93
2024	Genessee Lake	June	Spring	Cyclopoida	Cyclopoida indet.	16.0	9.61
2024	Genessee Lake	June	Spring	Flosculariaceae	Conochilus sp.	0.9	4.79
2024	Genessee Lake	June	Spring	Flosculariaceae	Conochilus sp.	6.6	1.32
2024	Genessee Lake	June	Spring	Ploima	Kellicottia longispina	23.5	2.38
2024	Genessee Lake	June	Spring	Ploima	Keratella sp. 1	103.6	23.46
2024	Genessee Lake	June	Spring	Ploima	Keratella sp. 2	3.8	4.07
2024	Genessee Lake	June	Spring	Ploima	Gastropus stylifer	6.6	1.31
2024	Genessee Lake	June	Spring	Ploima	Polyarthra sp.	0.9	0.37
2024	Pakwash Lake - North Basin	June	Spring	Diplostraca	Bosmina longirostris	0.2	1.27
2024	Pakwash Lake - North Basin	June	Spring	Diplostraca	Daphnia sp.	0.6	34.95
2024	Pakwash Lake - North Basin	June	Spring	Diplostraca	Holopedium gibberum	0.3	17.74
2024	Pakwash Lake - North Basin	June	Spring	Diplostraca	Leptodora kindti	0.0	0.43
2024	Pakwash Lake - North Basin	June	Spring	Calanoida	Diaptomidae indet.	0.2	4.63
2024	Pakwash Lake - North Basin	June	Spring	Calanoida	Epischura sp.	0.0	3.48
2024	Pakwash Lake - North Basin	June	Spring	Calanoida	Epischura sp.	0.1	17.46
2024	Pakwash Lake - North Basin	June	Spring	Calanoida	Epischura sp.	0.0	4.98
2024	Pakwash Lake - North Basin	June	Spring	Calanoida	Calanoida indet.	0.4	17.64
2024	Pakwash Lake - North Basin	June	Spring	Cyclopoida	Diacyclops thomasi	0.2	7.28
2024	Pakwash Lake - North Basin	June	Spring	Cyclopoida	Diacyclops thomasi	0.5	6.17
2024	Pakwash Lake - North Basin	June	Spring	Cyclopoida	Cyclopoida indet.	5.3	68.83
2024	Pakwash Lake - North Basin	June	Spring	Calanoida	Calanoida indet.	1.6	1.82
2024	Pakwash Lake - North Basin	June	Spring	Cyclopoida	Cyclopoida indet.	2.5	0.79
2024	Pakwash Lake - North Basin	June	Spring	Flosculariaceae	Conochilus sp.	0.8	605.22
2024	Pakwash Lake - North Basin	June	Spring	Flosculariaceae	Conochilus sp.	33.0	11.18
2024	Pakwash Lake - North Basin	June	Spring	Ploima	Kellicottia longispina	51.1	5.60
2024	Pakwash Lake - North Basin	June	Spring	Ploima	Keratella sp. 1	12.4	2.71
2024	Pakwash Lake - North Basin	June	Spring	Ploima	Keratella sp. 2	1.6	2.05
2024	Pakwash Lake - North Basin	June	Spring	Ploima	Gastropus stylifer	0.8	0.20



Table A2-2: 2024 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2024	Pakwash Lake - North Basin	June	Spring	Ploima	Polyarthra sp.	10.7	9.10
2024	Pakwash Lake - North Basin	June	Spring	Ploima	Synchaeta sp.	0.8	0.22
2024	Unnamed Waterbody 2	June	Spring	Diplostraca	Bosmina longirostris	0.7	5.20
2024	Unnamed Waterbody 2	June	Spring	Diplostraca	Ceriodaphnia sp.	0.0	1.02
2024	Unnamed Waterbody 2	June	Spring	Diplostraca	Daphnia sp.	0.1	2.81
2024	Unnamed Waterbody 2	June	Spring	Diplostraca	Diaphanosoma sp.	0.0	0.05
2024	Unnamed Waterbody 2	June	Spring	Calanoida	Skistodiptomus oregonensis	0.0	3.59
2024	Unnamed Waterbody 2	June	Spring	Calanoida	Skistodiptomus oregonensis	0.0	0.46
2024	Unnamed Waterbody 2	June	Spring	Calanoida	Calanoida indet.	0.0	0.14
2024	Unnamed Waterbody 2	June	Spring	Cyclopoida	Cyclopoida indet.	0.4	3.13
2024	Unnamed Waterbody 2	June	Spring	Diptera	Chaoborus sp.	0.0	39.26
2024	Unnamed Waterbody 2	June	Spring	Cyclopoida	Cyclopoida indet.	2.2	0.66
2024	Unnamed Waterbody 2	June	Spring	Collotheceae	Collotheceae indet.	1.2	0.21
2024	Unnamed Waterbody 2	June	Spring	Flosculariaceae	Conochiloides sp.	4.5	1.33
2024	Unnamed Waterbody 2	June	Spring	Flosculariaceae	Conochilus sp.	0.7	6.12
2024	Unnamed Waterbody 2	June	Spring	Flosculariaceae	Conochilus sp.	0.2	0.04
2024	Unnamed Waterbody 2	June	Spring	Flosculariaceae	Filinia sp.	1.5	0.13
2024	Unnamed Waterbody 2	June	Spring	Flosculariaceae	Pompholyx sp.	0.3	0.06
2024	Unnamed Waterbody 2	June	Spring	Ploima	Asplanchna sp.	0.2	8.94
2024	Unnamed Waterbody 2	June	Spring	Ploima	Kellicottia bostoniensis	0.7	0.04
2024	Unnamed Waterbody 2	June	Spring	Ploima	Keratella sp. 1	15.6	3.97
2024	Unnamed Waterbody 2	June	Spring	Ploima	Keratella sp. 2	15.9	4.77
2024	Unnamed Waterbody 2	June	Spring	Ploima	Trichotria sp.	0.2	0.09
2024	Unnamed Waterbody 2	June	Spring	Ploima	Gastropus sp.	0.2	0.05
2024	Unnamed Waterbody 2	June	Spring	Ploima	Polyarthra sp.	2.1	0.89
2024	Unnamed Waterbody 2	June	Spring	Ploima	Synchaeta sp.	0.7	0.27
2024	Unnamed Waterbody 6	June	Spring	Diplostraca	Bosmina longirostris	11.4	73.83
2024	Unnamed Waterbody 6	June	Spring	Diplostraca	Chydorus sphaericus	5.9	42.09
2024	Unnamed Waterbody 6	June	Spring	Diplostraca	Ceriodaphnia sp.	0.1	3.40
2024	Unnamed Waterbody 6	June	Spring	Diplostraca	Daphnia sp.	2.0	72.98
2024	Unnamed Waterbody 6	June	Spring	Diplostraca	Holopedium gibberum	2.0	133.76
2024	Unnamed Waterbody 6	June	Spring	Calanoida	Diaptomidae indet.	0.1	4.03
2024	Unnamed Waterbody 6	June	Spring	Cyclopoida	Mesocyclops edax	0.1	29.86
2024	Unnamed Waterbody 6	June	Spring	Cyclopoida	Cyclopoida indet.	3.5	25.72
2024	Unnamed Waterbody 6	June	Spring	Calanoida	Calanoida indet.	2.8	1.15
2024	Unnamed Waterbody 6	June	Spring	Cyclopoida	Cyclopoida indet.	48.0	21.47
2024	Unnamed Waterbody 6	June	Spring	Collotheceae	Collotheceae indet.	5.7	1.00
2024	Unnamed Waterbody 6	June	Spring	Flosculariaceae	Conochilus sp.	0.9	3.56



Table A2-2: 2024 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2024	Unnamed Waterbody 6	June	Spring	Flosculariaceae	Conochilus sp.	0.9	0.11
2024	Unnamed Waterbody 6	June	Spring	Flosculariaceae	Testudinella sp.	0.9	0.08
2024	Unnamed Waterbody 6	June	Spring	Ploima	Asplanchna sp.	0.9	36.04
2024	Unnamed Waterbody 6	June	Spring	Ploima	Keratella sp. 1	136.6	28.17
2024	Unnamed Waterbody 6	June	Spring	Ploima	Keratella sp. 2	1.9	0.59
2024	Unnamed Waterbody 6	June	Spring	Ploima	Notholca sp.	1.9	0.26
2024	Unnamed Waterbody 6	June	Spring	Ploima	Ascomorpha sp.	0.9	0.11
2024	Unnamed Waterbody 6	June	Spring	Ploima	Gastropus stylifer	13.2	2.61
2024	Unnamed Waterbody 6	June	Spring	Ploima	Ploesoma sp.	0.9	0.42
2024	Unnamed Waterbody 6	June	Spring	Ploima	Polyarthra sp.	44.3	22.58
2024	Unnamed Waterbody 6	June	Spring	Ploima	Trichocerca cylindrica	3.8	3.53
2024	Unnamed Waterbody 6	June	Spring	Ploima	Trichocerca multicrinis	3.8	3.78
2024	Unnamed Waterbody 6	June	Spring		Rotifera indet.	0.9	0.64
2024	Genessee Lake	July	Summer	Diplostraca	Bosmina longirostris	0.4	1.52
2024	Genessee Lake	July	Summer	Diplostraca	Daphnia sp.	3.3	99.67
2024	Genessee Lake	July	Summer	Diplostraca	Holopedium gibberum	0.1	4.57
2024	Genessee Lake	July	Summer	Diplostraca	Diaphanosoma sp.	0.1	0.44
2024	Genessee Lake	July	Summer	Calanoida	Skistodiaptomus oregonensis	0.3	17.16
2024	Genessee Lake	July	Summer	Calanoida	Skistodiaptomus oregonensis	0.1	5.49
2024	Genessee Lake	July	Summer	Calanoida	Calanoida indet.	0.6	16.19
2024	Genessee Lake	July	Summer	Cyclopoida	Mesocyclops edax	0.3	19.98
2024	Genessee Lake	July	Summer	Cyclopoida	Mesocyclops edax	0.6	7.19
2024	Genessee Lake	July	Summer	Cyclopoida	Tropocyclops prasinus mexicanus	0.0	0.27
2024	Genessee Lake	July	Summer	Cyclopoida	Cyclopoida indet.	2.0	50.03
2024	Genessee Lake	July	Summer	Cyclopoida	Cyclopoida indet.	0.0	0.63
2024	Genessee Lake	July	Summer	Diptera	Chaoborus sp.	0.1	64.09
2024	Genessee Lake	July	Summer	Calanoida	Calanoida indet.	1.3	0.91
2024	Genessee Lake	July	Summer	Cyclopoida	Cyclopoida indet.	1.1	0.67
2024	Genessee Lake	July	Summer	Collotheceaceae	Collotheceidae indet.	1.9	0.20
2024	Genessee Lake	July	Summer	Flosculariaceae	Conochilus sp.	0.2	0.02
2024	Genessee Lake	July	Summer	Flosculariaceae	Filinia sp.	0.6	0.03
2024	Genessee Lake	July	Summer	Ploima	Asplanchna sp.	0.2	8.45
2024	Genessee Lake	July	Summer	Ploima	Kellicottia bostoniensis	0.4	0.02
2024	Genessee Lake	July	Summer	Ploima	Kellicottia longispina	0.2	0.02
2024	Genessee Lake	July	Summer	Ploima	Keratella sp. 1	3.6	0.91
2024	Genessee Lake	July	Summer	Ploima	Keratella sp. 2	0.6	0.32
2024	Genessee Lake	July	Summer	Ploima	Ascomorpha sp.	0.2	0.02
2024	Genessee Lake	July	Summer	Ploima	Gastropus stylifer	0.2	0.04



Table A2-2: 2024 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2024	Genessee Lake	July	Summer	Ploima	Polyarthra sp.	6.2	6.38
2024	Genessee Lake	July	Summer	Ploima	Trichocerca cylindrica	2.6	3.20
2024	Pakwash Lake - North Basin	July	Summer	Diplostraca	Bosmina longirostris	0.0	0.33
2024	Pakwash Lake - North Basin	July	Summer	Diplostraca	Ceriodaphnia sp.	0.1	1.27
2024	Pakwash Lake - North Basin	July	Summer	Diplostraca	Daphnia sp.	0.1	1.45
2024	Pakwash Lake - North Basin	July	Summer	Diplostraca	Holopedium gibberum	0.2	2.32
2024	Pakwash Lake - North Basin	July	Summer	Diplostraca	Leptodora kindti	0.1	5.51
2024	Pakwash Lake - North Basin	July	Summer	Diplostraca	Diaphanosoma sp.	0.2	2.31
2024	Pakwash Lake - North Basin	July	Summer	Calanoida	Skistodiaptomus oregonensis	0.0	2.48
2024	Pakwash Lake - North Basin	July	Summer	Calanoida	Epischura sp.	0.3	3.72
2024	Pakwash Lake - North Basin	July	Summer	Calanoida	Calanoida indet.	2.9	45.56
2024	Pakwash Lake - North Basin	July	Summer	Cyclopoida	Mesocyclops edax	0.0	0.67
2024	Pakwash Lake - North Basin	July	Summer	Cyclopoida	Tropocyclops prasinus mexicanus	0.5	4.02
2024	Pakwash Lake - North Basin	July	Summer	Cyclopoida	Tropocyclops prasinus mexicanus	0.2	0.97
2024	Pakwash Lake - North Basin	July	Summer	Cyclopoida	Cyclopoida indet.	6.4	57.87
2024	Pakwash Lake - North Basin	July	Summer	Calanoida	Calanoida indet.	5.7	8.92
2024	Pakwash Lake - North Basin	July	Summer	Cyclopoida	Cyclopoida indet.	4.2	3.51
2024	Pakwash Lake - North Basin	July	Summer	Collotheceaceae	Collotheceidae indet.	0.7	0.08
2024	Pakwash Lake - North Basin	July	Summer	Flosculariaceae	Conochilus sp.	6.4	1.44
2024	Pakwash Lake - North Basin	July	Summer	Flosculariaceae	Filinia sp.	42.4	1.79
2024	Pakwash Lake - North Basin	July	Summer	Flosculariaceae	Hexarthra sp.	0.7	0.02
2024	Pakwash Lake - North Basin	July	Summer	Ploima	Asplanchna sp.	2.8	109.55
2024	Pakwash Lake - North Basin	July	Summer	Ploima	Keratella sp. 1	41.0	14.93
2024	Pakwash Lake - North Basin	July	Summer	Ploima	Gastropus stylifer	2.1	0.36
2024	Pakwash Lake - North Basin	July	Summer	Ploima	Bipalpus hudsoni	1.4	5.11
2024	Pakwash Lake - North Basin	July	Summer	Ploima	Ploesoma sp.	9.9	3.97
2024	Pakwash Lake - North Basin	July	Summer	Ploima	Polyarthra sp.	57.2	36.71
2024	Pakwash Lake - North Basin	July	Summer	Ploima	Synchaeta sp.	4.2	1.29
2024	Pakwash Lake - North Basin	July	Summer	Ploima	Trichocerca cylindrica	107.4	148.26
2024	Unnamed Waterbody 2	July	Summer	Diplostraca	Bosmina longirostris	1.1	4.09
2024	Unnamed Waterbody 2	July	Summer	Diplostraca	Ceriodaphnia sp.	0.0	0.17
2024	Unnamed Waterbody 2	July	Summer	Diplostraca	Diaphanosoma sp.	0.1	0.28
2024	Unnamed Waterbody 2	July	Summer	Calanoida	Skistodiaptomus oregonensis	0.2	19.11
2024	Unnamed Waterbody 2	July	Summer	Calanoida	Skistodiaptomus oregonensis	0.2	8.99
2024	Unnamed Waterbody 2	July	Summer	Calanoida	Calanoida indet.	1.5	30.76
2024	Unnamed Waterbody 2	July	Summer	Cyclopoida	Mesocyclops edax	0.0	0.24
2024	Unnamed Waterbody 2	July	Summer	Cyclopoida	Cyclopoida indet.	0.4	3.59
2024	Unnamed Waterbody 2	July	Summer	Diptera	Chaoborus sp.	0.0	577.59



Table A2-2: 2024 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2024	Unnamed Waterbody 2	July	Summer	Calanoida	Calanoida indet.	3.6	2.76
2024	Unnamed Waterbody 2	July	Summer	Collotheceae	Collotheceae indet.	2.3	0.35
2024	Unnamed Waterbody 2	July	Summer	Flosculariaceae	Conochiloides sp.	10.4	2.02
2024	Unnamed Waterbody 2	July	Summer	Flosculariaceae	Conochilus sp.	0.4	1.93
2024	Unnamed Waterbody 2	July	Summer	Flosculariaceae	Conochilus sp.	3.6	0.36
2024	Unnamed Waterbody 2	July	Summer	Flosculariaceae	Filinia sp.	2.1	0.25
2024	Unnamed Waterbody 2	July	Summer	Flosculariaceae	Hexarthra sp.	3.4	0.10
2024	Unnamed Waterbody 2	July	Summer	Ploima	Keratella sp. 1	15.3	4.25
2024	Unnamed Waterbody 2	July	Summer	Ploima	Keratella sp. 2	0.8	0.57
2024	Unnamed Waterbody 2	July	Summer	Ploima	Gastropus sp.	1.3	0.31
2024	Unnamed Waterbody 2	July	Summer	Ploima	Polyarthra sp.	8.1	3.54
2024	Unnamed Waterbody 2	July	Summer	Ploima	Synchaeta sp.	0.4	0.10
2024	Unnamed Waterbody 2	July	Summer		Rotifera indet.	0.4	0.12
2024	Unnamed Waterbody 6	July	Summer	Diplostraca	Bosmina longirostris	4.1	12.11
2024	Unnamed Waterbody 6	July	Summer	Diplostraca	Chydorus sphaericus	4.7	14.37
2024	Unnamed Waterbody 6	July	Summer	Diplostraca	Ceriodaphnia sp.	3.9	21.83
2024	Unnamed Waterbody 6	July	Summer	Diplostraca	Holopedium gibberum	4.5	244.27
2024	Unnamed Waterbody 6	July	Summer	Diplostraca	Diaphanosoma sp.	0.1	1.07
2024	Unnamed Waterbody 6	July	Summer	Calanoida	Calanoida indet.	1.1	8.04
2024	Unnamed Waterbody 6	July	Summer	Cyclopoida	Cyclopoida indet.	5.0	40.84
2024	Unnamed Waterbody 6	July	Summer	Cyclopoida	Cyclopoida indet.	0.2	1.17
2024	Unnamed Waterbody 6	July	Summer	Calanoida	Calanoida indet.	10.3	7.39
2024	Unnamed Waterbody 6	July	Summer	Cyclopoida	Cyclopoida indet.	89.9	73.11
2024	Unnamed Waterbody 6	July	Summer	Collotheceae	Collotheceae indet.	2.6	0.43
2024	Unnamed Waterbody 6	July	Summer	Flosculariaceae	Conochiloides sp.	2.6	0.75
2024	Unnamed Waterbody 6	July	Summer	Flosculariaceae	Conochilus sp.	7.7	63.82
2024	Unnamed Waterbody 6	July	Summer	Flosculariaceae	Conochilus sp.	12.0	2.39
2024	Unnamed Waterbody 6	July	Summer	Flosculariaceae	Filinia sp.	37.7	2.13
2024	Unnamed Waterbody 6	July	Summer	Flosculariaceae	Hexarthra sp.	16.3	0.71
2024	Unnamed Waterbody 6	July	Summer	Ploima	Keratella sp. 1	44.5	9.81
2024	Unnamed Waterbody 6	July	Summer	Ploima	Ascomorpha sp.	3.4	0.39
2024	Unnamed Waterbody 6	July	Summer	Ploima	Gastropus stylifer	16.3	2.92
2024	Unnamed Waterbody 6	July	Summer	Ploima	Bipalpus hudsoni	2.6	7.96
2024	Unnamed Waterbody 6	July	Summer	Ploima	Ploesoma sp.	14.6	8.98
2024	Unnamed Waterbody 6	July	Summer	Ploima	Polyarthra sp.	15.4	4.88
2024	Unnamed Waterbody 6	July	Summer	Ploima	Trichocerca cylindrica	12.8	16.97
2024	Unnamed Waterbody 6	July	Summer	Ploima	Trichocerca multicrinis	3.4	3.12
2024	Unnamed Waterbody 6	July	Summer		Rotifera indet.	1.7	0.55



Table A2-2: 2024 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2024	Pakwash Lake - Deep Basin	October	Fall	Diplostraca	Bosmina longirostris	0.2	1.86
2024	Pakwash Lake - Deep Basin	October	Fall	Diplostraca	Daphnia sp.	3.1	169.75
2024	Pakwash Lake - Deep Basin	October	Fall	Diplostraca	Diaphanosoma sp.	0.0	0.85
2024	Pakwash Lake - Deep Basin	October	Fall	Calanoida	Diaptomidae indet.	0.1	1.21
2024	Pakwash Lake - Deep Basin	October	Fall	Calanoida	Leptodiaptomus sicilis	0.0	3.65
2024	Pakwash Lake - Deep Basin	October	Fall	Calanoida	Leptodiaptomus sicilis	0.0	2.64
2024	Pakwash Lake - Deep Basin	October	Fall	Calanoida	Skistodiaptomus oregonensis	0.2	13.68
2024	Pakwash Lake - Deep Basin	October	Fall	Calanoida	Skistodiaptomus oregonensis	0.1	8.00
2024	Pakwash Lake - Deep Basin	October	Fall	Calanoida	Epischura sp.	0.0	4.72
2024	Pakwash Lake - Deep Basin	October	Fall	Calanoida	Calanoida indet.	0.1	4.78
2024	Pakwash Lake - Deep Basin	October	Fall	Cyclopoida	Acanthocyclops sp.	0.0	1.62
2024	Pakwash Lake - Deep Basin	October	Fall	Cyclopoida	Diacyclops thomasi	0.0	0.51
2024	Pakwash Lake - Deep Basin	October	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	0.4	2.56
2024	Pakwash Lake - Deep Basin	October	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	0.2	0.88
2024	Pakwash Lake - Deep Basin	October	Fall	Cyclopoida	Cyclopoida indet.	2.9	30.75
2024	Pakwash Lake - Deep Basin	October	Fall	Cyclopoida	Cyclopoida indet.	1.6	0.88
2024	Pakwash Lake - Deep Basin	October	Fall	Flosculariaceae	Conochilus sp.	1.1	0.31
2024	Pakwash Lake - Deep Basin	October	Fall	Ploima	Kellicottia bostoniensis	0.2	0.01
2024	Pakwash Lake - Deep Basin	October	Fall	Ploima	Kellicottia longispina	6.8	0.73
2024	Pakwash Lake - Deep Basin	October	Fall	Ploima	Keratella sp. 1	9.3	2.38
2024	Pakwash Lake - Deep Basin	October	Fall	Ploima	Gastropus sp.	0.2	0.05
2024	Pakwash Lake - Deep Basin	October	Fall	Ploima	Polyarthra sp.	3.6	3.88
2024	Pakwash Lake - Deep Basin	October	Fall	Ploima	Synchaeta sp.	0.4	0.10
2024	Unnamed Waterbody 6	October	Fall	Diplostraca	Bosmina longirostris	20.5	139.14
2024	Unnamed Waterbody 6	October	Fall	Diplostraca	Chydorus sphaericus	0.8	8.55
2024	Unnamed Waterbody 6	October	Fall	Diplostraca	Ceriodaphnia sp.	0.3	6.51
2024	Unnamed Waterbody 6	October	Fall	Diplostraca	Daphnia sp.	1.0	19.79
2024	Unnamed Waterbody 6	October	Fall	Diplostraca	Holopedium gibberum	0.2	2.01
2024	Unnamed Waterbody 6	October	Fall	Calanoida	Skistodiaptomus oregonensis	3.1	229.03
2024	Unnamed Waterbody 6	October	Fall	Calanoida	Skistodiaptomus oregonensis	4.0	241.08
2024	Unnamed Waterbody 6	October	Fall	Calanoida	Calanoida indet.	0.2	6.65
2024	Unnamed Waterbody 6	October	Fall	Cyclopoida	Diacyclops thomasi	0.5	5.14
2024	Unnamed Waterbody 6	October	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	2.9	19.64
2024	Unnamed Waterbody 6	October	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	0.8	2.87
2024	Unnamed Waterbody 6	October	Fall	Cyclopoida	Cyclopoida indet.	3.4	50.62
2024	Unnamed Waterbody 6	October	Fall	Cyclopoida	Cyclopoida indet.	5.1	1.46
2024	Unnamed Waterbody 6	October	Fall	Collotheceae	Collotheceae indet.	4.5	0.90
2024	Unnamed Waterbody 6	October	Fall	Flosculariaceae	Conochilus sp.	1.1	38.90



Table A2-2: 2024 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2024	Unnamed Waterbody 6	October	Fall	Flosculariaceae	Conochilus sp.	15.3	5.42
2024	Unnamed Waterbody 6	October	Fall	Flosculariaceae	Pompholyx sp.	2.3	0.55
2024	Unnamed Waterbody 6	October	Fall	Ploima	Kellicottia longispina	1.1	0.13
2024	Unnamed Waterbody 6	October	Fall	Ploima	Keratella sp. 1	139.0	29.12
2024	Unnamed Waterbody 6	October	Fall	Ploima	Gastropus stylifer	3.4	1.00
2024	Unnamed Waterbody 6	October	Fall	Ploima	Polyarthra sp.	11.9	6.05
2024	Unnamed Waterbody 6	October	Fall	Ploima	Synchaeta sp.	0.6	0.45
2024	Genessee Lake	September	Fall	Diplostraca	Bosmina longirostris	1.5	6.89
2024	Genessee Lake	September	Fall	Diplostraca	Ceriodaphnia sp.	0.0	0.34
2024	Genessee Lake	September	Fall	Diplostraca	Daphnia sp.	0.4	10.91
2024	Genessee Lake	September	Fall	Diplostraca	Holopedium gibberum	0.0	0.48
2024	Genessee Lake	September	Fall	Diplostraca	Diaphanosoma sp.	0.0	0.16
2024	Genessee Lake	September	Fall	Calanoida	Calanoida indet.	0.5	8.28
2024	Genessee Lake	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	0.0	0.25
2024	Genessee Lake	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	0.2	0.58
2024	Genessee Lake	September	Fall	Cyclopoida	Cyclopoida indet.	1.0	14.58
2024	Genessee Lake	September	Fall	Cyclopoida	Cyclopoida indet.	0.1	0.97
2024	Genessee Lake	September	Fall	Calanoida	Calanoida indet.	1.1	1.09
2024	Genessee Lake	September	Fall	Cyclopoida	Cyclopoida indet.	0.9	0.46
2024	Genessee Lake	September	Fall	Collotheceaceae	Collotheceidae indet.	0.8	0.18
2024	Genessee Lake	September	Fall	Flosculariaceae	Conochilus sp.	0.4	0.33
2024	Genessee Lake	September	Fall	Flosculariaceae	Conochilus sp.	0.4	0.04
2024	Genessee Lake	September	Fall	Ploima	Asplanchna sp.	0.4	5.36
2024	Genessee Lake	September	Fall	Ploima	Kellicottia bostoniensis	5.3	0.26
2024	Genessee Lake	September	Fall	Ploima	Kellicottia longispina	1.1	0.10
2024	Genessee Lake	September	Fall	Ploima	Keratella sp. 1	2.4	0.52
2024	Genessee Lake	September	Fall	Ploima	Gastropus stylifer	0.2	0.05
2024	Genessee Lake	September	Fall	Ploima	Polyarthra sp.	6.0	3.82
2024	Genessee Lake	September	Fall	Ploima	Trichocerca cylindrica	0.4	0.67
2024	Pakwash Lake - Center Basin	September	Fall	Diplostraca	Bosmina longirostris	16.9	72.90
2024	Pakwash Lake - Center Basin	September	Fall	Diplostraca	Ceriodaphnia sp.	1.3	12.02
2024	Pakwash Lake - Center Basin	September	Fall	Diplostraca	Daphnia sp.	1.3	20.17
2024	Pakwash Lake - Center Basin	September	Fall	Diplostraca	Holopedium gibberum	0.2	2.42
2024	Pakwash Lake - Center Basin	September	Fall	Diplostraca	Diaphanosoma sp.	0.2	3.14
2024	Pakwash Lake - Center Basin	September	Fall	Calanoida	Epischura sp.	0.6	41.92
2024	Pakwash Lake - Center Basin	September	Fall	Calanoida	Calanoida indet.	5.4	103.61
2024	Pakwash Lake - Center Basin	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	1.1	8.06
2024	Pakwash Lake - Center Basin	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	3.2	13.25



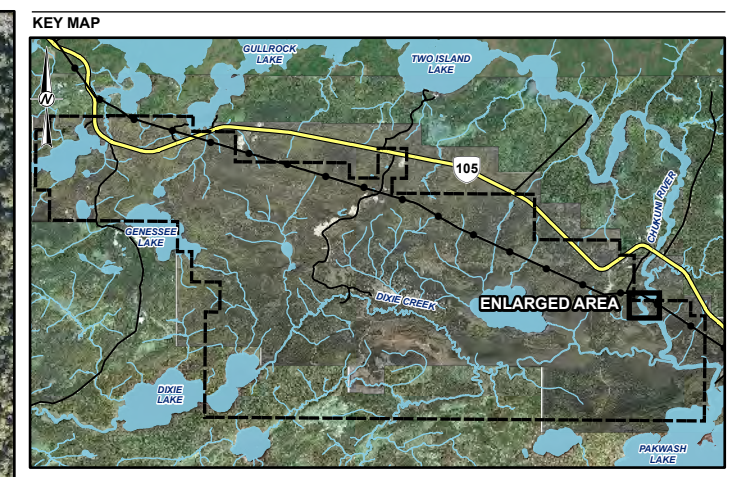
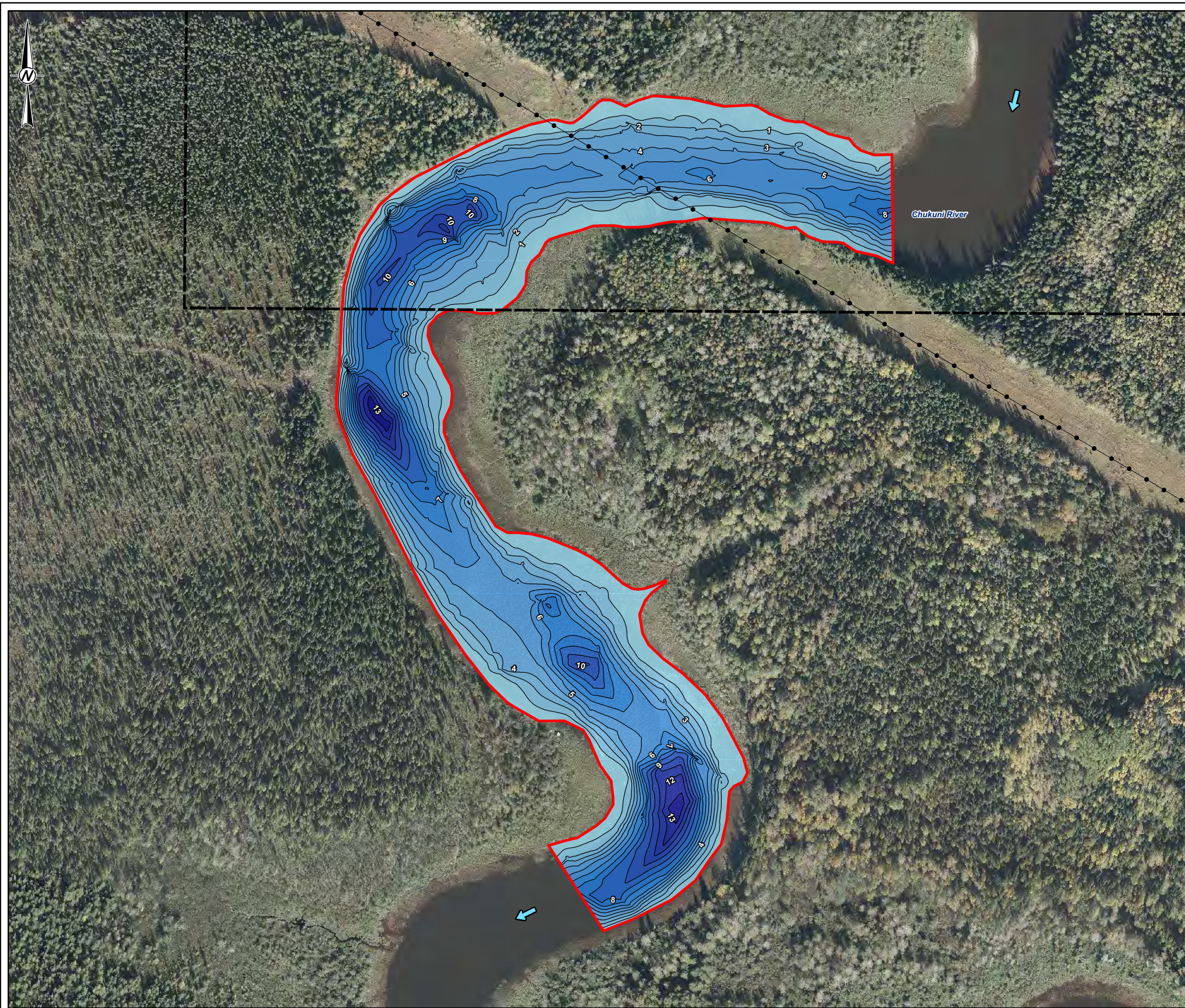
Table A2-2: 2024 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2024	Pakwash Lake - Center Basin	September	Fall	Cyclopoida	Cyclopoida indet.	14.6	252.44
2024	Pakwash Lake - Center Basin	September	Fall	Cyclopoida	Cyclopoida indet.	1.1	29.80
2024	Pakwash Lake - Center Basin	September	Fall	Calanoida	Calanoida indet.	6.0	7.47
2024	Pakwash Lake - Center Basin	September	Fall	Cyclopoida	Cyclopoida indet.	24.8	5.26
2024	Pakwash Lake - Center Basin	September	Fall	Collotheceaceae	Collotheceidae indet.	1.7	0.39
2024	Pakwash Lake - Center Basin	September	Fall	Flosculariaceae	Conochilus sp.	1.7	1.12
2024	Pakwash Lake - Center Basin	September	Fall	Flosculariaceae	Conochilus sp.	18.0	3.35
2024	Pakwash Lake - Center Basin	September	Fall	Flosculariaceae	Filinia sp.	0.9	0.07
2024	Pakwash Lake - Center Basin	September	Fall	Ploima	Asplanchna sp.	1.7	70.79
2024	Pakwash Lake - Center Basin	September	Fall	Ploima	Kellicottia longispina	6.0	0.64
2024	Pakwash Lake - Center Basin	September	Fall	Ploima	Keratella sp. 1	105.3	27.16
2024	Pakwash Lake - Center Basin	September	Fall	Ploima	Keratella sp. 2	0.9	0.34
2024	Pakwash Lake - Center Basin	September	Fall	Ploima	Ploesoma sp.	4.3	1.96
2024	Pakwash Lake - Center Basin	September	Fall	Ploima	Polyarthra sp.	111.3	81.24
2024	Pakwash Lake - Center Basin	September	Fall	Ploima	Synchaeta sp.	1.7	0.52
2024	Pakwash Lake - Center Basin	September	Fall	Ploima	Trichocerca cylindrica	2.6	3.50
2024	Pakwash Lake - Center Basin	September	Fall	Ploima	Trichocerca multicrinis	1.7	1.88
2024	Pakwash Lake - North Basin	September	Fall	Diplostraca	Bosmina longirostris	79.9	432.14
2024	Pakwash Lake - North Basin	September	Fall	Diplostraca	Ceriodaphnia sp.	1.9	29.87
2024	Pakwash Lake - North Basin	September	Fall	Diplostraca	Holopedium gibberum	0.8	24.25
2024	Pakwash Lake - North Basin	September	Fall	Diplostraca	Diaphanosoma sp.	0.4	4.32
2024	Pakwash Lake - North Basin	September	Fall	Calanoida	Diaptomidae indet.	0.4	4.82
2024	Pakwash Lake - North Basin	September	Fall	Calanoida	Calanoida indet.	3.4	86.45
2024	Pakwash Lake - North Basin	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	1.5	12.60
2024	Pakwash Lake - North Basin	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	1.9	8.74
2024	Pakwash Lake - North Basin	September	Fall	Cyclopoida	Cyclopoida indet.	12.1	175.95
2024	Pakwash Lake - North Basin	September	Fall	Cyclopoida	Cyclopoida indet.	0.8	19.09
2024	Pakwash Lake - North Basin	September	Fall	Calanoida	Calanoida indet.	3.8	3.57
2024	Pakwash Lake - North Basin	September	Fall	Cyclopoida	Cyclopoida indet.	29.2	16.05
2024	Pakwash Lake - North Basin	September	Fall	Collotheceaceae	Collotheceidae indet.	4.7	1.02
2024	Pakwash Lake - North Basin	September	Fall	Flosculariaceae	Conochilus sp.	2.8	53.15
2024	Pakwash Lake - North Basin	September	Fall	Flosculariaceae	Conochilus sp.	34.8	6.35
2024	Pakwash Lake - North Basin	September	Fall	Flosculariaceae	Filinia sp.	2.8	0.21
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Asplanchna sp.	0.9	40.68
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Kellicottia bostoniensis	0.9	0.05
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Kellicottia longispina	18.8	1.91
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Keratella sp. 1	305.1	82.52
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Euchlanis sp.	8.5	13.53



Table A2-2: 2024 Zooplankton Sample Results

Year	Site	Month	Season	Order	Taxa	Density (#/L)	Biomass (ug/L wwt)
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Gastropus stylifer	0.9	0.19
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Bipalpus hudsoni	0.9	4.39
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Ploesoma sp.	3.8	1.21
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Polyarthra sp.	95.1	41.82
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Synchaeta sp.	23.5	10.05
2024	Pakwash Lake - North Basin	September	Fall	Ploima	Trichocerca cylindrica	17.9	19.02
2024	Pakwash Lake - South Basin	September	Fall	Diplostraca	Bosmina longirostris	0.8	4.47
2024	Pakwash Lake - South Basin	September	Fall	Diplostraca	Daphnia sp.	3.4	62.62
2024	Pakwash Lake - South Basin	September	Fall	Diplostraca	Diaphanosoma sp.	0.0	0.21
2024	Pakwash Lake - South Basin	September	Fall	Calanoida	Leptodiatomus minutus	0.0	0.55
2024	Pakwash Lake - South Basin	September	Fall	Calanoida	Skistodiatomus oregonensis	0.0	1.95
2024	Pakwash Lake - South Basin	September	Fall	Calanoida	Skistodiatomus oregonensis	0.0	1.73
2024	Pakwash Lake - South Basin	September	Fall	Calanoida	Epischura sp.	0.0	0.45
2024	Pakwash Lake - South Basin	September	Fall	Calanoida	Epischura sp.	0.0	3.81
2024	Pakwash Lake - South Basin	September	Fall	Calanoida	Calanoida indet.	0.8	27.74
2024	Pakwash Lake - South Basin	September	Fall	Cyclopoida	Acanthocyclops sp.	0.0	3.41
2024	Pakwash Lake - South Basin	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	0.4	2.92
2024	Pakwash Lake - South Basin	September	Fall	Cyclopoida	Tropocyclops prasinus mexicanus	0.2	0.84
2024	Pakwash Lake - South Basin	September	Fall	Cyclopoida	Cyclopoida indet.	1.2	15.21
2024	Pakwash Lake - South Basin	September	Fall	Cyclopoida	Cyclopoida indet.	0.1	2.03
2024	Pakwash Lake - South Basin	September	Fall	Calanoida	Calanoida indet.	3.7	3.05
2024	Pakwash Lake - South Basin	September	Fall	Cyclopoida	Cyclopoida indet.	8.8	2.61
2024	Pakwash Lake - South Basin	September	Fall	Collotheceae	Collotheceae indet.	0.3	0.03
2024	Pakwash Lake - South Basin	September	Fall	Flosculariaceae	Conochilus sp.	2.5	0.44
2024	Pakwash Lake - South Basin	September	Fall	Flosculariaceae	Filinia sp.	0.6	0.03
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Asplanchna sp.	1.4	87.60
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Kellicottia longispina	0.8	0.09
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Keratella sp. 1	13.8	3.98
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Euchlanis sp.	0.6	0.59
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Gastropus hytopus	0.6	0.17
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Bipalpus hudsoni	0.3	1.40
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Ploesoma sp.	0.6	0.18
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Polyarthra sp.	11.0	6.76
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Synchaeta sp.	2.3	1.27
2024	Pakwash Lake - South Basin	September	Fall	Ploima	Trichocerca cylindrica	0.3	0.30
2024	Pakwash Lake - South Basin	September	Fall		Rotifera indet.	0.3	0.19

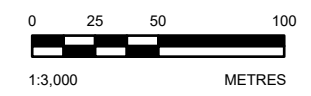


- LEGEND**
- PROPERTY BOUNDARY
 - POWER LINE
 - FLOW DIRECTION
 - BATHYMETRY ANALYSIS EXTENT
 - BATHYMETRY CONTOURS (1 M INTERVAL)

BATHYMETRY (DEPTH, M)

WATER DEPTH (M)

	0 - 1
	1 - 2
	2 - 3
	3 - 4
	4 - 5
	5 - 6
	6 - 7
	7 - 8
	8 - 9
	9 - 10
	10 - 11
	11 - 12
	12 - 13
	13 - 13.9



NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022)
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

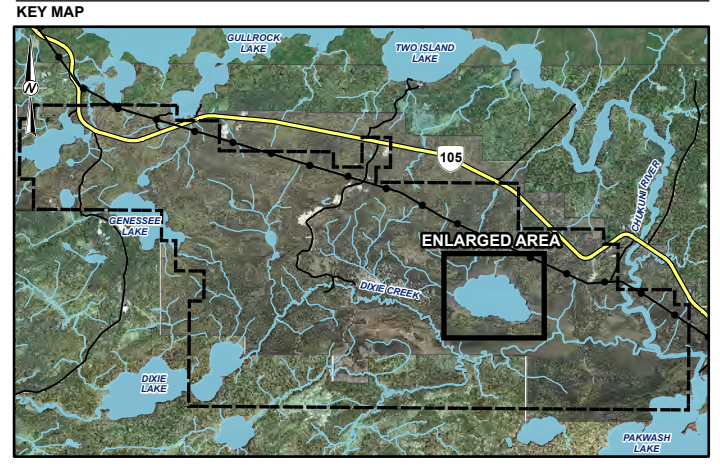
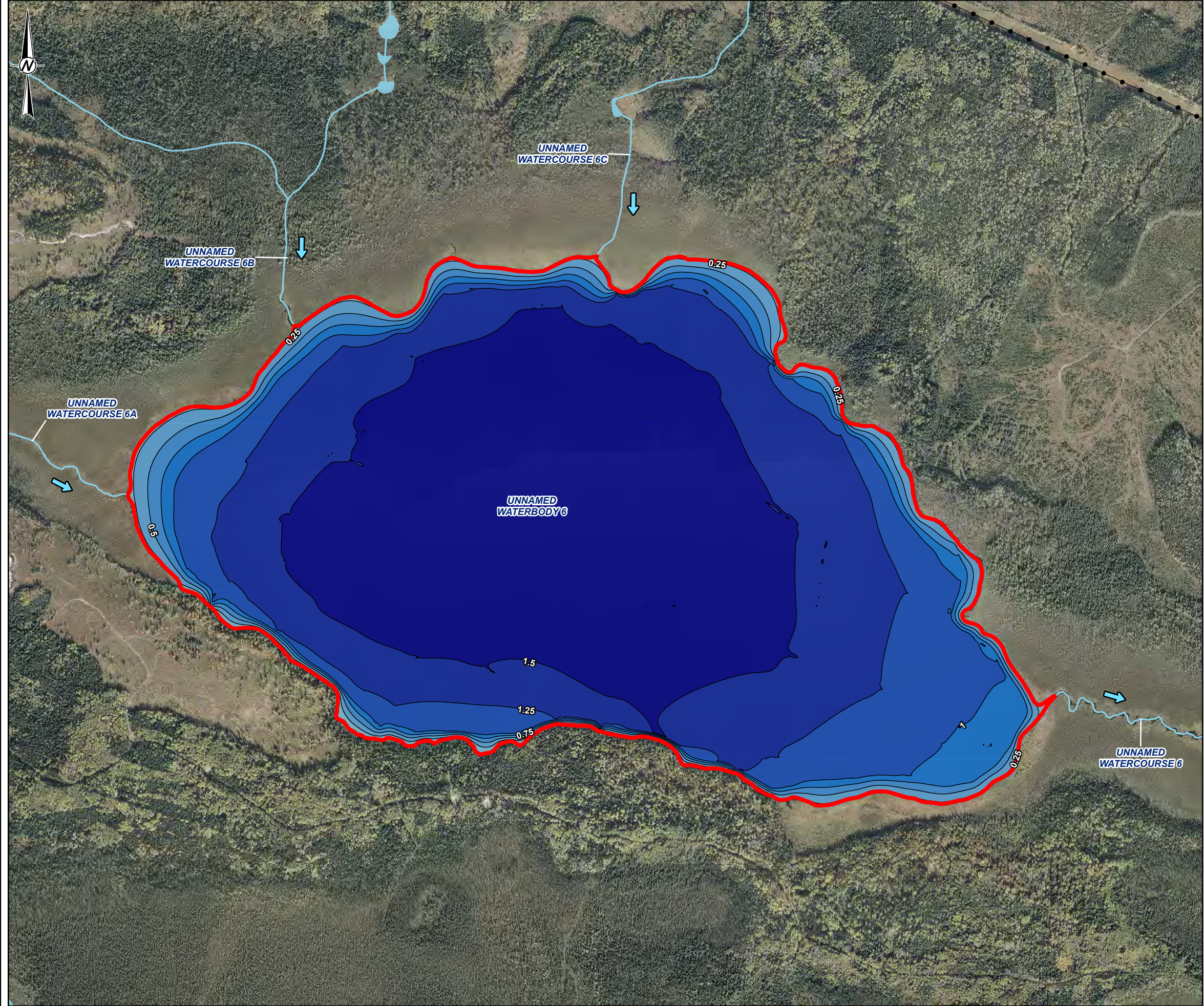
TITLE
CHUKUNI RIVER BATHYMETRY

CONSULTANT	YYYY-MM-DD	2025-03-06
	DESIGNED	----
	PREPARED	MD
	REVIEWED	----
	APPROVED	----

PROJECT NO. CA0031272 CONTROL 0001 REV. A FIGURE A1-1

P:\1711_X\CAD\CAD\030-CAK\MIS-FB1-Project\2023\Project\01\ME\A3\030_Kirross_Gmail_Bear_Erin\7_GIS\Aquatic\Baseline_2024\FRD\Appendix.aprx PRINTED ON: AT: 3:38:52 PM

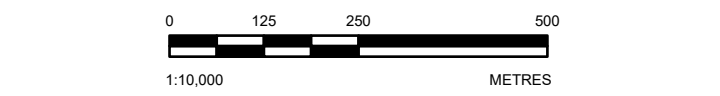
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



- LEGEND**
- PROPERTY BOUNDARY
 - POWER LINE
 - WATERCOURSE
 - WATERBODY
 - FLOW DIRECTION
 - BATHYMETRY ANALYSIS EXTENT
 - BATHYMETRY CONTOURS (0.25 M INTERVAL)

BATHYMETRY (DEPTH, M)

WATER DEPTH (M)	
	0.0 - 0.25
	0.25 - 0.5
	0.5 - 0.75
	0.75 - 1.0
	1.0 - 1.25
	1.251 - 1.5
	1.5 - 1.78



NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

- REFERENCE(S)**
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
 2. AERIAL IMAGERY PROVIDED BY GREAT BEAR RESOURCES (SCENE DATE: SEPTEMBER 2022).
 3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
 4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
 5. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
UNNAMED WATERBODY 6 BATHYMETRY

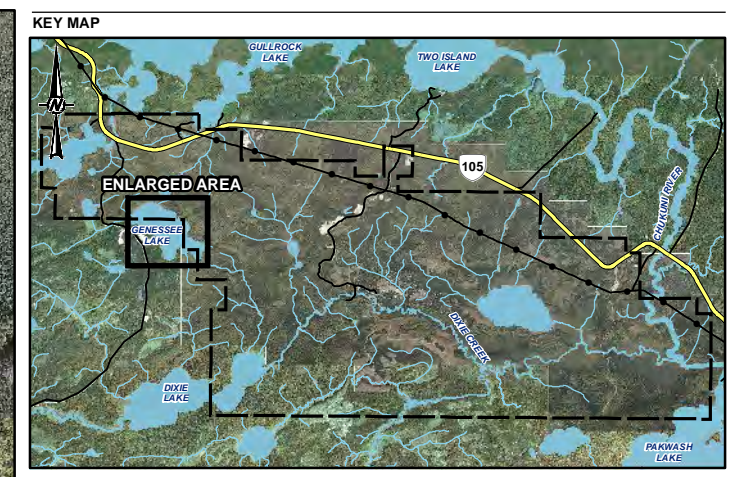
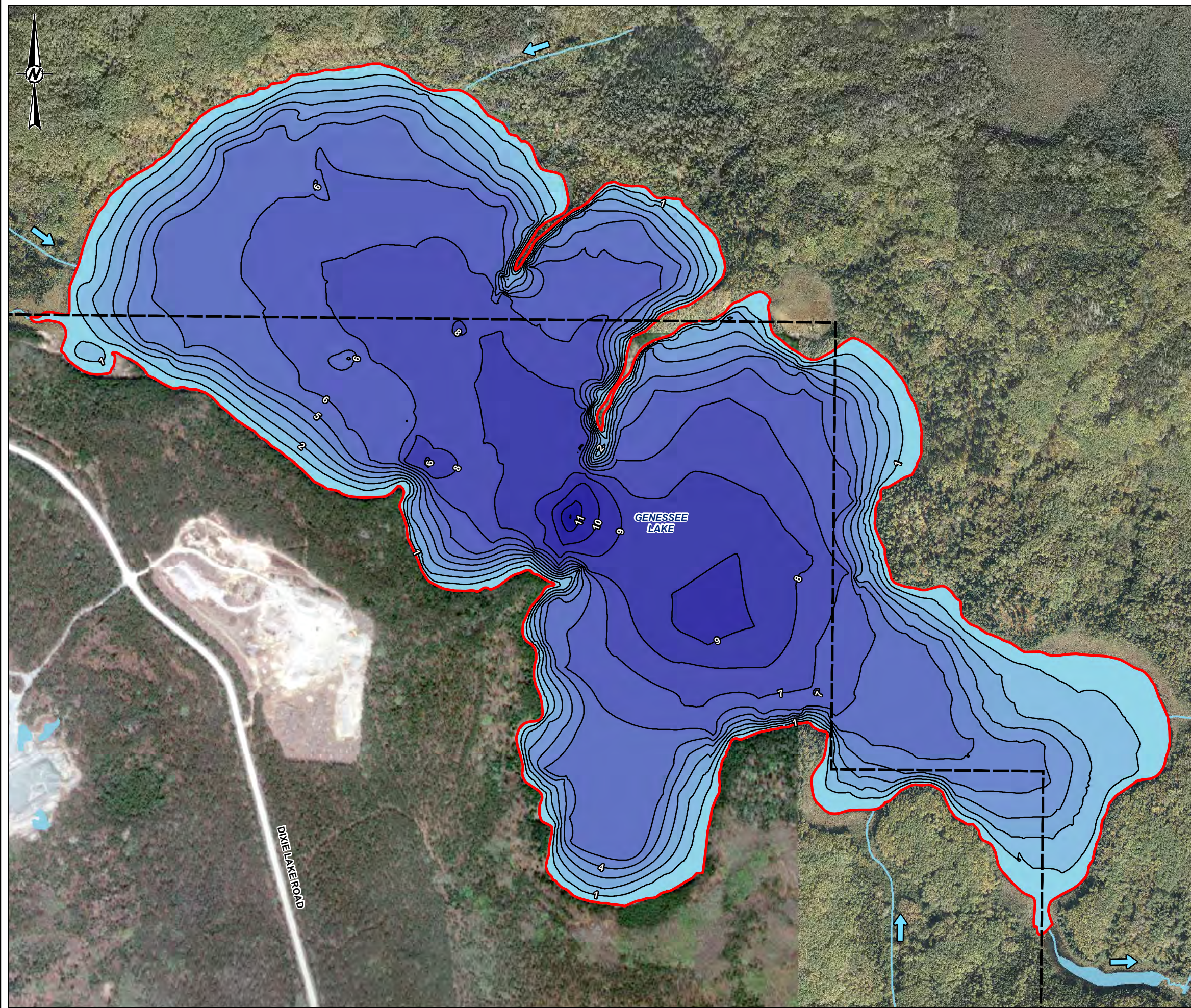
CONSULTANT	YYYY-MM-DD	
	2025-03-06	
	DESIGNED	---
	PREPARED	MD
	REVIEWED	---
	APPROVED	---

PROJECT NO. CA0031272 CONTROL 0001 REV. A FIGURE A1-2

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

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LEGEND

- PROPERTY BOUNDARY
- WATERCOURSE
- WATERBODY
- FLOW DIRECTION
- BATHYMETRY ANALYSIS EXTENT
- BATHYMETRY CONTOUR (1 METRE INTERVAL)

**BATHYMETRY (DEPTH, M)
(FILLED CONTOURS)**

	0 - 1		7 - 8
	1 - 2		8 - 9
	2 - 3		9 - 10
	3 - 4		10 - 11
	4 - 5		11 - 12
	5 - 6		> 12
	6 - 7		

0 125 250 500
1:8,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. AERIAL IMAGERY PROVIDED BY KINROSS (SCENE DATE: SEPTEMBER 2022) AND ESRI BASEMAPS (SCENE DATA: MAY 2019)
3. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
5. CONTOURS ACQUIRED FROM 2022 LIDAR SURVEY.

CLIENT
GREAT BEAR RESOURCES

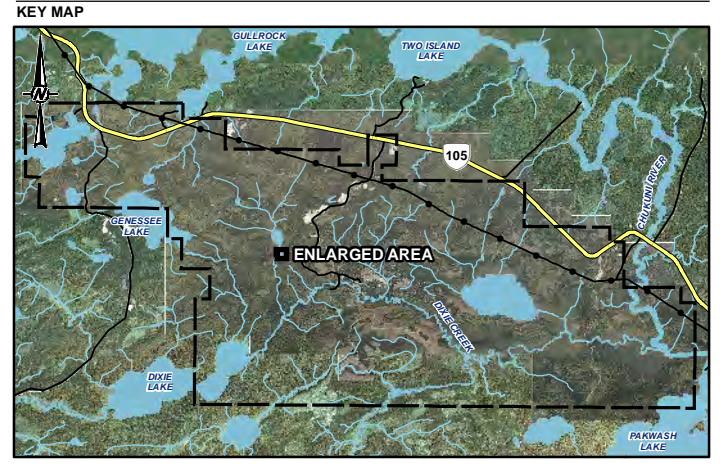
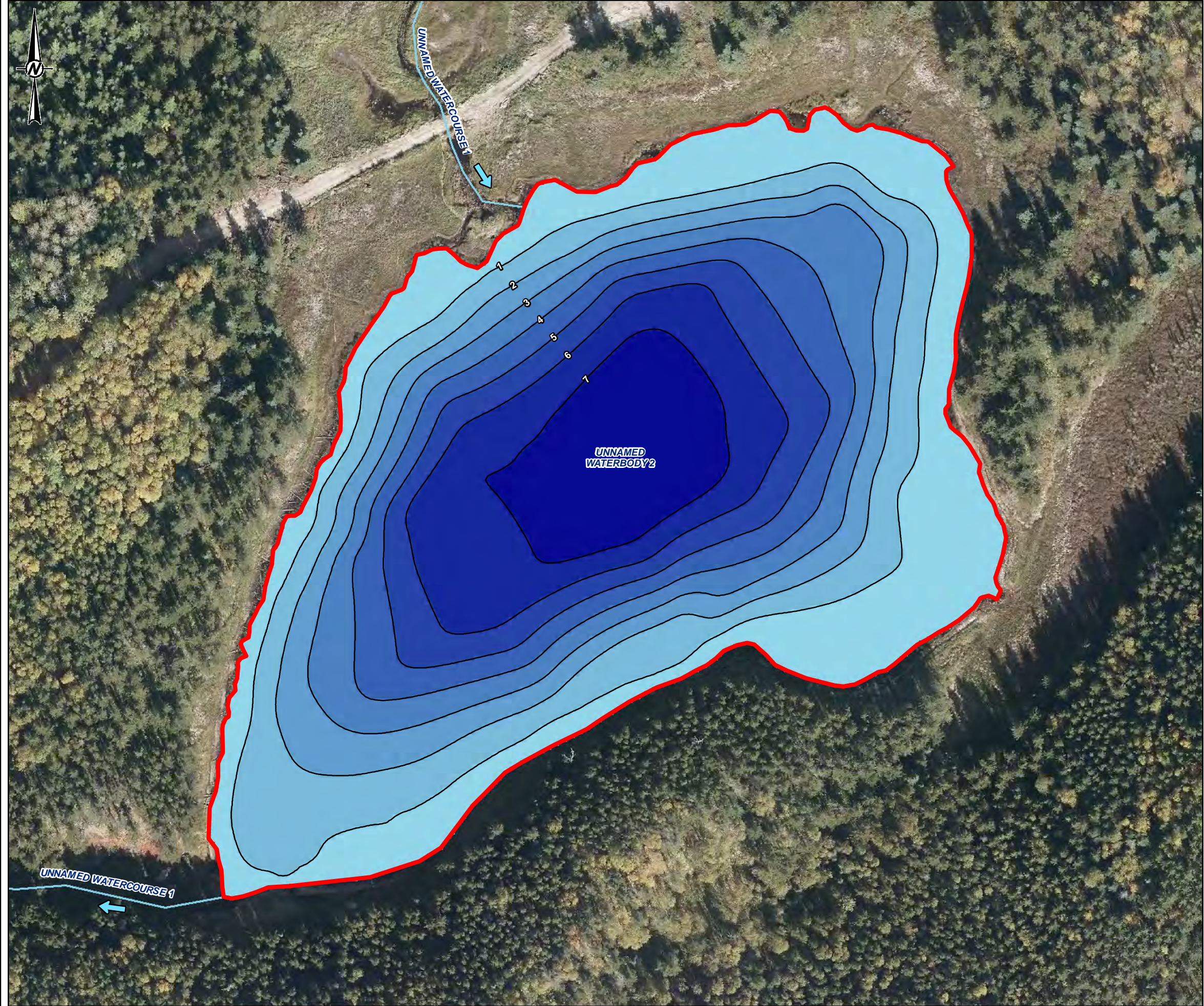
PROJECT
GREAT BEAR PROJECT

TITLE
GENESSEE LAKE BATHYMETRY

CONSULTANT	YYYY-MM-DD	2024-12-18
	DESIGNED	---
	PREPARED	MD
	REVIEWED	---
	APPROVED	---

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

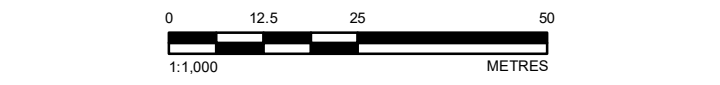
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- LEGEND**
- PROPERTY BOUNDARY
 - WATERCOURSE
 - FLOW DIRECTION
 - BATHYMETRY ANALYSIS EXTENT
 - BATHYMETRY CONTOUR (1 METRE INTERVAL)

BATHYMETRY (DEPTH, M)
(FILLED CONTOURS)

	0 - 1
	1 - 2
	2 - 3
	3 - 4
	4 - 5
	5 - 6
	6 - 7
	> 7



NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

- REFERENCE(S)**
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
 2. AERIAL IMAGERY PROVIDED BY KINROSS (SCENE DATE: SEPTEMBER 2022).
 3. PROPERTY BOUNDARY PROVIDED BY KINROSS, AUGUST 2022.
 4. ROADS INFORMATION PROVIDED BY KINROSS, AUGUST 2022.
 5. CONTOURS ACQUIRED FROM 2022 LIDAR SURVEY.
 6. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
UNNAMED WATERBODY 2 BATHYMETRY

CONSULTANT	YYYY-MM-DD	2024-12-18
	DESIGNED	---
	PREPARED	MD
	REVIEWED	---
	APPROVED	---

PROJECT NO. CA0031272	CONTROL 0001	REV. A	FIGURE A1-4
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

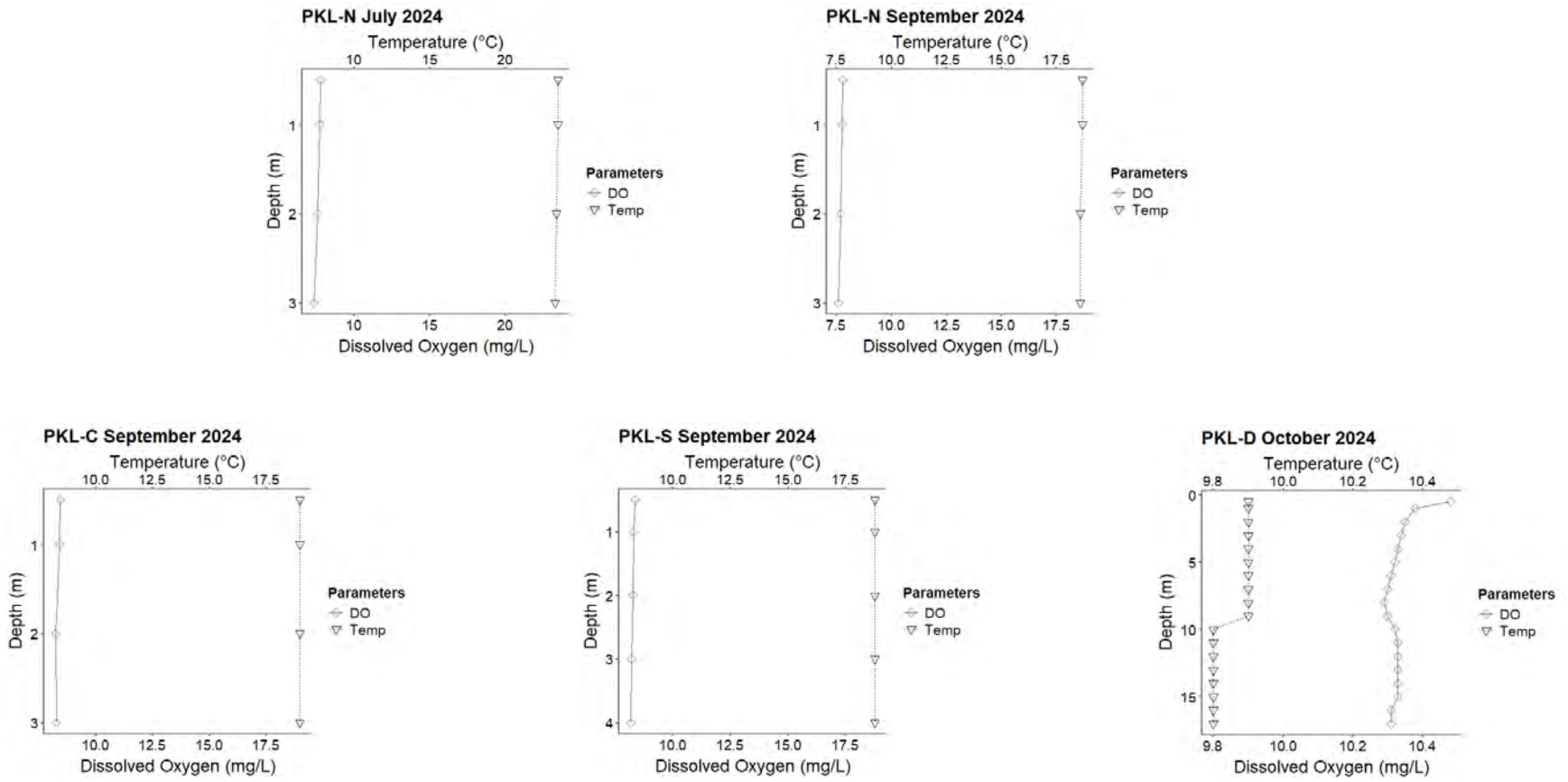


Figure A1-5: Temperature and Dissolved Oxygen Profiles for Pakwash Lake

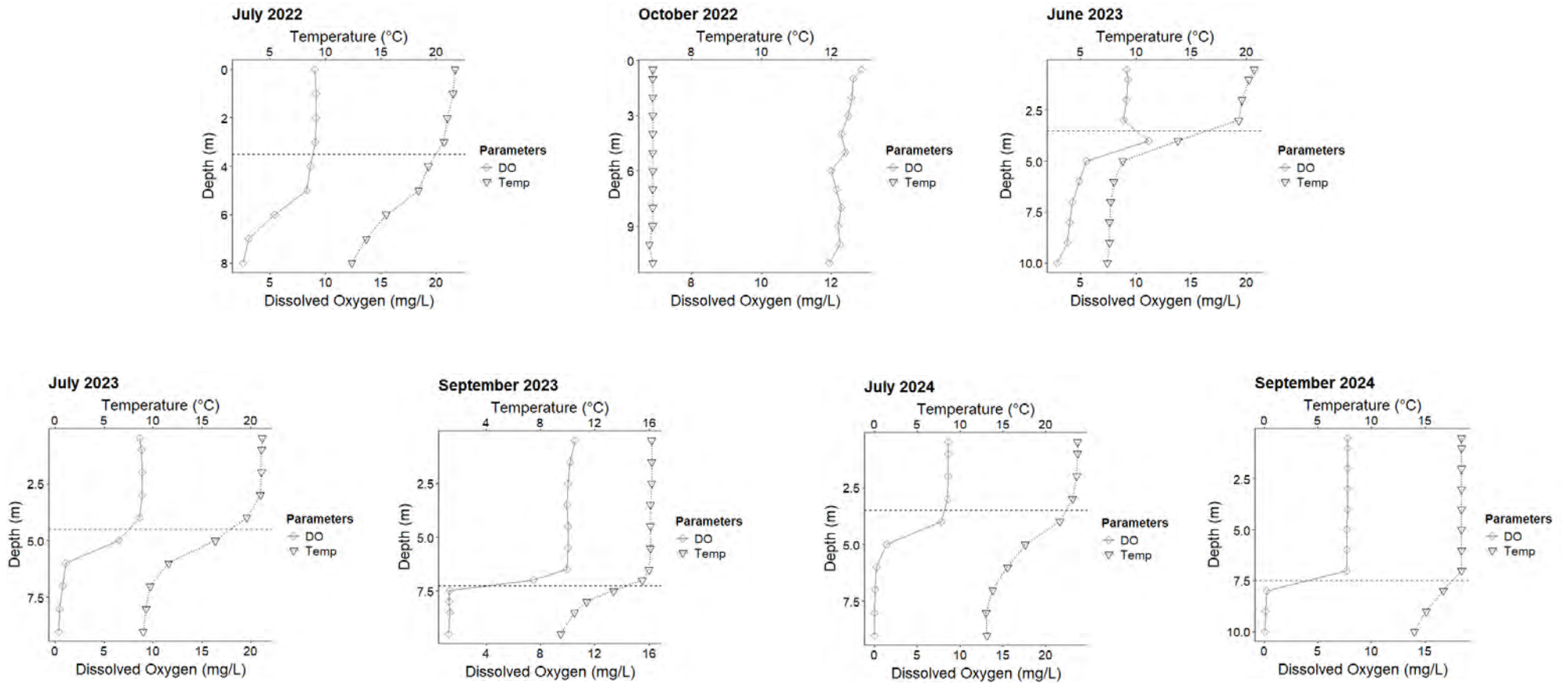


Figure A1-6: Temperature and Dissolved Oxygen Profiles for Genessee Lake

Note: Dashed line represents thermocline; defined as a change of $\geq 1^{\circ}\text{C}$ within 1 m of water depth.

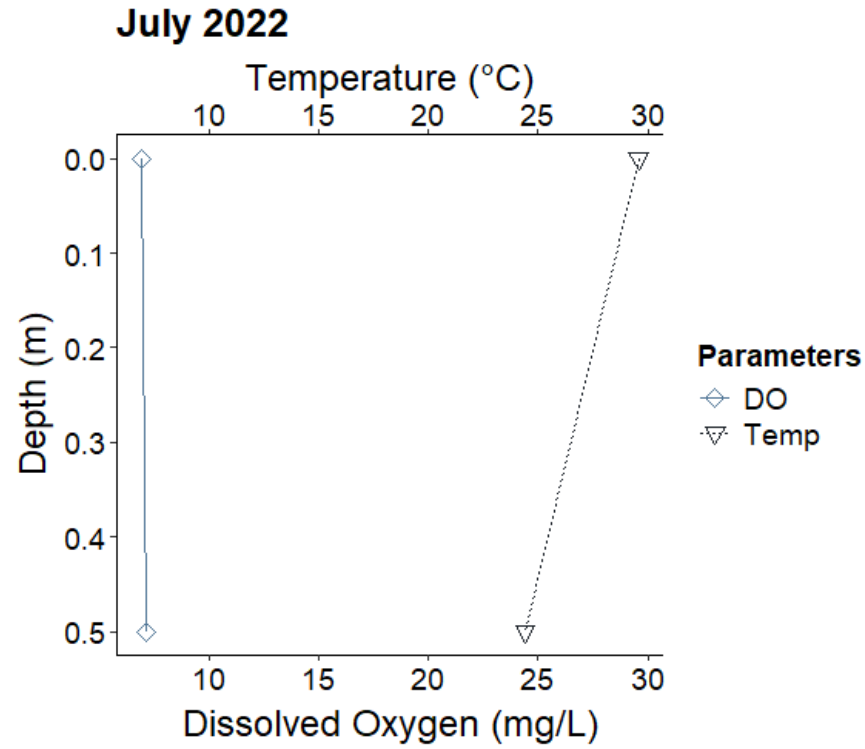


Figure A1-7: Temperature and Dissolved Oxygen Profiles for Unnamed Waterbody 1

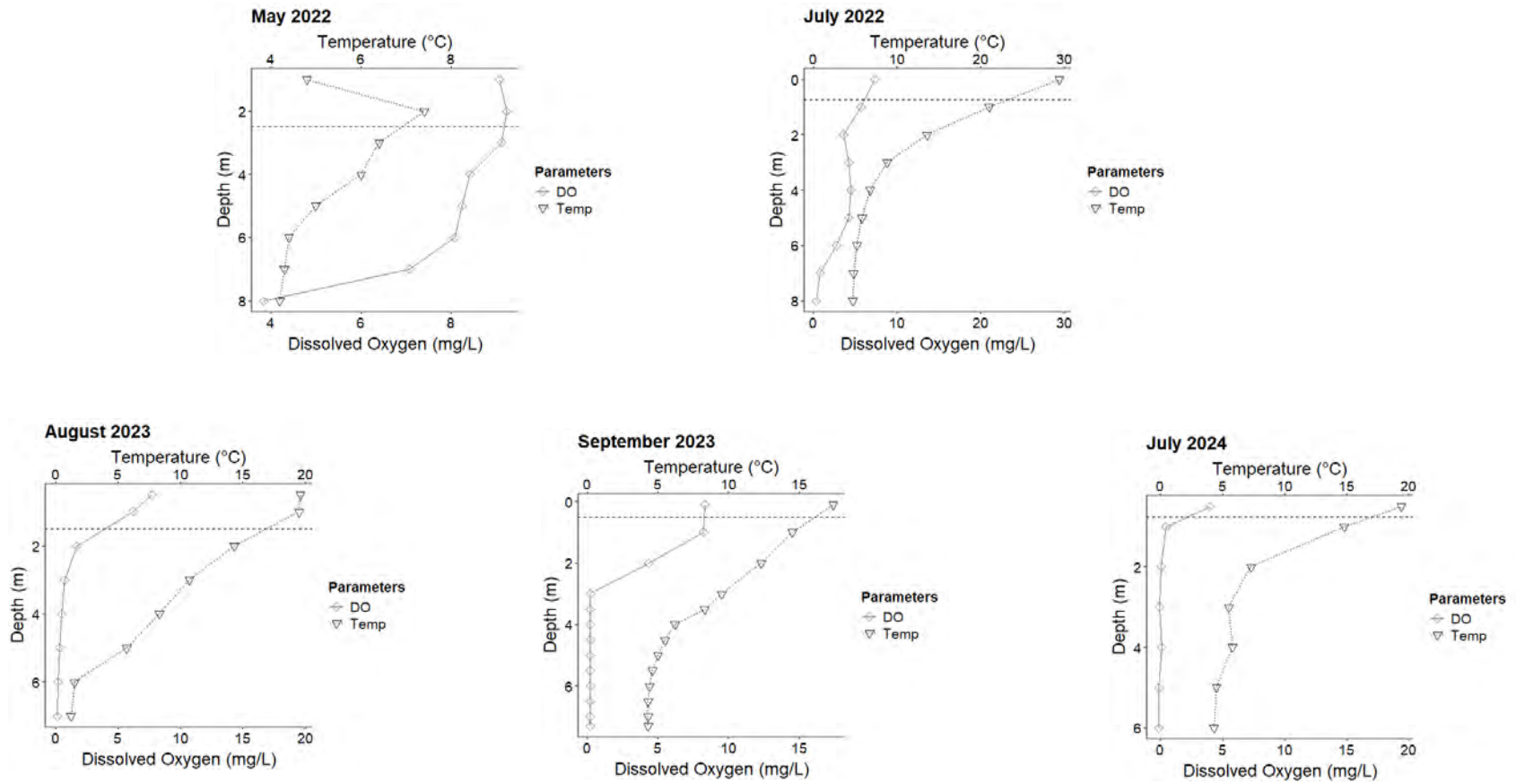


Figure A1-8: Temperature and Dissolved Oxygen Profile for Unnamed Waterbody 2

Note: Dashed line represents thermocline; defined as a change of $\geq 1^{\circ}\text{C}$ within 1 m of water depth.

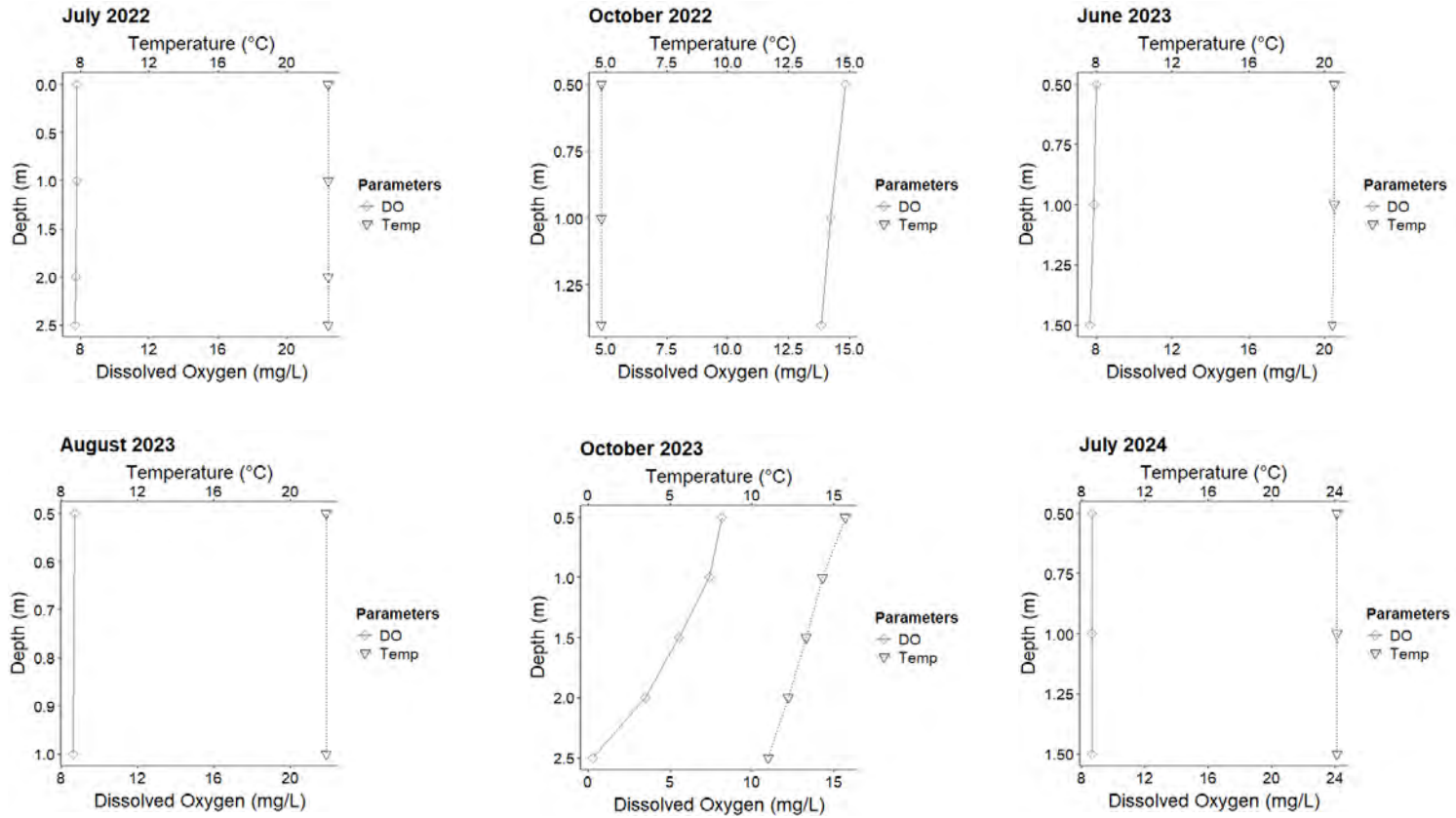


Figure A1-9: Temperature and Dissolved Oxygen Profiles for Unnamed Waterbody 6

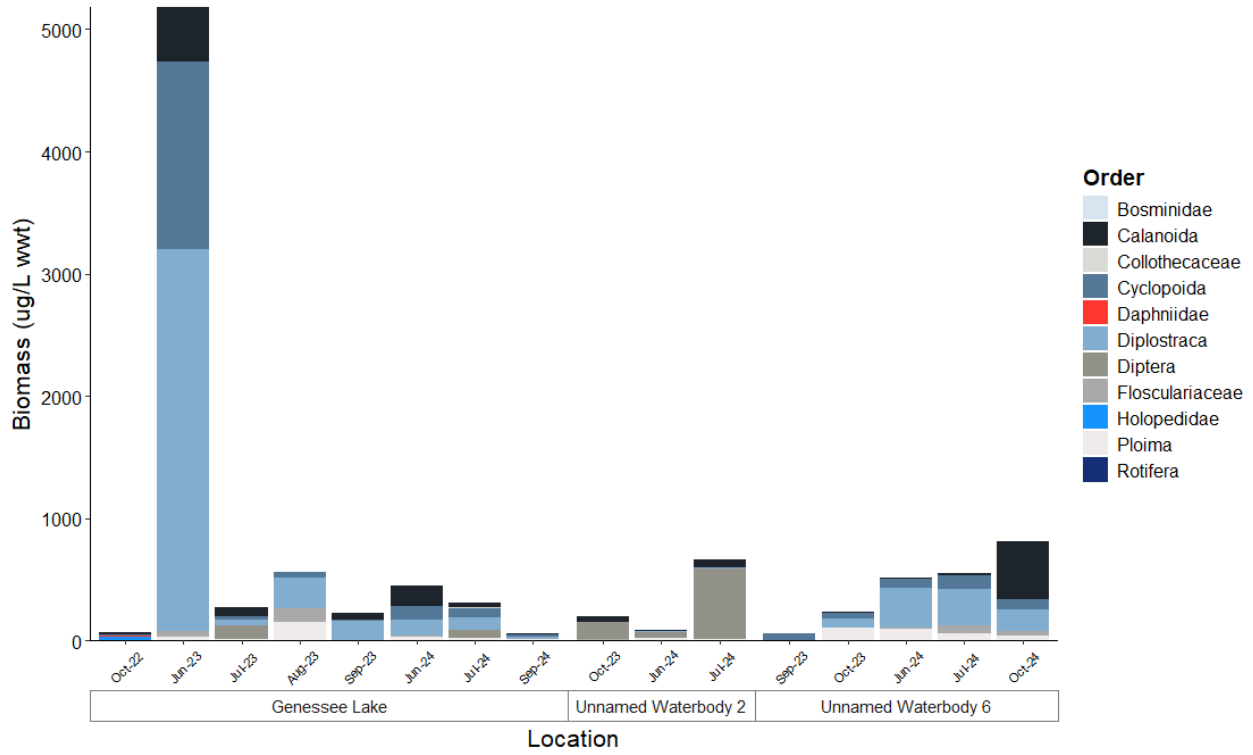


Figure A2-1: Zooplankton Biomass (ug/L wwft) by Waterbody

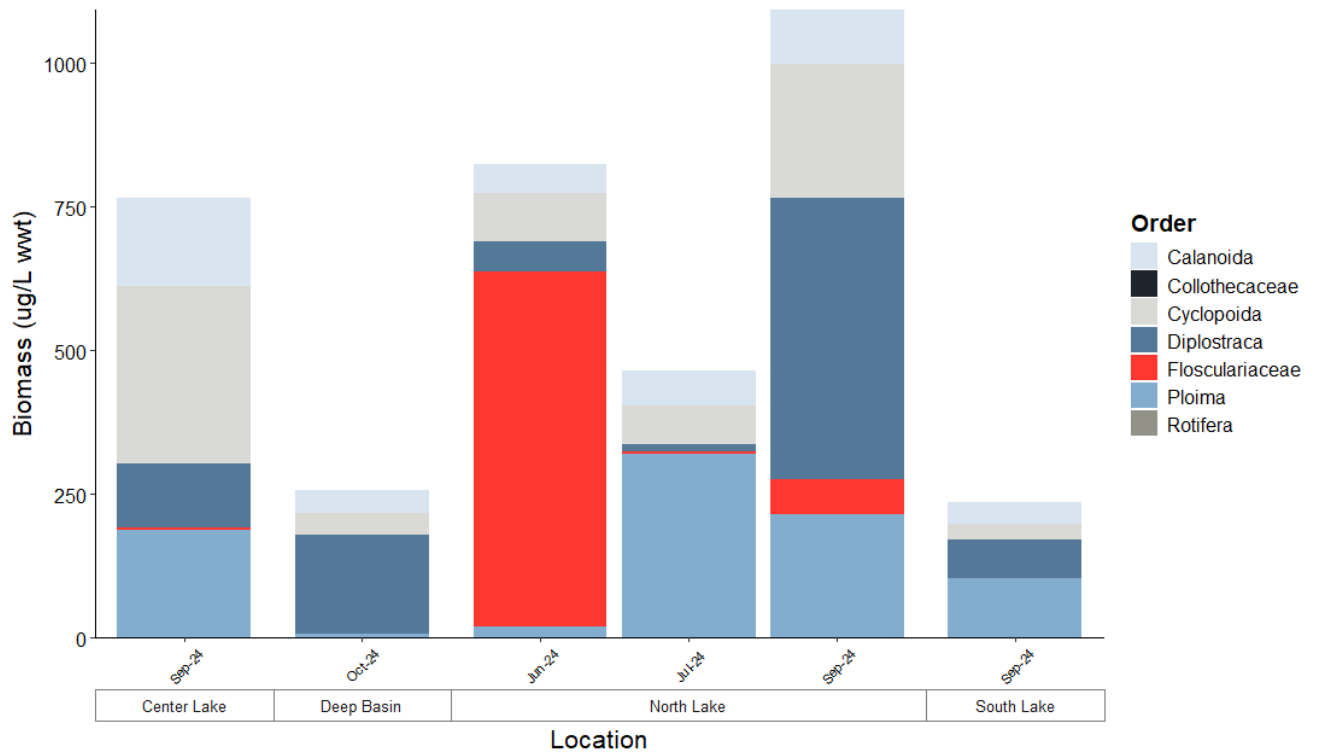


Figure A2-2: Zooplankton Biomass (ug/L wwft) in Pakwash Lake

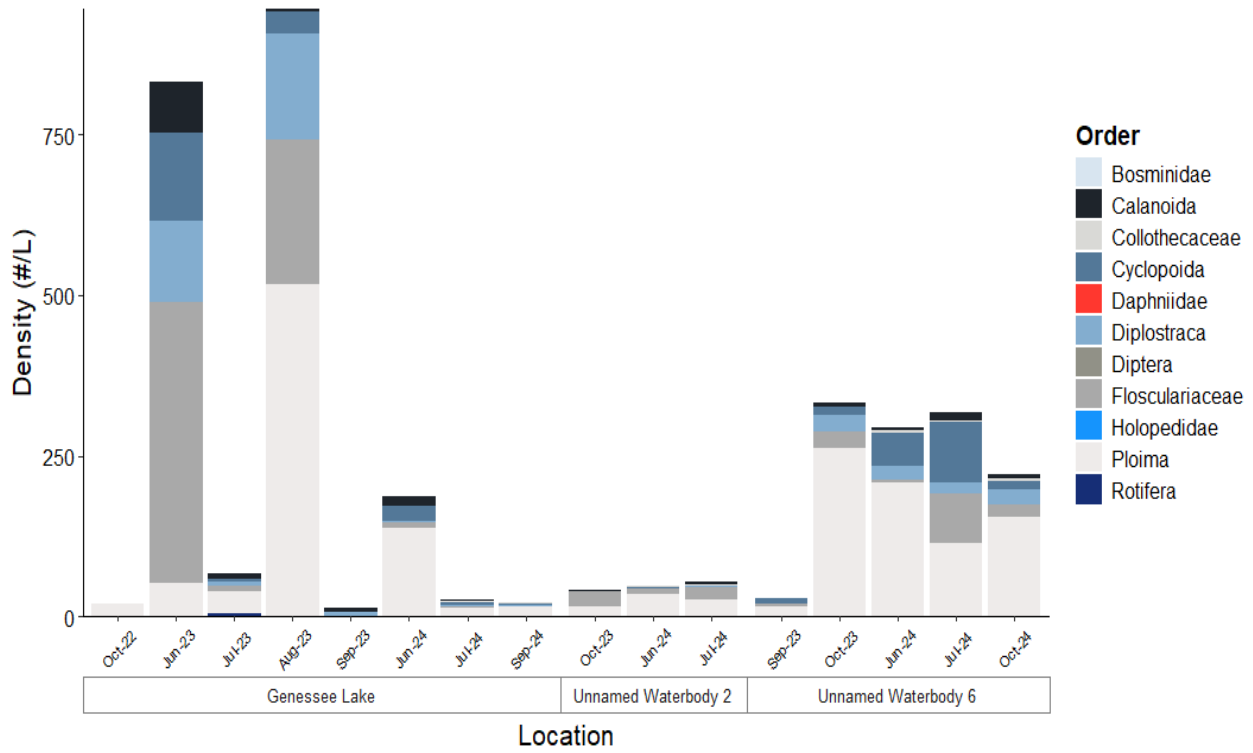


Figure A2-3: Zooplankton Density (#/L) by Waterbody

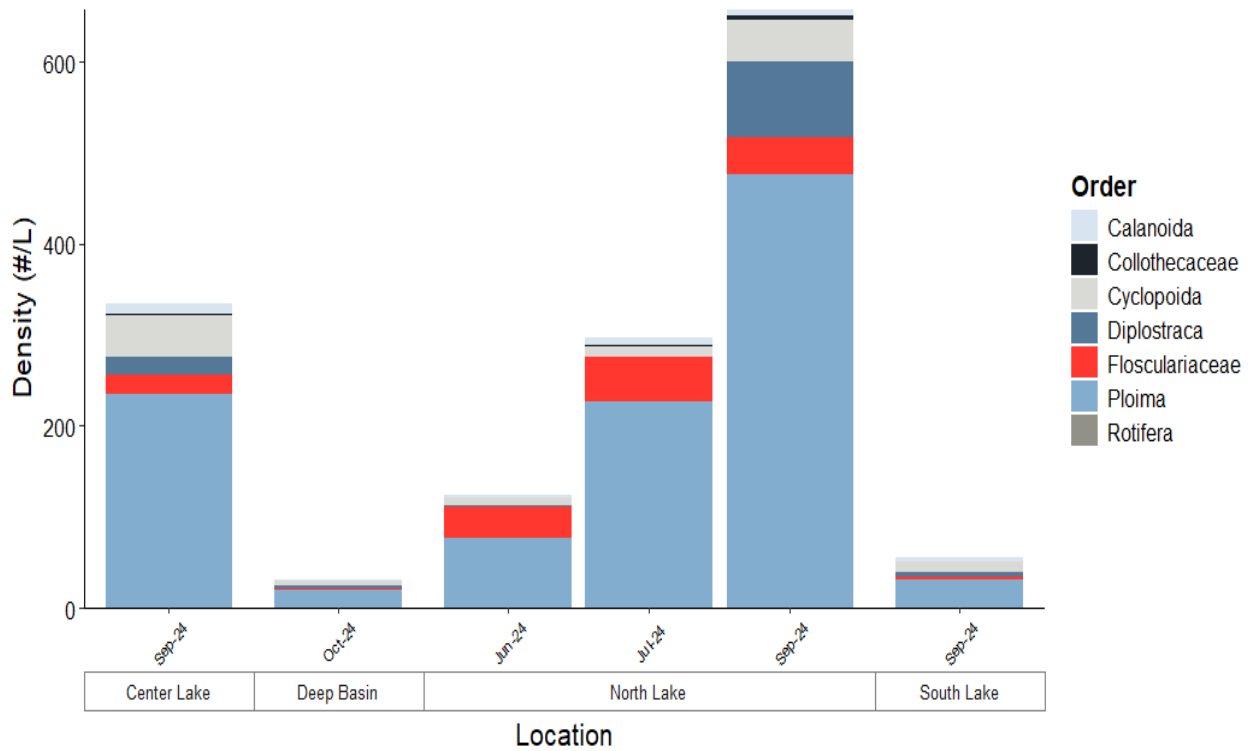


Figure A2-4: Zooplankton Density (#/L) in Pakwash Lake

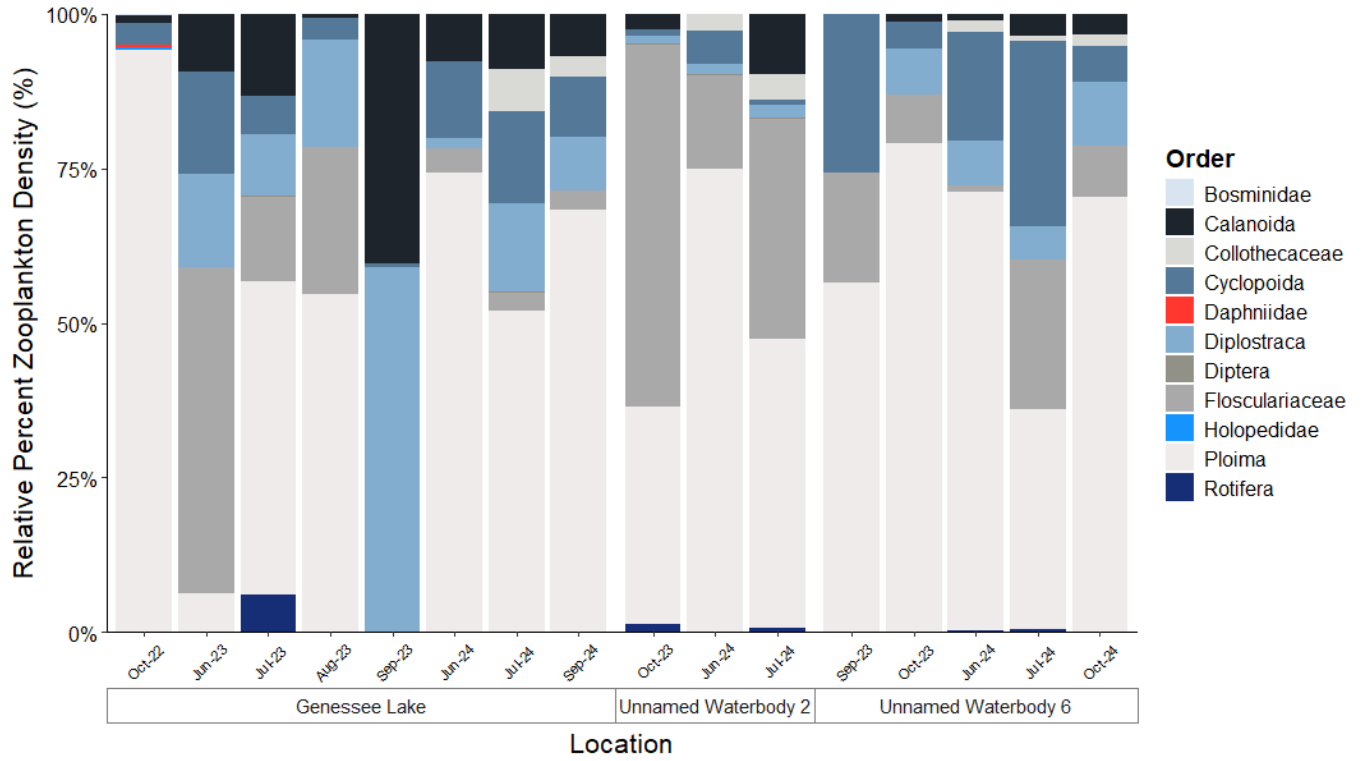


Figure A2-5: Relative Percent Zooplankton Density by Waterbody

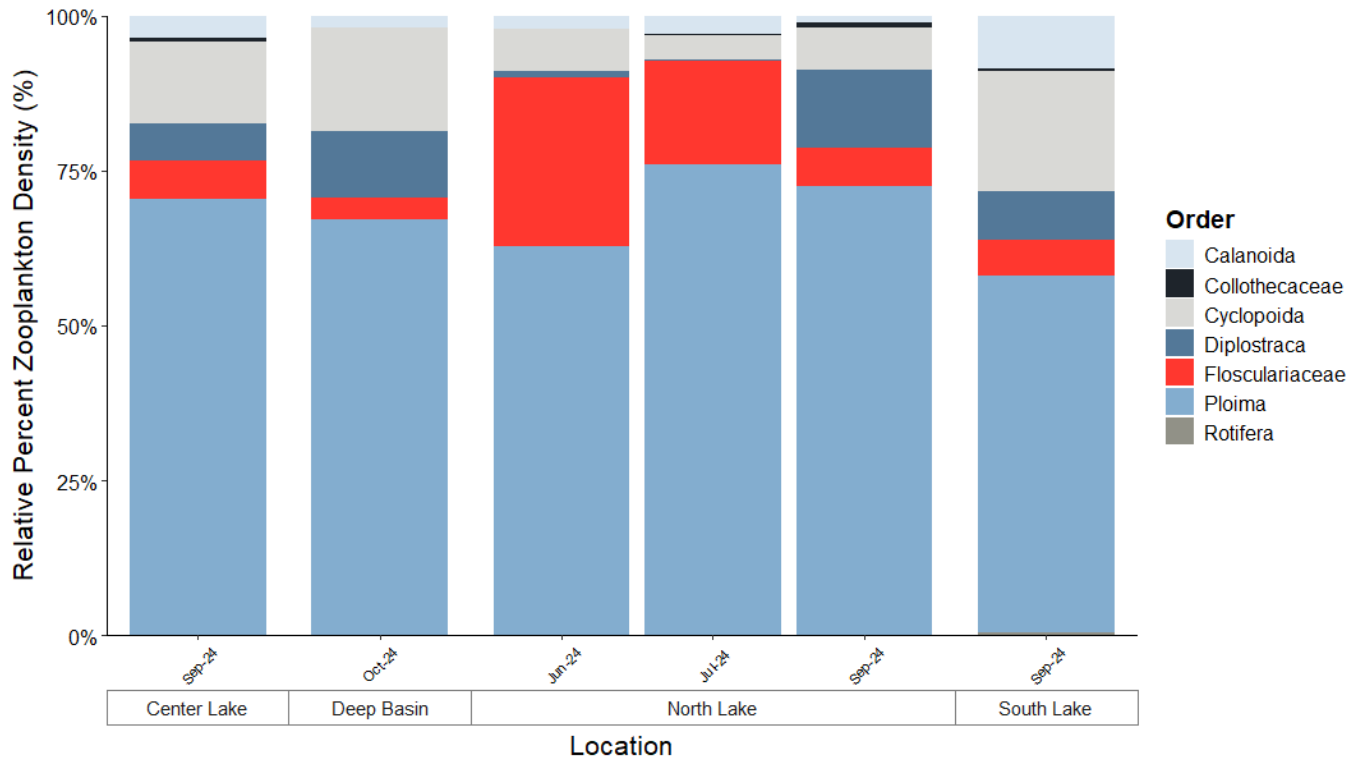


Figure A2-6: Relative Percent Zooplankton Density in Pakwash Lake

Appendix B
Fish Age Data

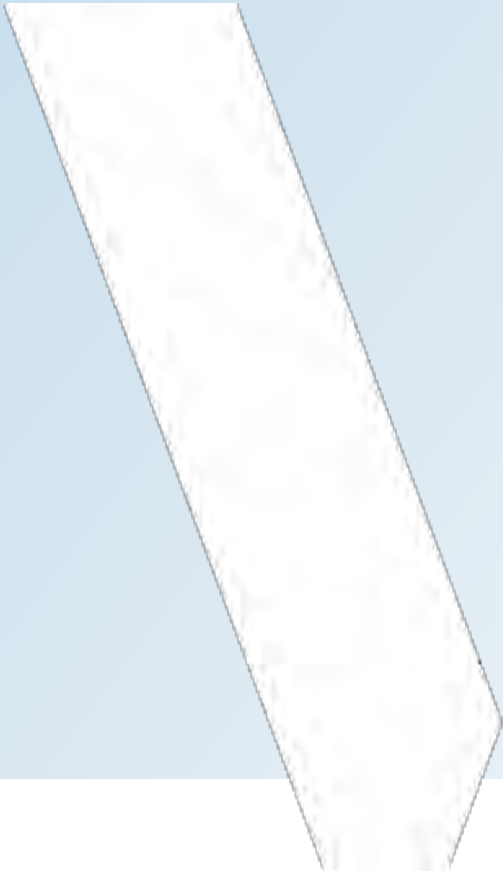




Table B1-1: Angling Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Angling Duration (hr)	Species	Site Catch Total	Site Total CPUE
					Northern Pike		
Unnamed Waterbody 6	Spring	WB-6-AN1	06-05-22	0.58		0	0.0
Unnamed Waterbody 6	Spring	WB-6-AN2	06-05-22	0.50	1	1	2.0
Unnamed Waterbody 1	Summer	WB-1-AN1	17-07-22	0.25		0	0.0
Unnamed Waterbody 2	Summer	WB-1-AN2	17-07-22	0.25		0	0.0
Species Catch Total					1	1	2.0

Notes:

Blank cells represent a catch of zero

Catch per unit effort (CPUE) expressed as total catch per angling hour (#fish/hour)



Table B1-2: 2022 Dip Net Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Angling Duration (hr)	Fish Species					Site Catch Total	Site Total CPUE
					Blacknose Shiner	Finescale Dace	Fathead Minnow	Golden Shiner	Yellow Perch		
Unnamed Watercourse 3	Spring	WC-3-DN1	03-06-22	0.50		1				1	2.0
Unnamed Waterbody 2		WB-2-DN1	27-05-22	0.50				10		10	20.0
Unnamed Waterbody 6		WB-6-DN1	06-05-22	0.58	16		25		4	45	77.6
	Summer	WB-6-DN1	23-07-22	0.50					0	0.0	
Species Catch Total					16	1	25	10	4	56	99.6

Notes:

Blank cells represent a catch of zero

Catch per unit effort (CPUE) expressed as total catch per dipping minute (#fish/minute)



Table B1-3: 2022 Electrofishing Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Effort (hr)	Fish Species											Site Catch Total	Site Total CPUE
					Brook Stickleback	Central Mudminnow	Fathead Minnow	Finescale Dace	Golden Shiner	Northern Pearl Dace	Northern Pike	Northern Redbelly Dace	Slimy Sculpin	White Sucker			
Unnamed Watercourse 1	Spring	WC-1-EF1	27-05-22	0.21		1			9					3	13	61.0	
Unnamed Watercourse 2		WC-2-EF1	30-05-22	0.18	2	14									16	90.1	
		WC-2-EF2	30-05-22	0.20											0	0.0	
		WC-2-EF3	29-05-22	0.17											0	0.0	
Unnamed Watercourse 3		WC-3-EF1	03-06-22	0.27	2	18		1							21	77.8	
		WC-3-EF2	01-06-22	0.18											0	0.0	
Unnamed Watercourse 3A		WC-3A-EF1	04-06-22	0.10											0	0.0	
Unnamed Watercourse 3B		WC-3B-EF1	02-06-22	0.10		6									6	62.2	
		WC-3B-EF2	04-06-22	0.17											0	0.0	
Unnamed Watercourse 4		WC-4-EF1	29-05-22	0.17	12	2		4						1	19	112.1	
		WC-4-EF2	01-06-22	0.05											0	0.0	
		WC-9-EF1	01-06-22	0.10											0	0.0	
Unnamed Watercourse 5		WC-9-EF2	01-06-22	0.14											0	0.0	
		WC-5-EF1	01-06-22	0.33	1	5							1		7	20.9	
Unnamed Watercourse 6B		WC-6B-EF1	04-06-22	0.15		3									3	19.4	
Unnamed Watercourse 6B-01		WC-6B-01-EF1	04-06-22	0.12											0	0.0	
Unnamed Watercourse 6C		WC-6C-EF1	04-06-22	0.11		10									10	88.9	
Unnamed Watercourse 7A-03		WC-7A-03-EF1	28-05-22	0.17											0	0.0	
Unnamed Watercourse 7A-07		WC-7A-07-EF1	28-05-22	0.17		3									3	17.7	
Unnamed Watercourse 7A-08		WC-7A-08-EF1	28-05-22	0.19											0	0.0	
Unnamed Watercourse 1	Summer	WC-1-EF1	16-07-22	0.19										2	2	10.3	
Unnamed Watercourse 1A		WC-1A-EF1	23-07-22	0.18											0	0.0	
Unnamed Watercourse 2		WC-2-EF1	20-07-22	0.17											0	0.0	
		WC-2-EF2	20-07-22	0.17		1							1		2	11.7	
		WC-3-EF1	17-07-22	0.23											0	0.0	
Unnamed Watercourse 3		WC-3-EF2	17-07-22	0.22		2									2	9.0	
		WC-3-EF3	18-07-22	0.18	1	65		2							68	376.6	
		WC-3-EF4	18-07-22	0.17		27		5							32	193.6	
		WC-3-EF5	18-07-22	0.20		1							1	1	3	15.1	
		WC-3A-EF1	18-07-22	0.16											0	0.0	
Unnamed Watercourse 3A		WC-3A-EF1	18-07-22	0.16											0	0.0	
Unnamed Watercourse 3B		WC-3B-EF1	21-07-22	0.19											0	0.0	
		WC-3B-EF2	21-07-22	0.15											0	0.0	
Unnamed Watercourse 4		WC-4-EF1	20-07-22	0.20											0	0.0	
		WC-4-EF2	20-07-22	0.20											0	0.0	
		WC-9-EF1	20-07-22	0.16											0	0.0	
		WC-9-EF2	20-07-22	0.25											0	0.0	
Unnamed Watercourse 5		WC-5-EF1	13-07-22	0.19	2	48	1	8							59	310.1	
		WC-5-EF2	13-07-22	0.19	4	9	2	9							24	123.4	
Unnamed Watercourse 6B		WC-6B-EF1	22-07-22	0.20		2									2	10.1	
Unnamed Watercourse 6B-01	WC-6B-01-EF1	22-07-22	0.18											0	0.0		
Unnamed Watercourse 6C	WC-6C-EF1	22-07-22	0.17		4									4	23.4		
Unnamed Watercourse 7A-03	WC-7A-03-EF1	14-07-22	0.16											0	0.0		



Table B1-3: 2022 Electrofishing Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Effort (hr)	Fish Species										Site Catch Total	Site Total CPUE
					Brook Stickleback	Central Mudminnow	Fathead Minnow	Finescale Dace	Golden Shiner	Northern Pearl Dace	Northern Pike	Northern Redbelly Dace	Slimy Sculpin	White Sucker		
Unnamed Watercourse 7A-07		WC-7A-07-EF1	15-07-22	0.18											0	0.0
Unnamed Watercourse 7A-08		WC-7A-08-EF1	15-07-22	0.19		16					9				25	128.6
Unnamed Watercourse 8	Fall	WC-8-EF1	17-07-22	0.19											0	0.0
Unnamed Watercourse 1		WC-1-EF1	28-10-22	0.12											0	0.0
Unnamed Watercourse 2		WC-2-EF2	25-10-22	0.13	1										1	8.0
Unnamed Watercourse 3		WC-3-EF1	25-10-22	0.14		10									10	73.9
Unnamed Watercourse 3A		WC-3B-EF1	22-10-22	0.09											0	0.0
Unnamed Watercourse 3B		WC-3A-EF1	22-10-22	0.17											0	0.0
Unnamed Watercourse 4		WC-4-EF1	20-10-22	0.13		3							6		9	68.4
Unnamed Watercourse 5		WC-5-EF1	21-10-22	0.17		8		5							13	76.0
Unnamed Watercourse 6A		WC-6A-EF1	25-10-22	0.13		14									14	104.6
Unnamed Watercourse 6B		WC-6B-EF1	24-10-22	0.21		1									1	4.8
Unnamed Watercourse 6B-01		WC-6B-01-EF1	23-10-22	0.09											0	0.0
Unnamed Watercourse 6C		WC-6C-EF1	24-10-22	0.11											0	0.0
Unnamed Watercourse 7A-03		WC-7A-03-EF1	21-10-22	0.17											0	0.0
Unnamed Watercourse 7A-07		WC-7A-07-EF1	22-10-22	0.09											0	0.0
Unnamed Watercourse 7A-08		WC-7A-08-EF1	22-10-22	0.09											0	0.0
Unnamed Watercourse 8		WC-8-EF1	25-10-22	0.16						2					2	12.7
Species Catch Total					25	273	3	34	9	2	9	2	2	12	371	596.3

Notes:

Blank cells represent a catch of zero

Catch per unit effort (CPUE) expressed as total catch per electrofishing second (#fish/second)



Table B1-4: 2022 Gill Net Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Duration (hr)	Fish Species									Site Catch Total	Site Total CPUE
					Blacknose Shiner	Cisco	Golden Shiner	Lake Whitefish	Mooneye	Northern Pike	Walleye	White Sucker	Yellow Perch		
Unnamed Waterbody 2	Spring	WB-2-GN1	26-05-22	3.3			4			2				6	1.8
		WB-2-GN2	26-05-22	3.3										0	0.0
		WB-2-GN3	26-05-22	3.3						3				3	0.9
Unnamed Waterbody 5		WB-5-GN2	28-05-22	3.3										0	0.0
		WB-5-GN3	28-05-22	3.3										0	0.0
Unnamed Waterbody 6		WB-6-GN1	05-06-22	3.0						3				3	1.0
		WB-6-GN2	05-06-22	3.0						3			3	6	2.0
		WB-6-GN3	05-06-22	3.0								10		10	3.3
Dixie Creek - 02		DC02-GN1	19-07-22	0.5										0	0.0
Dixie Creek - 03	DC02-GN2	19-07-22	0.5										0	0.0	
	DC03-GN1	19-07-22	1.0					2	2				4	4.0	
Genessee Lake	DC03-GN2	19-07-22	1.0					1					1	1.0	
	GL-GN1	14-07-22	0.5	4									4	8.0	
Unnamed Waterbody 1	GL-GN2	14-07-22	0.5						1				1	2.0	
	WB-1-GN1	16-07-22	0.5			1							1	2.0	
Unnamed Waterbody 2	WB-1-GN2	16-07-22	0.5										0	0.0	
	WB-2-GN1	16-07-22	0.5			1							1	2.0	
Unnamed Waterbody 5	WB-2-GN2	16-07-22	0.5										0	0.0	
	WB-5-GN1	21-07-22	0.1										0	0.0	
	WB-5-GN2	21-07-22	0.1										0	0.0	
	WB-5-GN1	21-07-22	0.2										0	0.0	
Unnamed Waterbody 6	WB-5-GN2	21-07-22	0.2										0	0.0	
	WB-6-GN1	22-07-22	0.5						36			6	42	84.0	
	WB-6-GN2	22-07-22	0.5										0	0.0	
	WB-6-GN3	22-07-22	0.5						10			3	13	26.0	
Dixie Creek - 01	WB-6-GN4	22-07-22	0.5						2				2	4.0	
	DC-01-GN1	27-10-22	3.0										0	0.0	
	DC-01-GN2	27-10-22	3.0										0	0.0	
	DC-01-GN3	27-10-22	3.0										0	0.0	
Dixie Creek - 02	DC-01-GN4	27-10-22	3.0										0	0.0	
	DC-01-GN5	27-10-22	3.0										0	0.0	
	DC-02-GN1	22-10-22	3.3										0	0.0	
	DC-02-GN2	22-10-22	3.3										0	0.0	
	DC-02-GN3	22-10-22	3.3										0	0.0	
Dixie Creek - 03	DC-02-GN4	22-10-22	3.3										0	0.0	
	DC-02-GN5	22-10-22	3.3										0	0.0	
	DC-03-GN1	23-10-22	5.0										0	0.0	
	DC-03-GN2	23-10-22	5.0										0	0.0	



Table B1-4: 2022 Gill Net Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Duration (hr)	Fish Species									Site Catch Total	Site Total CPUE
					Blacknose Shiner	Cisco	Golden Shiner	Lake Whitefish	Mooneye	Northern Pike	Walleye	White Sucker	Yellow Perch		
Dixie Creek - 03	Fall	DC-03-GN3	23-10-22	5.0						1				1	0.2
		DC-03-GN4	23-10-22	5.0										0	0.0
		DC-03-GN5	23-10-22	5.0										0	0.0
Dixie Creek - 04	Fall	DC-04-GN1	25-10-22	3.0						3				3	1.0
		DC-04-GN2	25-10-22	3.0						2				2	0.7
		DC-04-GN3	25-10-22	3.0						3				3	1.0
		DC-04-GN4	25-10-22	3.0						2		1		3	1.0
		DC-04-GN5	25-10-22	3.0							1		1	2	0.7
Chukuni River - REF	Fall	CR-REF-GN1	28-10-22	0.5						1	1			2	4.0
		CR-REF-GN2	28-10-22	0.5						1	1			2	4.0
		CR-REF-GN3	28-10-22	0.5										0	0.0
Chukuni River - FDP	Fall	CR-FDP-GN1	28-10-22	0.5				1				1		2	4.0
		CR-FDP-GN2	28-10-22	0.5										0	0.0
		CR-FDP-GN3	28-10-22	0.5										0	0.0
Chukuni River - DS	Fall	CR-DS-GN1	29-10-22	0.5						1	1	1		3	6.0
		CR-DS-GN2	29-10-22	0.5						1		1		2	4.0
		CR-DS-GN3	29-10-22	0.5						1		1		2	4.0
Genessee Lake	Fall	GL-GN1	26-10-22	27.8		2				1			8	11	0.4
		GL-GN2	26-10-22	27.8						5				5	0.2
		GL-GN3	26-10-22	28.0						1				1	0.0
		GL-GN4	26-10-22	28.0						2				2	0.1
Unnamed Waterbody 6	Fall	WB-6-GN1	26-10-22	3.0						4				4	1.3
		WB-6-GN2	26-10-22	3.0						4				4	1.3
		WB-6-GN3	26-10-22	3.0						2				2	0.7
		WB-6-GN4	26-10-22	3.0						3				3	1.0
Unnamed Waterbody 2	Fall	WB-2-GN1	27-10-22	2.0						1				1	0.5
		WB-2-GN2	27-10-22	2.0										0	0.0
		WB-2-GN3	27-10-22	2.0										0	0.0
Unnamed Watercourse 7	Fall	WC-7-GN1	24-10-22	3.0										0	0.0
		WC-7-GN2	24-10-22	3.0										0	0.0
		WC-7-GN3	24-10-22	3.0										0	0.0
		WC-7-GN4	24-10-22	3.0							1			1	0.3
Total Catch					4	2	6	1	3	102	4	5	31	158	178.5

Notes:

Blank cells represent a catch of zero

Catch per unit effort (CPUE) expressed as total catch per gillnetting hour (#fish/hour)



Table B1-5: 2022 Minnow Trap Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Traps Set (#)	Duration (hr)	Total Effort (hr)	Fish Species														Site Catch Total	Site Total CPUE								
							Blacknose Shiner	Brook Stickleback	Burbot	Central Mudminnow	Common Shiner	Fathead Minnow	Finescale Dace	Golden Shiner	Iowa Darter	Lake Chub	Northern Pearl Dace	Northern Pike	Northern Redbelly Dace	Rock Bass			White Sucker	Yellow Perch						
Unnamed Waterbody 1	Spring	WB-1-MT1	27-05-22	20	24.0	480.0																	0	0.0						
Unnamed Waterbody 2		WB-2-MT1	28-05-22	20	24.5	490.0																		0	0.0					
Unnamed Waterbody 3		WB-3-MT1	02-06-22	5	24.0	120.0							3		1							1	1	6	0.1					
Unnamed Waterbody 4		WB-4-MT1	27-06-22	4	24.0	96.0							13											24	0.3					
Unnamed Waterbody 5		WB-5-MT1	28-05-22	20	23.5	470.0																		0	0.0					
Unnamed Waterbody 6		WB-6-MT1	06-06-22	30	29.0	870.0																		0	0.0					
Unnamed Watercourse 1B		WC-1B-MT1	27-06-22	6	24.0	144.0							1											63	0.4					
		WC-1B-MT2	27-06-22	2	24.0	48.0																		0	0.0					
Unnamed Watercourse 1B-03		WC-1B-03-MT1	25-06-22	4	24.0	96.0																		5	0.1					
		WC-1B-03-MT2	25-06-22	4	24.0	96.0																		0	0.0					
		WC-1B-03-MT3	25-06-22	4	24.0	96.0																		0	0.0					
Unnamed Watercourse 3A		WC-3A-MT1	11-06-22	5	24.0	120.0																		3	0.0					
		WC-3A-MT2	07-06-22	8	24.0	192.0																	1	3	0.0					
		WC-3A-MT3	07-06-22	10	24.0	240.0																		0	0.0					
Unnamed Watercourse 3B		WC-3B-MT1	07-06-22	4	24.0	96.0																		0	0.0					
		WC-3B-MT2	11-06-22	5	24.0	120.0																		14	0.1					
		WC-3B-MT3	11-06-22	6	24.0	144.0																		20	0.1					
		WC-3B-MT4	12-06-22	3	24.0	72.0																		3	0.0					
Unnamed Watercourse 5		WC-5-MT1	04-06-22	8	24.3	194.0																		27	167	0.9				
		WC-5-MT2	03-06-22	8	24.0	192.0																		9	34	0.2				
Unnamed Watercourse 6A		WC-6A-MT1	13-06-22	2	24.0	48.0																			0	0.0				
		WC-6A-MT2	13-06-22	2	24.0	48.0																		1	6	0.1				
Unnamed Watercourse 6A-02		WC-6A-02-MT1	13-06-22	1	24.0	24.0																			0	0.0				
Unnamed Watercourse 6A-US		WC-6A-2-MT1	13-06-22	2	24.0	48.0																			1	0.0				
Unnamed Watercourse 6B-01		WC-6B-01-MT1	13-06-22	5	24.0	120.0																		14	23	0.2				
Unnamed Watercourse 6B-02		WC-6B-02-MT1	13-06-22	4	24.0	96.0																			0	0.0				
Unnamed Watercourse 7A-03		WC-7A-03-MT1	03-06-22	5	24.0	120.0																			0	0.0				
Unnamed Watercourse 7A-07		WC-7A-07-MT1	03-06-22	5	24.0	120.0																			4	0.0				
		WC-7A-08-MT2	05-06-22	7	24.0	168.0																			29	40	0.2			
Unnamed Watercourse 7A-08		WC-7A-08-MT1	04-06-22	5	24.3	121.3																			10	0	0.0			
		WC-8-MT1	02-06-22	5	24.0	120.0																			25	720	6.0			
		WC-8-MT2	10-06-22	5	24.0	120.0																			13	30	0.3			
Unnamed Watercourse 8		WC-8B-MT1	04-06-22	5	24.0	120.0																			29	74	0.6			
		GL-MT1	13-07-22	15	24.0	360.0																			4	5	35	0.1		
Unnamed Waterbody 1	Summer	WB-1-MT1	17-07-22	15	19.1	286.2																			0	0.0				
Unnamed Waterbody 2		WB-2-MT1	17-07-22	5	18.2	90.9																				0	0.0			
Unnamed Waterbody 3		WB-3-MT1	13-07-22	15	24.0	360.0																			8	2	46	0.1		
Unnamed Waterbody 5		WB-5-MT1	21-07-22	10	24.0	240.0																					0	0.0		
Unnamed Waterbody 6		WB-6-MT1	23-07-22	15	24.0	360.0																					0	0.0		
Unnamed Watercourse 1		WC-1-MT1	17-07-22	13	13.5	175.5																					1	2	0.0	
		WC-3-MT1	18-07-22	15	15.0	225.0																				34	69	139	0.6	
Unnamed Watercourse 3		WC-3-MT2	18-07-22	15	17.0	255.0																				28	31	377	1.5	
		WC-4-MT1	20-07-22	15	19.0	285.0																						2	5	0.0
Unnamed Watercourse 5		WC-5-MT1	14-07-22	15	19.3	288.8																					14	17	628	2.2
		WC-5-MT2	14-07-22	15	17.8	266.3																				18	70	318	1.2	
Unnamed Watercourse 7A-03		WC-7A-03-MT1	16-07-22	15	19.5	292.5																							0	0.0
Unnamed Watercourse 7A-08		WC-7A-08-MT1	16-07-22	15	20.8	311.3																				1	20	51	0.1	



Table B1-5: 2022 Minnow Trap Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Traps Set (#)	Duration (hr)	Total Effort (hr)	Fish Species														Site Catch Total	Site Total CPUE				
							Blacknose Shiner	Brook Stickleback	Burbot	Central Mudminnow	Common Shiner	Fathead Minnow	Finescale Dace	Golden Shiner	Iowa Darter	Lake Chub	Northern Pearl Dace	Northern Pike	Northern Redbelly Dace	Rock Bass			White Sucker	Yellow Perch		
Dixie Creek - 01	Fall	DC01-MT1	17-07-22	12	4.3	51.0																	0	0.0		
Dixie Creek - 02		DC02-MT1	23-07-22	12	21.5	258.0																		0	0.0	
Dixie Creek - 03		DC03-MT1	23-07-22	12	4.5	54.0																		0	0.0	
Dixie Creek - 04		DC04-MT1	25-10-22	12	6.8	81.0																		0	0.0	
Chukuni River - REF		CR-REF-MT1	29-10-22	15	18.5	277.5			1															1	2	0.0
Chukuni River - FDP		CR-FDP-MT1	28-10-22	12	6.5	78.0																			0	0.0
Chukuni River - DS		CR-DS-MT1	29-10-22	10	3.8	37.5																			0	0.0
Genessee Lake		GL-MT1	27-10-22	15	22.0	330.0		2																	2	0.0
Unnamed Waterbody 2		WB-2-MT1	28-10-22	15	18.3	273.8																			0	0.0
Unnamed Waterbody 3		WB-3-MT1	27-10-22	10	20.0	200.0																			0	0.0
Unnamed Waterbody 5		WB-5-MT1	28-10-22	15	17.5	262.5																			0	0.0
Unnamed Waterbody 6		WB-6-MT1	26-10-22	12	6.5	78.0																			0	0.0
Unnamed Watercourse 3B		WC-3B-MT1	22-10-22	12	20.0	240.0		32		20															52	0.2
Unnamed Watercourse 4		DC03-MT1	21-10-22	12	23.8	285.0		21		4		3													28	0.1
Unnamed Watercourse 5		WC-5-MT1	21-10-22	15	24.0	360.0		45		57		4	447				10		18						581	1.6
Unnamed Watercourse 6B		WC-6B-MT1	24-10-22	15	20.0	300.0		19		26															45	0.2
Unnamed Watercourse 6C		WC-6C-MT1	24-10-22	10	20.0	200.0		58		64															122	0.6
Unnamed Watercourse 7		WC-7-MT1	24-10-22	12	6.8	81.0																			0	0.0
Unnamed Watercourse 7A-03		WC-7A-03-MT1	21-10-22	10	24.0	240.0																			0	0.0
Unnamed Watercourse 7A-07		WC-7A-07-MT1	23-10-22	10	19.8	197.5				63	2														65	0.3
Unnamed Watercourse 7A-08	WC-7A-08-MT1	22-10-22	10	19.5	195.0													1						1	0.0	
Total Catch							8	451	1	596	2	59	2,140	4	8	18	46	36	326	4	12	28	3,739	18.5		

Notes:

Blank cells represent a catch of zero

Catch per unit effort (CPUE) expressed as total catch per minnowtrapping hour (#fish/hour)



Table B1-6: 2023 Dip Net Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	# Dips	Fish Species	Site Catch Total	Site Total CPUE	
Unnamed Waterbody 1	Spring	WB-1-DN1	07-06-23	20	0	0	0.0	
Unnamed Watercourse 3A		WC-3A-DN1	07-06-23	15	0	0	0.0	
Unnamed Watercourse 9		WC-9-DN1	11-06-23	30	0	0	0.0	
Total Catch						0	0	0.0



Table B1-7: 2023 Electrofishing Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Effort (hr)	Fish Species								Site Catch Total	Site Total CPUE
					Brook Stickleback	Burbot	Central Mudminnow	Finescale Dace	Northern Pike	Northern Pearl Dace	Spottail Shiner	White Sucker		
Unnamed Watercourse 1	Spring	WC-1-EF1	08-06-23	0.24			1					1	2	8.2
		WC-1-EF2	07-06-23	0.22					1			1	2	9.1
		WC-1-EF3	08-06-23	0.22									0	0.0
Unnamed Watercourse 1A		WC-1A-EF1	09-06-23	0.03									0	0.0
Unnamed Watercourse 1B-03		WC-1B-03-EF1	09-06-23	0.07			4						4	56.9
		WC-3-EF1	11-06-23	0.14			1						1	7.1
Unnamed Watercourse 3		WC-3-EF2	11-06-23	0.13									0	0.0
		WC-3-EF3	11-06-23	0.11									0	0.0
		WC-3A-EF1	11-06-23	0.10			1						1	9.7
Unnamed Watercourse 3A		WC-3A-EF2	11-06-23	0.10									0	0.0
		WC-3A-EF3	11-06-23	0.14									0	0.0
		WC-3B-EF1	10-06-23	0.22	2								2	9.1
Unnamed Watercourse 3B		WC-3B-EF2	10-06-23	0.16									0	0.0
		WC-3B-EF3	10-06-23	0.13									0	0.0
		WC-5-EF1	10-06-23	0.17									0	0.0
Unnamed Watercourse 5		WC-5-EF2	10-06-23	0.15									0	0.0
		WC-5-EF3	10-06-23	0.11									0	0.0
		WC-6A-1-EF1	15/06/23	0.11									0	0.0
Unnamed Watercourse 6A-1		WC-6A-1-EF2	15/06/23	0.17									0	0.0
		WC-6A-1-EF3	15/06/23	0.09									0	0.0
		WC-6B-01-EF1	08-06-23	0.15									0	0.0
Unnamed Watercourse 6B-01		WC-6B-01-EF2	08-06-23	0.17									0	0.0
		WC-6B-01-EF3	08-06-23	-									0	-
		WC-6B-02-EF1	15/06/23	0.11									0	0.0
Unnamed Watercourse 6B-02		WC-6B-01A-EF2	15/06/23	0.13									0	0.0
		WC-6B-01A-EF3	15/06/23	0.16									0	0.0
		WC-7A-03-EF1	12-06-23	0.16									0	0.0
Unnamed Watercourse 7A-03		WC-7A-03-EF2	12-06-23	0.15									0	0.0
		WC-7A-03-EF3	12-06-23	0.11									0	0.0
		WC-7A-08-EF1	12-06-23	0.20					1				1	5.0
		WC-7A-08-EF2	12-06-23	0.14									0	0.0
		WC-7A-08-EF3	12-06-23	0.13			1						1	7.9
Unnamed Watercourse 7A-07	WC-7A-07-EF1	10-06-23	0.14			1						1	7.0	
	WC-7A-07-EF2	10-06-23	0.13									0	0.0	
	WC-7A-07-EF3	10-06-23	0.13			1						1	7.7	



Table B1-7: 2023 Electrofishing Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Effort (hr)	Fish Species								Site Catch Total	Site Total CPUE
					Brook Stickleback	Burbot	Central Mudminnow	Finescale Dace	Northern Pike	Northern Pearl Dace	Spottail Shiner	White Sucker		
Unnamed Watercourse 8		WC-8-EF1	17/06/23	0.11									0	0.0
		WC-8-EF2	17/06/23	0.11									0	0.0
		WC-8-EF3	17/06/23	0.10									0	0.0
Unnamed Watercourse 8B		WC-8B-EF1	16/06/24	0.21									0	0.0
		WC-8B-EF2	16/06/24	0.15									0	0.0
		WC-8B-EF3	16/06/24	0.11									0	0.0
Unnamed Watercourse 1		WC-1-EF1	28-07-23	0.32									0	0.0
		WC-1-EF2	28-07-23	0.27									0	0.0
		WC-1-EF3	28-07-23	0.34									0	0.0
Unnamed Watercourse 1B-03		WC-1B-03-EF1	28-07-23	0.18									0	0.0
		WC-1B-03-EF2	28-07-23	0.10									0	0.0
		WC-1B-03-EF3	28-07-23	0.20			1						1	5.0
Unnamed Watercourse 2		WC-2-EF1	31-07-23	0.04									0	0.0
Unnamed Watercourse 3A		WC-3A-EF1	27-07-23	0.17									0	0.0
		WC-3A-EF2	27-07-23	0.12									0	0.0
		WC-3A-EF3	27-07-23	0.16									0	0.0
Unnamed Watercourse 4		WC-4-EF1	27-07-23	0.12									0	0.0
		WC-4-EF2	27-07-23	0.13									0	0.0
Unnamed Watercourse 5		WC-5-EF1	26-07-23	0.16									0	0.0
		WC-5-EF2	26-07-23	0.21	3		6	1					10	48.5
		WC-5-EF3	26-07-23	0.19	1		5	8		1	1	1	16	82.8
Unnamed Watercourse 6A-02	Summer	WC-6A-02-EF1	01-08-23	0.05									0	0.0
Unnamed Watercourse 6A-US		WC-6A-US-EF1	02-08-23	0.06			1						1	17.4
		WC-6A-US-EF2	02-08-23	0.04									0	0.0
		WC-6A-US-EF3	02-08-23	0.05									0	0.0
Unnamed Watercourse 6B		WC-6B-EF1	26-07-23	0.18			1						1	5.6
		WC-6B-EF2	26-07-23	0.20									0	0.0
		WC-6B-EF3	26-07-23	0.16			1						1	6.4
Unnamed Watercourse 6B-01		WC-6B-01-EF1	26-07-23	0.15									0	0.0
		WC-6B-01-EF2	26-07-23	0.19									0	0.0
		WC-6B-01-EF3	26-07-23	0.14									0	0.0
Unnamed Watercourse 6C		WC-6C-EF1	26-07-23	0.14									0	0.0
		WC-6C-EF2	26-07-23	0.15			4						4	27.2
		WC-6C-EF3	26-07-23	0.10			4						4	38.7
Unnamed Watercourse 7A-07			WC-7A-07-EF1	29-07-23	0.25			2					2	8.0



Table B1-7: 2023 Electrofishing Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Effort (hr)	Fish Species							Site Catch Total	Site Total CPUE	
					Brook Stickleback	Burbot	Central Mudminnow	Finescale Dace	Northern Pike	Northern Pearl Dace	Spottail Shiner			White Sucker
Unnamed Watercourse 7A-08		WC-7A-08-EF1	28-07-23	0.15								0	0.0	
		WC-7A-08-EF2	28-07-23	0.24			1					1	4.2	
		WC-7A-08-EF3	28-07-23	0.19			7					7	36.2	
Unnamed Watercourse 8		WC-8-EF1	26-07-23	0.10								0	0.0	
		WC-8-EF2	26-07-23	0.10								0	0.0	
		WC-8-EF3	26-07-23	0.10								0	0.0	
Unnamed Watercourse 8B		WC-8B-EF1	12-08-23	0.08								0	0.0	
		WC-8B-EF2	12-08-23	0.08								0	0.0	
Unnamed Watercourse 1		WC-1-EF1	08-09-23	0.19						1		1	5.2	
		WC-1-EF2	08-09-23	0.19			1					1	5.2	
		WC-1-EF3	08-09-23	0.28						2		2	7.0	
Unnamed Watercourse 1B-03		WC-1B-03-EF1	10-09-23	0.10			1					1	10.3	
		WC-1B-03-EF2	10-09-23	0.12								0	0.0	
Unnamed Watercourse 2		WC-2-EF1	12-09-23	0.14								0	0.0	
Unnamed Watercourse 3		WC-3-EF1	14-09-23	0.74	103		95	378				2	578	776.4
		WC-3-EF2	14-09-23	0.18								0	0.0	
		WC-3-EF3	14-09-23	0.16			7					7	43.0	
Unnamed Watercourse 3A		WC-3A-EF1	14-09-23	0.09								0	0.0	
Unnamed Watercourse 4		WC-4-EF1	11-09-23	0.30	1							1	3.4	
		WC-4-EF2	11-09-23	0.23								0	0.0	
		WC-4-EF3	11-09-23	0.26			1				1	2	7.8	
Unnamed Watercourse 5		WC-5-EF1	06-09-23	0.09								0	0.0	
		WC-5-EF2	06-09-23	0.18			4					4	22.7	
		WC-5-EF3	07-09-23	0.29	1		1	3				5	17.4	
Unnamed Watercourse 6A		WC-6A-EF1	10-09-23	0.15								0	0.0	
Unnamed Watercourse 6A-02	Fall	WC-6A-02-EF1	10-09-23	0.06								0	0.0	
Unnamed Watercourse 6A-US		WC-6A-US-EF1	09-09-23	0.29			6					6	20.9	
Unnamed Watercourse 6B		WC-6B-EF1	16-09-23	0.05	1							1	21.2	
		WC-6B-EF2	16-09-23	0.07								0	0.0	
Unnamed Watercourse 6B-01		WC-6B-01-EF1	16-09-23	0.10								0	0.0	
Unnamed Watercourse 6C		WC-6C-EF1	16-09-23	0.25	1		16					17	67.6	
		WC-6C-EF2	16-09-23	0.03								0	0.0	
		WC-6C-EF3	16-09-23	0.21	3		5					8	38.2	
Unnamed Watercourse 7A-03		WC-7A-03-EF1	16-09-23	0.05								0	0.0	
		WC-7A-03-EF2	15-09-23	0.09								0	0.0	
		WC-7A-03-EF3	15-09-23	0.09								0	0.0	



Table B1-7: 2023 Electrofishing Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Effort (hr)	Fish Species								Site Catch Total	Site Total CPUE
					Brook Stickleback	Burbot	Central Mudminnow	Finescale Dace	Northern Pike	Northern Pearl Dace	Spottail Shiner	White Sucker		
Unnamed Watercourse 7A-07		WC-7A-07-EF1	07-09-23	0.09			5						5	55.2
Unnamed Watercourse 7A-08		WC-7A-08-EF1	08-09-23	0.20			4						4	20.2
		WC-7A-08-EF2	08-09-23	0.08									0	0.0
		WC-7A-08-EF3	08-09-23	0.20			20						20	99.7
Unnamed Watercourse 8		WC-8-EF1	11-09-23	0.08									0	0.0
		WC-8-EF2	11-09-23	0.16		1							1	6.4
Unnamed Watercourse 8B		WC-8B-EF1	12-09-23	0.16									0	0.0
Total Catch					116	1	209	390	2	4	1	5	728	1,635.6



Table B1-8: 2023 Gill Net Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Duration (hr)	Fish Species												Total Catch	Total CPUE	
					Bluntnose Minnow	Golden Shiner	Lake Whitefish	Mooneye	Northern Pike	Sauger	Shorthead Redhorse	Silver Redhorse	Spottail Shiner	Walleye	White Sucker	Yellow Perch			
Dixie Creek - 01	Spring	DC-01-GN1	12-06-23	0.5					1								1	2.0	
		DC-01-GN2	12-06-23	0.5					1								3	4	8.0
		DC-01-GN3	12-06-23	0.5												1	1	1	2.0
Dixie Creek - 02	Spring	DC-02-GN1	17-06-23	0.5													0	0.0	
		DC-02-GN2	17-06-23	0.5													0	0.0	
Dixie Creek - 04	Spring	DC-04-GN1	15-06-23	0.5					2								2	4.0	
		DC-04-GN2	15-06-23	0.5													0	0.0	
		DC-04-GN3	15-06-23	0.5												1	1	2	4.0
		DC-03-GN1	16-06-23	0.5					2								2	4.0	
Genessee Lake	Spring	DC-03-GN2	16-06-23	0.5				1	1								2	4.0	
		GenL-GN1	11-06-23	1.0													0	0.0	
		GenL-GN2	11-06-23	1.5	1	3				1							18	23	15.3
		GenL-GN3	11-06-23	1.5						1				1			1	3	2.0
Unnamed Waterbody 2	Spring	GenL-GN4	11-06-23	1.5													0	0.0	
		WB-02-GN1	09-06-23	0.5													0	0.0	
		WB-02-GN2	10-06-23	0.5													0	0.0	
		WB-02-GN3	10-06-23	0.5													0	0.0	
Unnamed Waterbody 6	Spring	WB-02-GN4	10-06-23	0.5													0	0.0	
		WB-6-GN1	18-06-23	0.5						3							3	6.0	
		WB-6-GN2	18-06-23	0.5						1							1	2.0	
Unnamed Watercourse 7	Spring	WB-6-GN3	18-06-23	0.5						4							3	7	14.0
		WC-7-GN1	15-06-23	0.5												1	1	1	2.0
		WC-7-GN2	15-06-23	0.5													0	0.0	
Dixie Creek - 01	Summer	WC-7-GN3	15-06-23	0.5													0	0.0	
		DC-01-GN1	29-07-23	0.5						1							1	2.0	
		DC-01-GN2	29-07-23	0.5													0	0.0	
Dixie Creek - 02	Summer	DC-01-GN3	29-07-23	0.5													0	0.0	
		DC-01-GN4	29-07-23	0.5						1							1	2.0	
Dixie Creek - 03	Summer	DC-02-GN1	27-07-23	0.5													0	0.0	
		DC-02-GN2	27-07-23	0.5													0	0.0	
Dixie Creek - 04	Summer	DC-03-GN1	27-07-23	0.5													0	0.0	
		DC-03-GN2	28-07-23	0.5													0	0.0	
Chukuni River - FDP	Summer	DC-04-GN1	01-08-23	0.5													0	0.0	
		DC-04-GN2	01-08-23	0.5												1	1	2.0	
		CR-FDP-GN1	02-08-23	0.5													0	0.0	
		CR-FDP-GN2	02-08-23	0.5													0	0.0	
Chukuni River - DS	Summer	CR-FDP-GN3	02-08-23	0.5													0	0.0	
		CR-FDP-GN4	02-08-23	0.5													0	0.0	
		CR-DS-GN1	02-08-23	0.5						1							1	2.0	
Genessee Lake	Summer	CR-DS-GN2	02-08-23	0.5													19	21	42.0
		CR-DS-GN3	02-08-23	0.5								1					2	3	6.0
		GenL-GN1	30-07-23	0.5										32			32	64.0	
		GenL-GN2	30-07-23	0.5												1	1	2.0	
Genessee Lake	Summer	GenL-GN3	30-07-23	0.5						1							1	2	4.0
		GenL-GN4	30-07-23	0.5													0	0.0	



Table B1-8: 2023 Gill Net Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Duration (hr)	Fish Species											Total Catch	Total CPUE		
					Bluntnose Minnow	Golden Shiner	Lake Whitefish	Mooneye	Northern Pike	Sauger	Shorthead Redhorse	Silver Redhorse	Spottail Shiner	Walleye	White Sucker			Yellow Perch	
Unnamed Waterbody 2		WB-02-GN1	01-08-23	0.5													0	0.0	
		WB-02-GN2	01-08-23	0.5													0	0.0	
		WB-02-GN3	01-08-23	0.5					1								1	2.0	
Unnamed Waterbody 6		WB-6-GN1	03-08-23	0.5											11	11	22.0		
		WB-6-GN2	03-08-23	0.5											8	8	16.0		
		WB-6-GN3	03-08-23	0.5					1						1	2	4.0		
Unnamed Watercourse 7		WC-7-GN1	01-08-23	0.5											1	1	2.0		
		WC-7-GN2	01-08-23	0.5											1	1	2.0		
Dixie Creek - 01	Fall	DC-01-GN1	01-10-23	2.5												0	0.0		
		DC-01-GN2	01-10-23	2.5											4	4	1.6		
Dixie Creek - 02		DC-02-GN1	29-09-23	3.0					2						1	3	1.0		
		DC-02-GN2	29-09-23	3.0					1						1	2	0.7		
Dixie Creek - 03		DC-03-GN1	28-09-23	2.0					2							2	1.0		
		DC-03-GN2	28-09-23	2.0												0	0.0		
Dixie Creek - 04		DC-04-GN1	30-09-23	6.0					1						4	5	0.8		
Chukuni River - REF		CR-REF-GN1	26-09-23	1.0												0	0.0		
		CR-REF-GN2	26-09-23	1.0											2	2	2.0		
		CR-REF-GN3	26-09-23	1.0			1	12	3			1	1		4	1	10	33	33.0
Chukuni River - FDP		CR-FDP-GN1	28-09-23	1.0			7	1	1				2		7		2	20	20.0
		CR-FDP-GN2	28-09-23	1.0				2	1	1	1		1				2	8	8.0
		CR-FDP-GN3	28-09-23	1.0			3	6	1						5	3	18	18.0	
Chukuni River - DS		CR-DS-GN1	29-09-23	1.0			11	2				1	1		5	4	4	28	28.0
		CR-DS-GN2	29-09-23	1.0											2		1	5	5.0
		CR-DS-GN3	29-09-23	1.0			8	1	1						6		7	23	23.0
Genessee Lake		GenL-GN1	16-09-23	5.5					2						6			8	1.5
		GenL-GN2	16-09-23	5.5					2							1	9	12	2.2
		GenL-GN3	16-09-23	5.5													1	1	0.2
Unnamed Waterbody 2			WB-02-GN1	09-09-23	3.5												0	0.0	
	WB-02-GN2		09-09-23	3.5					2							2	0.6		
	WB-02-GN3		09-09-23	3.5					1							1	0.3		
Unnamed Waterbody 6		WB-6-GN1	02-10-23	2.5					1							9	10	4.0	
		WB-6-GN2	02-10-23	2.5												2	2	0.8	
Unnamed Watercourse 7		WC-7-GN1	30-09-23	6.0					2							1	3	0.5	
Total Catch					1	3	30	27	44	1	5	5	39	32	12	140	339	411.4	



Table B1-10: 2023 Seine Net Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	# Hauls	Fish Species											Total Catch	Total CPUE		
					Blackchin Shiner	Blacknose Shiner	Brook Stickleback	Emerald Shiner	Iowa Darter	Johnny Darter	Northern Pike	Rock Bass	Smallmouth Bass	Spottail Shiner	Walleye			Yellow Perch	
Chukuni River - REF	Spring	CR-REF-SN1	13-06-23	1				51						17	31		99	99.0	
		CR-REF-SN2	13-06-23	1								1					2	2.0	
Chukuni River - FDP		CR-FDP-SN1	14-06-23	1		15						2			50	2		69	69.0
		CR-FDP-SN2	14-06-23	1		1								4			5	5.0	
Chukuni River - DS		CR-DS-SN1	14-06-23	1													0	0.0	
		CR-DS-SN2	14-06-23	1													0	0.0	
Unnamed Waterbody 6		WB-6-SN1	18-06-23	1												12	12	12.0	
		WB-6-SN2	18-06-23	1								3				10	13	13.0	
		WB-6-SN3	18-06-23	1		2						1				18	21	21.0	
Unnamed Waterbody 6		WB-6-SN1	02-08-23	1	51											3	54	54.0	
	WB-6-SN2	02-08-23	1	1											6	7	7.0		
Chukuni River - DS	CR-DS-SN1	03-08-23	1				62					9		70	2	143	143.0		
	CR-DS-SN2	03-08-23	1												1	1	1.0		
Chukuni River - FDP	CR-FDP-SN1	03-08-23	1								2		2	3		190	197	197.0	
	CR-FDP-SN2	03-08-23	1								2	9		13		57	81	81.0	
Chukuni River - REF	CR-REF-SN1	31-07-23	1				170			3		1					174	174.0	
	CR-REF-SN2	31-07-23	1		229		418				1	9				77	734	734.0	
Genessee Lake	GL-SN1	31-07-23	1	35			8							210	2	255	255.0		
Chukuni River - REF	CR-REF-SN1	27-09-23	1														0	0.0	
	CR-REF-SN2	27-09-23	1							16						3	19	19.0	
Chukuni River - FDP	CR-FDP-SN1	28-09-23	1													6	6	6.0	
	CR-FDP-SN2	28-09-23	1													21	21	21.0	
Chukuni River - DS	CR-DS-SN1	29-09-23	1											1			1	1.0	
	CR-DS-SN2	29-09-23	1														0	0.0	
Genessee Lake	GL-SN1	01-10-23	1	2		3		33			1			50		6	95	95.0	
	GL-SN2	02-10-23	1		10	6		27						406			449	449.0	
Unnamed Waterbody 6	WB-6-SN1	02-10-23	2													13	13	6.5	
				Total Catch	89	257	9	709	60	19	13	28	2	825	33	427	2,471	2,464.5	



Table B1-11: 2024 Electrofishing Catch and CPUE Summary

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Effort (hr)	Fish Species											Total Catch	Total CPUE	
					Blacknose Shiner	Emerald Shiner	Northern Pike	Rock Bass	Sauger	Shorthead Redhorse	Smallmouth Bass	Spottail Shiner	Walleye	White Sucker	Yellow Perch			
Chukuni River	Summer	CR-REF-EF1	26-07-24	0.01	1	13	1		1				14	7		20	57	5,313.8
		CR-FDP-EF1	24-07-24	0.02	2	5	6	5			10	3	1	3	4	2,211	2,250	133,663.4
		CR-DS-EF1	24-07-24	0.004			3						2		2	503	510	126,330.3
		CR-DS-EF2	25-07-24	0.01		2	2				5			10	4	1,211	1,234	162,824.7
				Total Catch	3	20	12	5	1	15	3	17	20	10	3,945	4,051	428,132.1	



Table B2-1: Fish Age Results 2022

Waterbody	Species	Sample ID	Total Length (mm)	Wet Weight (g)	Ageing Structure	Age
Dixie Creek	Northern Pike	DC-03-GN3-F1-NRPK	350	210	CL/SC	1
		DC-04-GN1-F1-NRPK	595	1,070	CL/SC	3
		DC-04-GN1-F2-NRPK	535	810	CL/SC	3
		DC-04-GN1-F3-NRPK	512	750	CL/SC	3
		DC-04-GN2-F4-NRPK	643	1,680	CL/SC	3
		DC-04-GN2-F5-NRPK	268	120	CL/SC	1
		DC-04-GN3-F6-NRPK	468	590	CL/SC	2
		DC-04-GN3-F7-NRPK	360	230	CL/SC	1
		DC-04-GN3-F8-NRPK	359	270	CL/SC	1
		DC-04-GN4-F9-NRPK	410	440	CL/SC	1
Dixie Creek	White Sucker	DC-04-GN4-F10-NRPK	335	210	CL/SC	1
	White Sucker	DC-04-GN4-F11-WHSK	229	110	PR/SC	3
Chukuni River	Lake Whitefish	CR-FDP-GN1-F2-LWF	420	1,180	PR/SC	4
	Northern Pike	CR-REF-GN1-F1-NRPK	440	410	CL/SC	1
		CR-REF-GN2-F2-NRPK	475	509	CL/SC	1
		CR-DS-GN1-F2-NRPK	583	1,100	CL/SC	2
		CR-DS-GN1-F3-NRPK	440	460	CL/SC	9
		CR-DS-GN2-F4-NRPK	420	440	CL/SC	1
	Walleye	CR-REF-GN1-F3-WAL	435	600	DS/SC	8
		CR-REF-GN2-F4-WAL	355	350	DS/SC	4
		CR-DS-GN1-F1-WAL	616	2,190	DS/SC	11
	White Sucker	CR-FDP-GN1-F1-WHSK	510	1,450	PR/SC	10
		CR-DS-GN2-F5-WHSK	530	1,920	PR/SC	4
		CR-DS-GN3-F6-WHSK	473	1,180	PR/SC	1
		CR-DS-GN3-F7-WHSK	409	810	PR/SC	4
Genessee Lake	Yellow Perch	GL-GN1-F4-YLP	220	90	DS/SC	4
		GL-GN1-F5-YLP	165	40	DS/SC	3
		GL-GN1-F6-YLP	155	37	DS/SC	3
		GL-GN1-F7-YLP	156	35	DS/SC	2
		GL-GN1-F8-YLP	146	27	DS/SC	1
		GL-GN1-F9-YLP	146	32	DS/SC	2
		GL-GN1-F10-YLP	157	37	DS/SC	2
	Northern Pike	GL-GN1-F11-YLP	162	45	DS/SC	3
		GL-GN1-F1-NRPK	545	880	CL/SC	3
		GL-GN2-F1-NRPK	490	680	CL/SC	3
		GL-GN2-F2-NRPK	415	360	CL/SC	1
		GL-GN2-F3-NRPK	470	560	CL/SC	2
		GL-GN2-F4-NRPK	450	480	CL/SC	2
		GL-GN2-F5-NRPK	935	5,670	CL/SC	7
		GL-GN3-F1-NRPK	234	50	CL/SC	0
		GL-GN4-F1-NRPK	545	790	CL/SC	2
		GL-GN4-F2-NRPK	855	2,920	CL/SC	7
Unnamed Waterbody 2	Northern Pike	WB-2-GN1-F1-NRPK	475	600	CL/SC	3
Unnamed Waterbody 3	Lake Chub	WB-3-MT1-F21-LKCH	108	16	WB	6
		WB-3-MT1-F22-LKCH	140	17	WB	6
		WB-3-MT1-F23-LKCH	117	12	WB	4
		WB-3-MT1-F24-LKCH	110	16	WB	5
Unnamed Waterbody 6	Northern Pike	WB-6-GN1-F1-NRPK	591	1,280	PR/SC	4
		WB-6-GN1-F2-NRPK	544	950	PR/SC	4
		WB-6-GN1-F3-NRPK	585	1,180	PR/SC	3
		WB-6-GN1-F4-NRPK	586	1,300	PR/SC	4
		WB-6-GN2-F1-NRPK	531	870	PR/SC	3
		WB-6-GN2-F2-NRPK	520	960	PR/SC	3
		WB-6-GN2-F3-NRPK	536	860	PR/SC	3
		WB-6-GN2-F4-NRPK	543	940	PR/SC	4
		WB-6-GN4-F1-NRPK	556	270	PR/SC	2
Unnamed Watercourse 4	Brook Stickleback	WC-4-MT1-F26-BSB	72	2	WB	1
		WC-4-MT1-F27-BSB	47	1	WB	0
	Central Mudminnow	WC-4-MT1-F28-CMM	62	2	WB	0
		WC-4-MT1-F29-FHM	50	1	WB	1
	Fathead Minnow	WC-4-MT1-F30-FHM	53	1	WB	1
		WC-4-MT1-F31-FHM	46	1	WB	1



Table B2-1: Fish Age Results 2022

Waterbody	Species	Sample ID	Total Length (mm)	Wet Weight (g)	Ageing Structure	Age
Unnamed Watercourse 5	Central Mudminnow	WC-5-MT1-F29-CMM	44	1	WB	0
		WC-5-MT1-F30-CMM	49	1	WB	0
		WC-5-MT1-F31-CMM	48	1	WB	0
		WC-5-MT1-F32-CMM	81	4	WB	1
		WC-5-MT1-F33-CMM	79	4	WB	2
		WC-5-MT1-F34-CMM	83	5	WB	1
		WC-5-MT1-F35-CMM	88	5	WB	1
		WC-5-MT1-F36-CMM	108	10	WB	3
		WC-5-MT1-F37-CMM	104	11	WB	2
	WC-5-MT1-F38-CMM	110	10	WB	2	
	Finescale Dace	WC-5-MT1-F89-FSD	97	8	WB	2
		WC-5-MT1-F90-FSD	100	9	WB	3
		WC-5-MT1-F91-FSD	100	9	WB	3
		WC-5-MT1-F92-FSD	81	5	WB	2
		WC-5-MT1-F93-FSD	83	5	WB	2
		WC-5-MT1-F94-FSD	81	4	WB	2
		WC-5-MT1-F95-FSD	68	3	WB	1
		WC-5-MT1-F96-FSD	58	2	WB	1
WC-5-MT1-F97-FSD		55	1	WB	1	
WC-5-MT1-F98-FSD	51	1	WB	1		
Unnamed Watercourse 6B	Central Mudminnow	WC-6B-MT1-F17-CMM	47	1	WB	0
		WC-6B-MT1-F18-CMM	47	1	WB	0
		WC-6B-MT1-F19-CMM	47	1	WB	0
		WC-6B-MT1-F20-CMM	83	5	WB	1
		WC-6B-MT1-F21-CMM	86	5	WB	2
		WC-6B-MT1-F22-CMM	112	13	WB	2
		WC-6B-MT1-F23-CMM	113	14	WB	2
		WC-6B-MT1-F24-CMM	116	15	WB	3
Unnamed Watercourse 6C	Central Mudminnow	WC-6C-MT1-F1-CMM	130	23	WB	4
		WC-6C-MT1-F2-CMM	113	13	WB	2
		WC-6C-MT1-F3-CMM	114	15	WB	2
		WC-6C-MT1-F4-CMM	92	7	WB	1
		WC-6C-MT1-F5-CMM	90	7	WB	1
		WC-6C-MT1-F6-CMM	86	6	WB	1
		WC-6C-MT1-F7-CMM	85	6	WB	1
		WC-6C-MT1-F8-CMM	65	3	WB	1
		WC-6C-MT1-F9-CMM	63	2	WB	0
		WC-6C-MT1-F10-CMM	65	2	WB	1
	Brook Stickleback	WC-6C-MT1-F91-BSB	57	2	WB	2
		WC-6C-MT1-F92-BSB	55	1	WB	1
		WC-6C-MT1-F93-BSB	56	1	WB	1
		WC-6C-MT1-F94-BSB	56	1	WB	1
Unnamed Watercourse 7	Northern Pike	WC-7-GN4-F1-NRPK	340	210	CL/SC	1
Unnamed Watercourse 7A-07	Central Mudminnow	WC-7A-07-MT1-F1-CMM	128	20	WB	3
		WC-7A-07-MT1-F2-CMM	123	17	WB	4
		WC-7A-07-MT1-F3-CMM	116	15	WB	3
		WC-7A-07-MT1-F4-CMM	80	6	WB	1
		WC-7A-07-MT1-F5-CMM	83	6	WB	1
		WC-7A-07-MT1-F6-CMM	91	7	WB	2
		WC-7A-07-MT1-F7-CMM	83	6	WB	1
		WC-7A-07-MT1-F8-CMM	73	3	WB	1
		WC-7A-07-MT1-F9-CMM	69	3	WB	1
		WC-7A-07-MT1-F10-CMM	67	3	WB	0

Notes:
 PR/SC; Pectoral ray and scales
 DR/SC; Dorsal ray and scales
 CL/SC; Cleithrum and scales
 WB; Whole body



Table B2-2: Fish Age Results 2023

Waterbody	Species	Sample ID	Total Length (mm)	Wet Weight (g)	Ageing Structure	Age
Dixie Creek	Brook Stickleback	DC-03-MT1-F1-BSB	42	1	Otolith	0
	Northern Pike	DC-02-GN2-F1-NP	195	-	Cleithra	0
		DC-02-GN2-F2-NP	285	-	Cleithra	0
		DC-02-GN2-F4-NP	300	-	Cleithra	0
		DC-03-GN1-F1-NP	221	28	Cleithra	0
		DC-03-GN1-F2-NP	235	30	Cleithra	0
		DC-04-GN1-F1	485	-	Cleithra	2
		DC-04-GN1-F2	405	389	Cleithra	1
	White Sucker	DC-02-GN2-F3-WHSC	115	-	Scales	0
	Yellow Perch	DC-01-GN2-F1-YP	109	14	Dorsal spine	1
		DC-01-GN2-F2-YP	100	11	Dorsal spine	1
		DC-01-GN2-F3-YP	101	11	Dorsal spine	1
		DC-01-GN2-F4-YP	102	11	Dorsal spine	1
		DC-02-GN2-F5-YP	158	-	Dorsal spine	2
		DC-02-GN2-F6-YP	154	-	Dorsal spine	2
		DC-04-GN1-F3	167	50	Dorsal spine	2
		DC-04-GN1-F4	142	31	Dorsal spine	2
		DC-04-GN1-F5	150	33	Dorsal spine	2
	Chukuni River	Lake Whitefish	CR-FDP-GN1-F12-LKWF	420	830	Fin ray
Northern Pike		CR-REF-GN3-F16-NP	470	510	Cleithra	3
		CR-REF-GN3-F17-NP	668	1,950	Cleithra	5
		CR-REF-GN3-F18-NP	550	790	Cleithra	3
		CR-FDP-GN1-F1-NP	480	520	Cleithra	2
		CR-FDP-GN2-F4-NP	500	640	Cleithra	2
		CR-FDP-GN3-F15-NP	620	1,110	Cleithra	3
		CR-DS-GN3-F14-NP	455	510	Cleithra	2
Silver Redhorse		CR-FDP-GN1-F11-SVRH	513	1,510	Fin ray	6
Walleye		CR-REF-GN3-F30-WALL	330	280	Dorsal spine	4
		CR-REF-GN3-F31-WALL	320	260	Dorsal spine	4
		CR-REF-GN3-F32-WALL	401	600	Dorsal spine	5
		CR-REF-GN3-F33-WALL	418	640	Dorsal spine	5
		CR-FDP-GN1-F4-WAE	391	490	Dorsal spine	6
		CR-FDP-GN1-F5-WAE	404	510	Dorsal spine	4
		CR-FDP-GN1-F6-WAE	385	480	Dorsal spine	4
		CR-FDP-GN1-F7-WAE	313	260	Dorsal spine	2
		CR-FDP-GN1-F8-WAE	460	870	Dorsal spine	6
		CR-FDP-GN1-F9-WAE	513	1,010	Dorsal spine	7
		CR-FDP-GN1-F10-WAE	492	1,030	Dorsal spine	6
		CR-FDP-GN2-F3-WAE	260	150	Dorsal spine	2
		CR-DS-GN1-F5-WAE	415	650	Dorsal spine	5
		CR-DS-GN1-F6-WAE	429	640	Dorsal spine	5
		CR-DS-GN1-F7-WAE	425	690	Dorsal spine	6
		CR-DS-GN2-F2-WAE	320	310	Dorsal spine	3
		CR-DS-GN2-F3-WAE	438	690	Dorsal spine	5
		CR-DS-GN3-F1-WAE	329	350	Dorsal spine	4
		CR-DS-GN3-F2-WAE	320	300	Dorsal spine	3
		CR-DS-GN3-F3-WAE	300	250	Dorsal spine	3
CR-DS-GN3-F4-WAE		406	570	Dorsal spine	4	
CR-DS-GN3-F5-WAE		470	800	Dorsal spine	7	
CR-DS-GN3-F6-WAE		430	680	Dorsal spine	5	
White Sucker		CR-REF-GN3-F15-WS	420	720	Fin ray	5
		CR-FDP-GN3-F9-WHSC	280	240	Fin ray	2
		CR-FDP-GN3-F10-WHSC	300	270	Fin ray	3
		CR-FDP-GN3-F11-WHSC	345	420	Fin ray	3
		CR-FDP-GN3-F12-WHSC	361	570	Fin ray	3
		CR-FDP-GN3-F13-WHSC	448	910	Fin ray	5
		CR-FDP-GN3-F14-WHSC	480	1,430	Fin ray	7
		CR-DS-GN1-F1-WHSC	390	700	Fin ray	4
		CR-DS-GN1-F2-WHSC	410	800	Fin ray	5
		CR-DS-GN1-F3-WHSC	272	240	Fin ray	2
		CR-DS-GN1-F4-WHSC	362	540	Fin ray	4
		CR-REF-GN2-F1-YP	180	70	Dorsal spine	2
		CR-REF-GN3-F19-YP	340	420	Dorsal spine	6
		CR-REF-GN3-F20-YP	280	220	Dorsal spine	4
		CR-REF-GN3-F21-YP	281	330	Dorsal spine	3
		CR-REF-GN3-F22-YP	295	350	Dorsal spine	4
		CR-REF-GN3-F23-YP	275	280	Dorsal spine	4
		CR-REF-GN3-F24-YP	260	230	Dorsal spine	4
CR-REF-GN3-F25-YP		242	200	Dorsal spine	4	
CR-REF-GN3-F26-YP		263	300	Dorsal spine	4	
CR-REF-GN3-F27-YP	228	150	Dorsal spine	3		
CR-REF-GN3-F28-YP	241	190	Dorsal spine	4		



Table B2-2: Fish Age Results 2023

Waterbody	Species	Sample ID	Total Length (mm)	Wet Weight (g)	Ageing Structure	Age
Genessee Lake	Yellow Perch	CR-FDP-GN3-F6-YLP	260	240	Dorsal spine	5
		CR-FDP-GN3-F7-YLP	272	290	Dorsal spine	5
		CR-FDP-GN3-F8-YLP	272	270	Dorsal spine	5
		CR-FDP-GN2-F1-YP	225	140	Dorsal spine	4
		CR-FDP-GN2-F2-YP	262	230	Dorsal spine	4
		CR-FDP-GN1-F2-YP	251	170	Dorsal spine	4
		CR-FDP-GN1-F3-YP	254	210	Dorsal spine	4
		CR-FDP-SN2-F5-YLP	48	1	Otolith	0
		CR-FDP-SN2-F12-YLP	53	2	Otolith	0
		CR-FDP-SN2-F13-YLP	50	1	Otolith	0
		CR-FDP-SN2-F14-YLP	5	1	Otolith	0
		CR-FDP-SN2-F15-YLP	51	1	Otolith	0
		CR-FDP-SN2-F16-YLP	66	3	Otolith	0
		CR-FDP-SN2-F17-YLP	59	2	Otolith	0
		CR-FDP-SN2-F18-YLP	49	1	Otolith	0
		CR-FDP-SN2-F19-YLP	66	3	Otolith	0
		CR-FDP-SN2-F20-YLP	55	2	Otolith	0
		CR-DS-GN1-F8-YLP	241	170	Dorsal spine	4
		CR-DS-GN1-F9-YLP	241	200	Dorsal spine	4
		CR-DS-GN1-F10-YLP	231	180	Dorsal spine	3
		CR-DS-GN1-F11-YLP	211	130	Dorsal spine	3
		CR-DS-GN2-F1-YLP	233	150	Dorsal spine	3
		CR-DS-GN3-F7-YLP	230	160	Dorsal spine	3
		CR-DS-GN3-F8-YLP	325	150	Dorsal spine	3
		CR-DS-GN3-F9-YLP	236	170	Dorsal spine	3
		CR-DS-GN3-F10-YLP	350	200	Dorsal spine	4
CR-DS-GN3-F11-YLP	352	210	Dorsal spine	3		
CR-DS-GN3-F12-YLP	270	250	Dorsal spine	4		
CR-DS-GN3-F13-YLP	284	250	Dorsal spine	5		
Genessee Lake	Northern Pike	GL-GN1-F3-NP	612	1,380	Cleithra	4
		GL-GN1-F8-NP	420	434	Cleithra	2
		GL-GN2-F1-NP	550	930	Cleithra	2
		GL-GN2-F5-NP	640	1,340	Cleithra	4
	Walleye	GL-GN1-F1-WAE	332	303	Dorsal spine	3
		GL-GN1-F2-WAE	343	315	Dorsal spine	4
		GL-GN1-F4-WAE	465	890	Dorsal spine	8
		GL-GN1-F5-WAE	346	354	Dorsal spine	3
		GL-GN1-F6-WAE	501	1,139	Dorsal spine	7
		GL-GN1-F7-WAE	351	344	Dorsal spine	3
	White Sucker	GL-GN2-F4-WHSC	160	44	Fin ray	1
		GL-GN2-F2-YLPR	182	63	Dorsal spine	3
	Yellow Perch	GL-GN2-F3-YLPR	153	34	Dorsal spine	3
		GL-GN2-F6-YLPR	158	41	Dorsal spine	3
		GL-GN2-F7-YLPR	165	48	Dorsal spine	3
		GL-GN2-F8-YLPR	151	38	Dorsal spine	3
		GL-GN2-F9-YLPR	163	42	Dorsal spine	3
		GL-GN2-F10-YLPR	165	48	Dorsal spine	3
		GL-GN2-F11-YLPR	149	33	Dorsal spine	3
		GL-GN2-F12-YLPR	148	32	Dorsal spine	3
GL-GN3-F1-YLPR	97	9	Scales	1		
Unnamed Waterbody 2	Northern Pike	WB-2-GN2-F1-NRP	643	1,522	Cleithra	6
		WB-2-GN2-F2-NRP	349	248	Cleithra	2
		WB-2-GN3-F1-NRP	457	526	Cleithra	3
		WB-2-MT1-F1-NRP	124	9	Cleithra	0
		WB-3-MT1-F51-FNSD	83	5	Otolith	3
Unnamed Waterbody 3	Finescale Dace	WB-3-MT1-F52-FNSD	78	3	Otolith	3
		WB-3-MT1-F53-FNSD	75	4	Otolith	3
		WB-3-MT1-F54-FNSD	66	2	Otolith	2
		WB-3-MT1-F55-FNSD	69	2	Otolith	2
		WB-3-MT1-F56-FNSD	81	4	Otolith	3
		WB-3-MT1-F57-FNSD	67	2	Otolith	2
		WB-3-MT1-F58-FNSD	56	1	Otolith	1
		WB-3-MT1-F59-FNSD	60	2	Otolith	1
		WB-3-MT1-F60-FNSD	57	2	Otolith	1
		Lake Chub	WB-3-MT1-F86-LKCH	76	4	Otolith
	WB-3-MT1-F87-LKCH		91	6	Otolith	2
	WB-3-MT1-F88-LKCH		96	8	Otolith	2
	WB-3-MT1-F89-LKCH		96	7	Otolith	2
	WB-3-MT1-F90-LKCH		91	6	Otolith	2
	WB-3-MT1-F91-LKCH		93	7	Otolith	2
	WB-3-MT1-F92-LKCH		98	8	Otolith	2
	WB-3-MT1-F93-LKCH		126	21	Otolith	3
	WB-3-MT1-F94-LKCH		127	20	Otolith	3
	WB-3-MT1-F95-LKCH		135	21	Otolith	4



Table B2-2: Fish Age Results 2023

Waterbody	Species	Sample ID	Total Length (mm)	Wet Weight (g)	Ageing Structure	Age
Unnamed Waterbody 6	Northern Pike	WB-6-GN1-F1-NP	475	556	Cleithra	2
	Yellow Perch	WB-6-GN1-F2-YP	145	35	Dorsal spine	2
		WB-6-GN1-F3-YP	175	66	Dorsal spine	3
		WB-6-GN1-F4-YP	190	72	Dorsal spine	3
		WB-6-GN1-F5-YP	185	66	Dorsal spine	3
		WB-6-GN1-F6-YP	185	75	Dorsal spine	3
		WB-6-GN1-F7-YP	161	46	Dorsal spine	3
		WB-6-GN1-F8-YP	142	33	Dorsal spine	2
		WB-6-GN1-F9-YP	168	41	Dorsal spine	2
		WB-6-GN1-F10-YP	173	50	Dorsal spine	3
		WB-6-GN2-F1-YP	132	28	Dorsal spine	2
		WB-6-GN2-F2-YP	150	37	Dorsal spine	2
WB-6-SN1-F1-YP	100	10	Dorsal spine	1		
Unnamed Watercourse 1	Central Mudminnow	WC-1-EF2-F1-CMM	93	11	Otolith	1
	Northern Pike	WC-1-EF1-F1-NRP	145	18	Cleithra	0
		WC-1-EF3-F1-NRP	163	23	Cleithra	0
		WC-1-EF3-F2-NRP	160	25	Cleithra	0
Unnamed Watercourse 1B-03	Central Mudminnow	WC-1B-03-EF1-F1-CMM	40	1	Otolith	0
Unnamed Watercourse 2	Central Mudminnow	WC-2-MT1-F1-CMM	103	11	Otolith	1
	Brook Stickleback	WC-2-MT1-F5-BSB	70	2	Otolith	1
		WC-2-MT1-F28-BSB	48	1	Otolith	0
		WC-2-MT1-F30-BSB	43	1	Otolith	0
		WC-2-MT1-F31-BSB	47	1	Otolith	0
		WC-2-MT1-F32-BSB	38	0	Otolith	0
		WC-2-MT1-F33-BSB	38	-	Otolith	0
Unnamed Watercourse 3	Central Mudminnow	WC-3-EF1-F31-CMM	28	-	Otolith	0
		WC-3-EF1-F32-CMM	47	1	Otolith	0
		WC-3-EF3-F1-CMM	46	1	Otolith	0
		WC-3-EF3-F2-CMM	52	1	Otolith	0
		WC-3-EF3-F3-CMM	47	1	Otolith	0
		WC-3-EF3-F4-CMM	56	2	Otolith	0
		WC-3-EF3-F5-CMM	46	1	Otolith	0
		WC-3-EF3-F6-CMM	30	0	Otolith	0
		WC-3-EF3-F7-CMM	129	21	Otolith	2
		WC-3-MT1-F7-CMM	92	8	Otolith	1
		WC-3-MT1-F17-CMM	48	1	Otolith	0
		WC-3-MT1-F23-CMM	49	2	Otolith	0
		Finescale Dace	WC-3-EF1-F33-FSDC	106	11	Otolith
	WC-3-EF1-F34-FSDC		94	8	Otolith	6
	WC-3-EF1-F35-FSDC		81	5	Otolith	3
	WC-3-EF1-F36-FSDC		80	5	Otolith	3
	WC-3-EF1-F37-FSDC		80	4	Otolith	3
	WC-3-EF1-F72-FSDC		53	1	Otolith	2
	WC-3-EF1-F73-FSDC		56	1	Otolith	1
	WC-3-EF1-F74-FSDC		40	1	Otolith	1
	WC-3-EF1-F75-FSDC		28	0	Otolith	0
	WC-3-EF1-F76-FSDC		30	0	Otolith	0
	White Sucker	WC-3-EF1-F77-WHSC	172	58	Fin ray	1
WC-3-EF1-F78-WHSC		192	86	Fin ray	1	
Unnamed Watercourse 4	Central Mudminnow	WC-4-EF3-F2-CMM	78	6	Otolith	1
	Northern Redbelly Dace	WC-4-MT1-F62-NRBD	55	1	Otolith	2
		WC-4-MT1-F63-NRBD	56	2	Otolith	2
		WC-4-MT1-F64-NRBD	58	1	Otolith	2
		WC-4-MT1-F65-NRBD	55	1	Otolith	2
		WC-4-MT1-F66-NRBD	56	1	Otolith	2
		WC-4-MT1-F67-NRBD	56	1	Otolith	2
		WC-4-MT1-F68-NRBD	62	2	Otolith	3
		WC-4-MT1-F69-NRBD	61	2	Otolith	3
	WC-4-MT1-F70-NRBD	61	2	Otolith	3	
	Slimy Sculpin	WC-4-EF3-F1-SS	76	6	Otolith	2
Unnamed Watercourse 5	Central Mudminnow	WC-5-EF3-F4-CNMN	42	1	Otolith	0
		WC-5-EFF2-F1-CNMN	37	1	Otolith	0
		WC-5-EFF2-F2-CNMN	38	1	Otolith	0
		WC-5-EFF2-F3-CNMN	34	0	Otolith	0
		WC-5-EFF2-F4-CNMN	34	0	Otolith	0
		WC-5-MT1-F5-CNMN	105	15	Otolith	1
		WC-5-MT1-F6-CNMN	120	19	Otolith	2
		WC-5-MT1-F9-CNMN	112	16	Otolith	2
		WC-5-MT1-F21-CNMN	84	7	Otolith	1
		WC-5-MT1-F24-CNMN	77	6	Otolith	1
		WC-5-MT1-F32-CNMN	40	1	Otolith	0



Table B2-2: Fish Age Results 2023

Waterbody	Species	Sample ID	Total Length (mm)	Wet Weight (g)	Ageing Structure	Age
	Finescale Dace	WC-5-EF3-F2-FNDC	38	-	Otolith	0
		WC-5-EF3-F3-FNDC	31	-	Otolith	0
		WC-5-EF3-F5-FNDC	28	-	Otolith	0
		WC-5-MT1-F28-FNDC	69	4	Otolith	2
		WC-5-MT1-F37-FNDC	64	3	Otolith	2
		WC-5-MT1-F39-FNDC	71	3	Otolith	3
		WC-5-MT1-F40-FNDC	84	6	Otolith	3
Unnamed Watercourse 6A-2	Central Mudminnow	WC-6A-2-EF1-F1-CMM	46	1	Otolith	0
		WC-6A-2-EF1-F2-CMM	47	1	Otolith	0
		WC-6A-2-EF1-F3-CMM	42	1	Otolith	0
		WC-6A-2-EF1-F4-CMM	51	1	Otolith	0
		WC-6A-2-EF1-F5-CMM	53	2	Otolith	0
		WC-6A-2-EF1-F6-CMM	49	1	Otolith	0
		WC-6A-2-MT1-F4-CMM	129	22	Otolith	2
		WC-6A-2-MT1-F5-CMM	113	19	Otolith	2
Unnamed Watercourse 6B	Brook Stickleback	WC-6B-EF2-F1-BSB	54	<1	Otolith	0
		WC-6B-MT1-F40-BSB	45	1	Otolith	0
		WC-6B-MT1-F45-BSB	46	1	Otolith	0
		WC-6B-MT1-F58-BSB	43	1	Otolith	0
		WC-6B-MT1-F65-BSB	51	1	Otolith	1
		WC-6B-MT1-F67-BSB	46	1	Otolith	0
		WC-6B-MT1-F68-BSB	46	1	Otolith	0
		WC-6B-MT1-F75-BSB	44	1	Otolith	0
		WC-6B-MT1-F77-BSB	43	1	Otolith	0
Unnamed Watercourse 6B-02	Brook Stickleback	WC-6B-02-MT1-F55-BSB	59	2	Otolith	1
		WC-6B-02-MT1-F56-BSB	61	2	Otolith	1
		WC-6B-02-MT1-F57-BSB	59	2	Otolith	1
		WC-6B-02-MT1-F61-BSB	44	1	Otolith	0
		WC-6B-02-MT1-F63-BSB	41	1	Otolith	0
		WC-6B-02-MT1-F66-BSB	46	1	Otolith	0
		WC-6B-02-MT1-F72-BSB	44	1	Otolith	0
		WC-6B-02-MT1-F75-BSB	44	1	Otolith	0
		WC-6B-02-MT1-F82-BSB	52	1	Otolith	0
	Central Mudminnow	WC-6B-02-MT1-F42-CMM	92	7	Otolith	1
		WC-6B-02-MT1-F43-CMM	121	46	Otolith	2
		WC-6B-02-MT1-F44-CMM	85	6	Otolith	1
		WC-6B-02-MT1-F45-CMM	51	1	Otolith	0
		WC-6B-02-MT1-F46-CMM	59	1	Otolith	0
		WC-6B-02-MT1-F47-CMM	61	2	Otolith	0
		WC-6B-02-MT1-F48-CMM	61	3	Otolith	0
		WC-6B-02-MT1-F49-CMM	86	7	Otolith	1
		WC-6B-02-MT1-F50-CMM	57	2	Otolith	0
Unnamed Watercourse 6C	Brook Stickleback	WC-6C-EF1-F1-BSB	46	1	Otolith	0
		WC-6C-EF3-F1-BSB	62	2	Otolith	1
		WC-6C-EF3-F2-BSB	32	0	Otolith	0
		WC-6C-EF3-F8-BSB	38	0	Otolith	0
		WC-6C-MT1-F13-CMM	105	13	Otolith	2
	Central Mudminnow	WC-6C-MT1-F19-CMM	46	1	Otolith	0
		WC-6C-MT1-F20-CMM	52	1	Otolith	0
		WC-6C-MT1-F21-CMM	48	1	Otolith	0
		WC-6C-MT1-F22-CMM	47	1	Otolith	0
		WC-6C-MT1-F23-CMM	46	1	Otolith	0
		WC-6C-MT1-F24-CMM	52	1	Otolith	0
		WC-6C-MT1-F25-CMM	41	1	Otolith	0
		WC-6C-MT1-F26-CMM	42	1	Otolith	0
		WC-6C-MT1-F27-CMM	45	1	Otolith	0
		WC-6C-MT1-F6-CMM	118	17	Otolith	2
Unnamed Watercourse 7	Northern Pike	WC-7-GN1-F1-NP	330	181	Cleithra	1
	Yellow Perch	WC-7-GN1-F2-NP	360	277	Cleithra	1
Unnamed Watercourse 7A-07	Central Mudminnow	WC-7-GN1-F3-YP	100	10	Scales	1
		WC-7A-07-EF1-F1-CMM	47	1	Otolith	0
		WC-7A-07-EF1-F2-CMM	35	1	Otolith	0
		WC-7A-07-EF1-F3-CMM	46	1	Otolith	0
		WC-7A-07-EF1-F4-CMM	37	1	Otolith	0
Unnamed Watercourse 7A-08	Central Mudminnow	WC-7A-07-EF1-F5-CMM	41	1	Otolith	0
		WC-7A-08-EF1-F1-CMM	113	18	Otolith	2
		WC-7A-08-EF3-F19-CMM	39	1	Otolith	0



Table B2-2: Fish Age Results 2023

Waterbody	Species	Sample ID	Total Length (mm)	Wet Weight (g)	Ageing Structure	Age
Unnamed Watercourse 8B	Brook Stickleback	WC-8B-MT1-F23-BRST	48	1	Otolith	0
		WC-8B-MT1-F49-BRST	59	1	Otolith	0
		WC-8B-MT1-F50-BRST	70	3	Otolith	2
		WC-8B-MT1-F62-BRST	72	4	Otolith	2
		WC-8B-MT1-F63-BRST	70	3	Otolith	2
		WC-8B-MT1-F73-BRST	45	1	Otolith	0
		WC-8B-MT1-F77-BRST	58	2	Otolith	1
		WC-8B-MT1-F80-BRST	58	2	Otolith	1
		WC-8B-MT1-F107-BRST	61	2	Otolith	1
		WC-8B-MT1-F119-BRST	46	1	Otolith	0

Notes:

PR/SC; Pectoral ray and scales

DR/SC; Dorsal ray and scales

CL/SC; Cleithrum and scales

WB; Whole body



Table B2-3: Fish Age Results 2024

Waterbody	Species	Sample ID	Total Length (mm)	Wet Weight (g)	Ageing Structure	Age
Chukuni River	Northern Pike	CR-REF-F1-NRPK	540	630	Cleithra	4
		CR-FDP-F1-NRPK	430	430	Cleithra	3
		CR-FDP-F2-NRPK	470	510	Cleithra	3
		CR-FDP-F3-NRPK	450	510	Cleithra	4
		CR-FDP-F4-NRPK	465	560	Cleithra	3
		CR-FDP-F5-NRPK	385	310	Cleithra	2
		CR-FDP-F6-NRPK	360	340	Cleithra	2
		CR-DS-F1-NRPK	531	850	Cleithra	3
		CR-DS-F2-NRPK	-	730	Cleithra	6
		CR-DS-F5-NRPK	415	340	Cleithra	3
	CR-DS-F6-NRPK	480	610	Cleithra	3	
	White Sucker	CR-FDP-F7-WS	390	640	Fin ray	4
		CR-FDP-F8-WS	400	730	Fin ray	4
		CR-FDP-F9-WS	485	1,240	Fin ray	6
		CR-FDP-F10-WS	560	1,920	Fin ray	9
		CR-DS-F4-WS	431	920	Fin ray	5
		CR-DS-F7-WS	410	700	Fin ray	5
		CR-DS-F8-WS	465	1,010	Fin ray	6
		CR-DS-F9-WS	415	800	Fin ray	4
		CR-DS-F10-WS	410	860	Fin ray	4

Notes:

PR/SC; Pectoral ray and scales

DR/SC; Dorsal ray and scales

CL/SC; Cleithrum and scales

WB; Whole body



Table B3-1: 2023 eDNA Metabarcoding Results

Family	Genus	Species	Common Name	CR-DS	CR-FDP	CR-REF	DC-01	DC-03	DC-04	GL	WB-2	WB-6	WC-3	WC-7
Catostomidae	<i>Catostomus</i>	<i>Catostomus commersonii</i>	White Sucker	X	X	X	X	X	X	X			X	X
Catostomidae	<i>Moxostoma</i>	<i>Moxostoma anisurum</i>	Silver Redhorse	X	X	X	X		X	X				X
Catostomidae	<i>Moxostoma</i>	<i>Moxostoma macrolepidotum</i>	Shorthead Redhorse	X	X	X	X	X	X	X		X		X
Cyprinidae	<i>Chrosomus</i>	<i>Chrosomus eos</i>	Northern Redbelly Dace						X	X				
Cyprinidae	<i>Chrosomus</i>	<i>Chrosomus neogaeus</i>	Finescale Dace		X	X		X	X	X				X
Cyprinidae	<i>Luxilus</i>		Common Shiner		X				X	X				X
Cyprinidae	<i>Couesius</i>		Lake Chub	X	X	X	X		X	X				X
Cyprinidae	<i>Margariscus</i>		Northern Pearl Dace		X	X		X	X	X				X
Cyprinidae	<i>Notemigonus</i>	<i>Notemigonus crysoleucas</i>	Golden Shiner		X	X		X	X	X	X			X
Cyprinidae	<i>Notropis</i>	<i>Notropis atherinoides</i>	Emerald Shiner	X	X	X			X					
Cyprinidae	<i>Notropis</i>	<i>Notropis heterolepis</i>	Blacknose Shiner	X	X	X	X	X	X	X				X
Cyprinidae	<i>Notropis</i>	<i>Notropis hudsonius</i>	Spottail Shiner	X	X	X	X	X	X	X	X			X
Cyprinidae	<i>Notropis</i>	<i>Notropis volucellus</i>	Mimic Shiner	X	X	X		X	X		X			X
Cyprinidae	<i>Pimephales</i>	<i>Pimephales promelas</i>	Fathead Minnow	X	X	X	X		X	X	X	X		X
Cyprinidae	<i>Rhinichthys</i>		Blacknose/Longnose Dace	X	X	X								
Cyprinidae	<i>Semotilus</i>	<i>Semotilus atromaculatus</i>	Creek Chub		X	X			X					
Esocidae	<i>Esox</i>	<i>Esox lucius</i>	Northern Pike	X	X	X	X	X	X	X	X	X	X	X
Umbridae	<i>Umbra</i>	<i>Umbra limi</i>	Central Mudminnow	X	X		X	X	X		X	X	X	X
Lotidae	<i>Lota</i>	<i>Lota lota</i>	Burbot	X	X	X	X	X	X	X			X	X
Hiodontidae	<i>Hiodon</i>		Mooneye	X	X	X		X	X	X		X	X	X
Centrarchidae	<i>Ambloplites</i>	<i>Ambloplites rupestris</i>	Rock Bass	X	X	X	X	X	X	X				
Centrarchidae	<i>Lepomis</i>	<i>Lepomis cyanellus</i>	Green Sunfish	X					X					
Centrarchidae	<i>Micropterus</i>	<i>Micropterus dolomieu</i>	Smallmouth Bass	X	X	X			X					X
Percidae	<i>Etheostoma</i>	<i>Etheostoma exile</i>	Iowa Darter	X	X	X	X	X	X	X		X		X
Percidae	<i>Etheostoma</i>	<i>Etheostoma nigrum</i>	Johnny Darter	X	X	X	X	X	X	X				X
Percidae	<i>Perca</i>	<i>Perca flavescens</i>	Yellow Perch	X	X	X	X	X	X	X		X		X
Percidae	<i>Sander</i>	<i>Sander canadensis</i>	Sauger	X	X	X	X	X		X				
Percidae	<i>Sander</i>	<i>Sander vitreus</i>	Walleye	X	X	X	X	X	X	X			X	X
Percopsidae	<i>Percopsis</i>	<i>Percopsis omiscomaycus</i>	Trout-Perch	X	X	X			X	X				X
Salmonidae	<i>Coregonus</i>		Lake Whitefish	X	X	X			X	X				X
Cottidae	<i>Cottus</i>		"Sculpin"	X	X	X	X	X		X			X	X
Total Species Detected				25	29	27	17	19	28	24	6	7	7	24

Notes:

Combined results from June, August, and October 2023

Rows without a species designation are those only identified to the Genus level and species was inferred by geographic location.

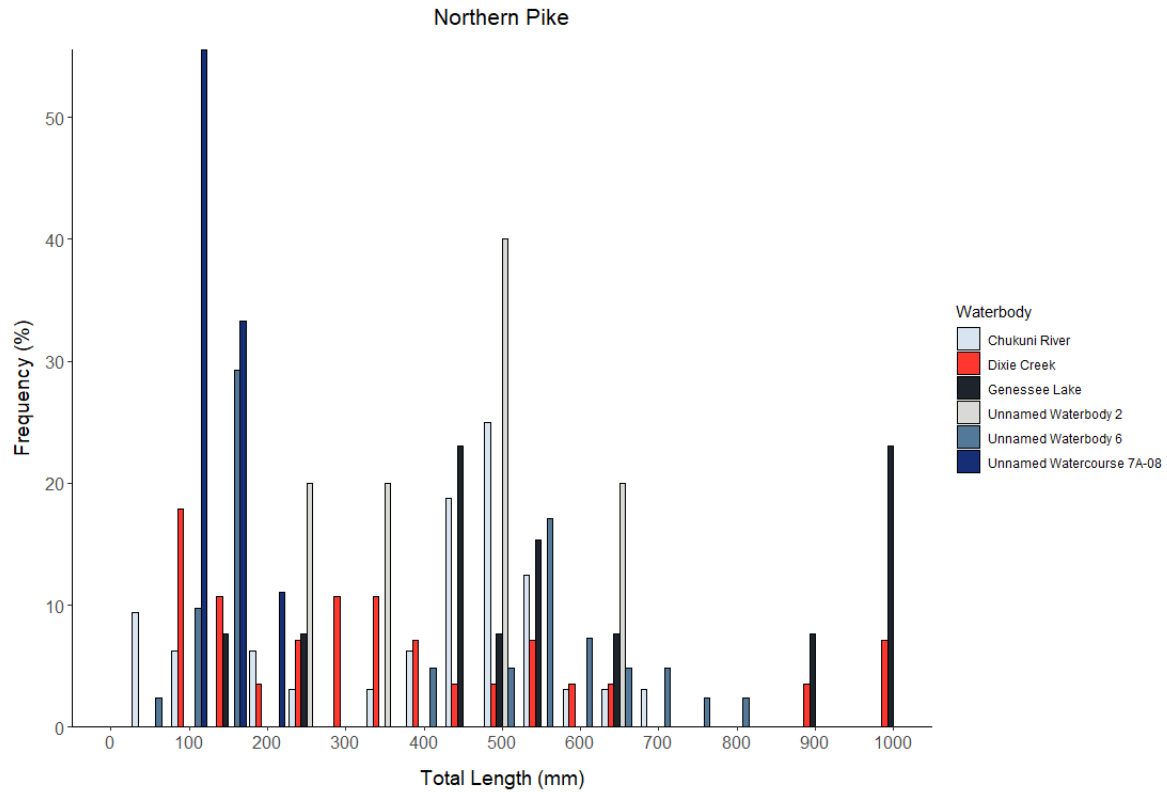


Figure B1-1: Length Frequency Distribution for Northern Pike

Notes: Individual sample sizes for Northern Pike are as follows: Chukuni River (n=32), Dixie Creeks (n=33), Genessee Lake (n=17), Unnamed Waterbody 2 (n=11), Unnamed Waterbody 6 (n=51) and Unnamed Watercourse 7A-08 (n=10). Northern Pike captured within the Dixie Creeks were combined to increase sample size for histogram generation. Figures represent waterbodies or watercourses where greater than 10 individuals of Northern Pike were captured. A full list of species occurrence in each waterbody is presented in Table A1-2.

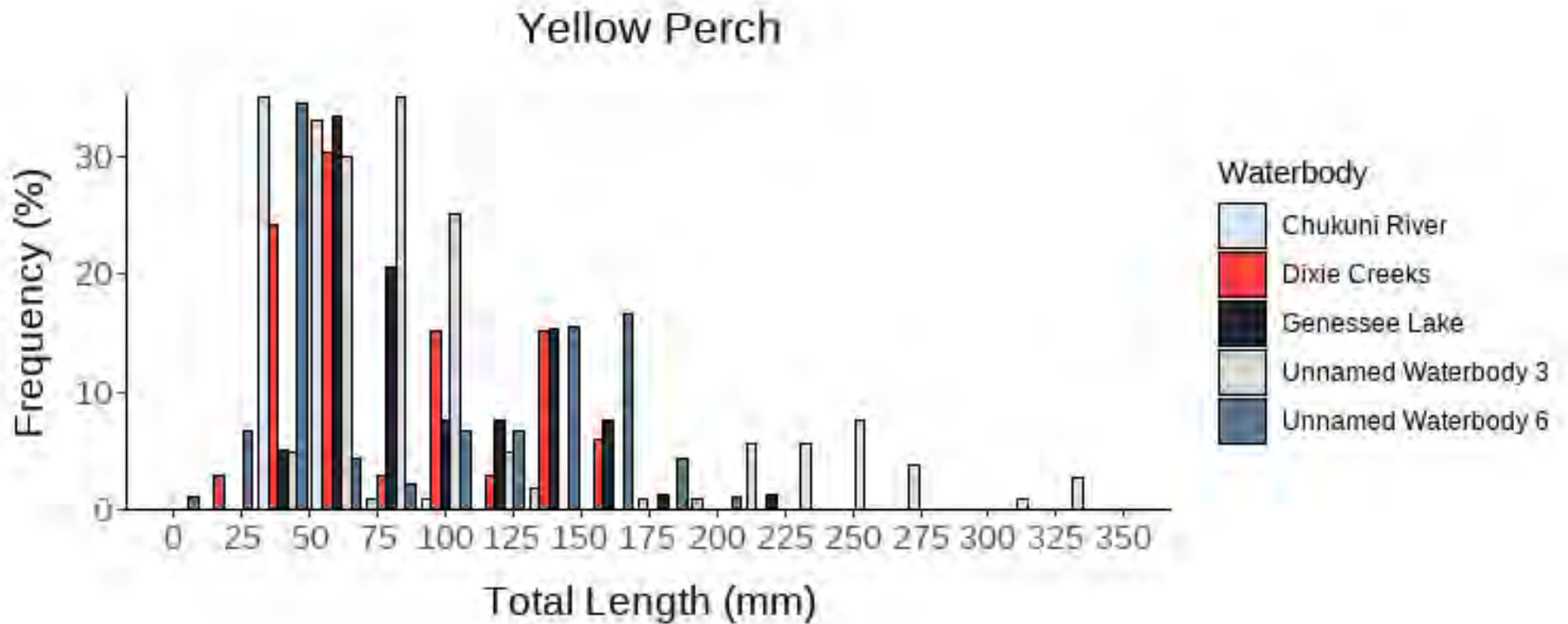


Figure B1-2: Length Frequency Distribution for Yellow Perch

Notes: Individual sample sizes for Yellow Perch are as follows: Chukuni River (n=106), Dixie Creeks (n=33), Genessee Lake (n=78), Unnamed Waterbody 3 (n=20), and Unnamed Waterbody 6 (n=90). Yellow Perch captured within the Chukuni River and Dixie Creeks and those captured within the Unnamed Waterbody 6 Tributaries were combined to increase sample size for histogram generation. Figures represent waterbodies or watercourses where greater than 10 individuals of Yellow Perch were captured. A full list of species occurrence in each waterbody is presented in Table A1-2.

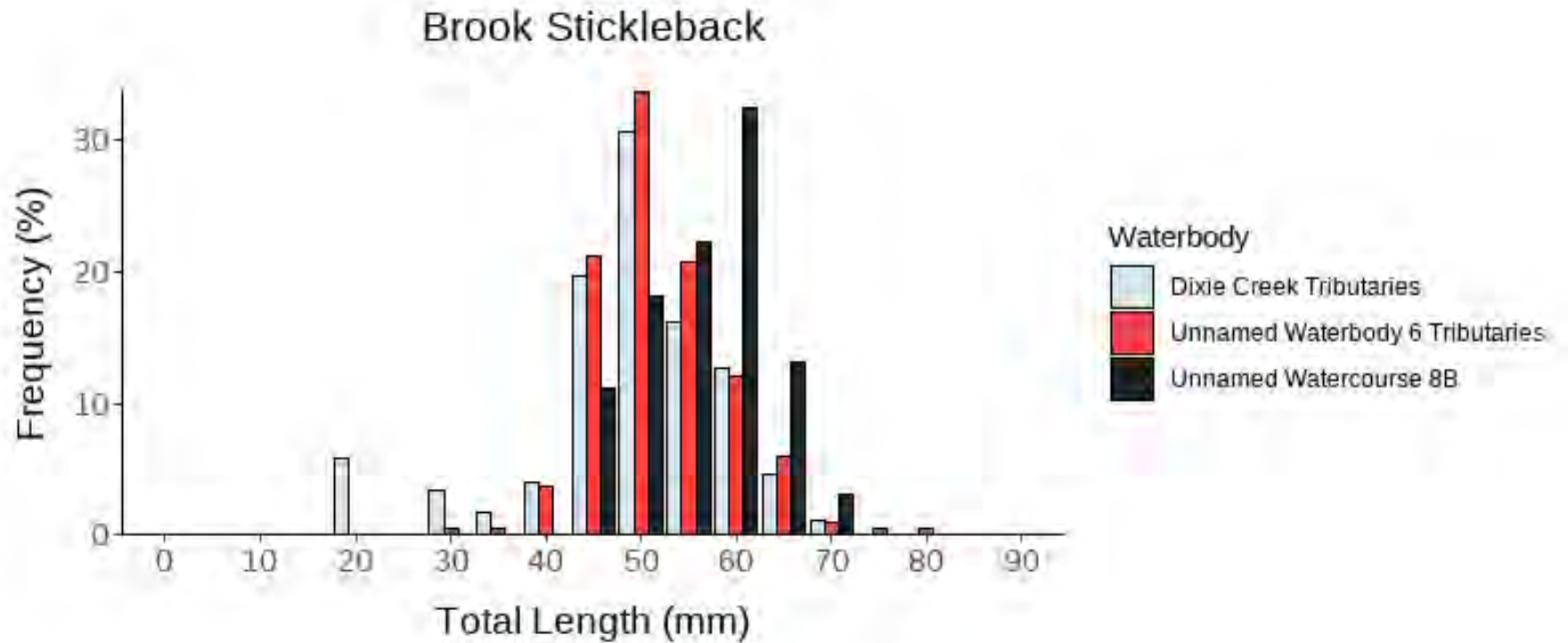


Figure B1-3: Length Frequency Distribution for Brook Stickleback

Notes: Individual sample sizes for Brook Stickleback are as follows: Dixie Creek Tributaries (n=173), Unnamed Waterbody 6 Tributaries (n=217), and Unnamed Watercourse 8B (n=99). Brook Stickleback captured within the Dixie Creek Tributaries and those captured within the Unnamed Waterbody 6 Tributaries were combined to increase sample size for histogram generation. Figures represent waterbodies or watercourses where greater than 10 individuals of Brook Stickleback were captured. A full list of species occurrence in each waterbody is presented in Table A1-2.

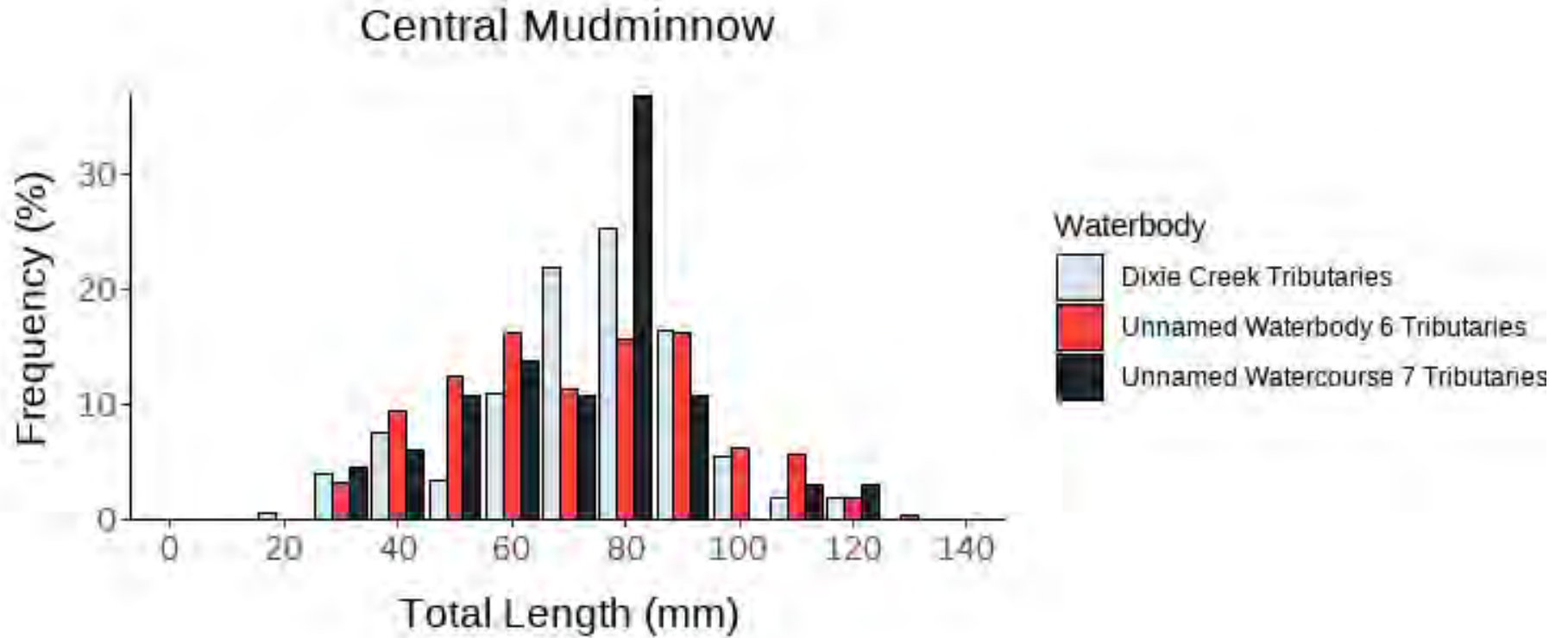


Figure B1-4: Length Frequency Distribution for Central Mudminnow

Notes: Individual sample sizes for Central Mudminnow are as follows: Dixie Creek Tributaries (n=146), Unnamed Waterbody 6 Tributaries (n=209), and Unnamed Watercourse 7 Tributaries (n=65). Central Mudminnow captured within the Dixie Creek Tributaries and those captured within Unnamed Waterbody 6 Tributaries and Unnamed Watercourse 7 Tributaries were combined to increase sample size for histogram generation. Figures represent waterbodies or watercourses where greater than 10 individuals of Central Mudminnow were captured. A full list of species occurrence in each waterbody is presented in Table A1-2.

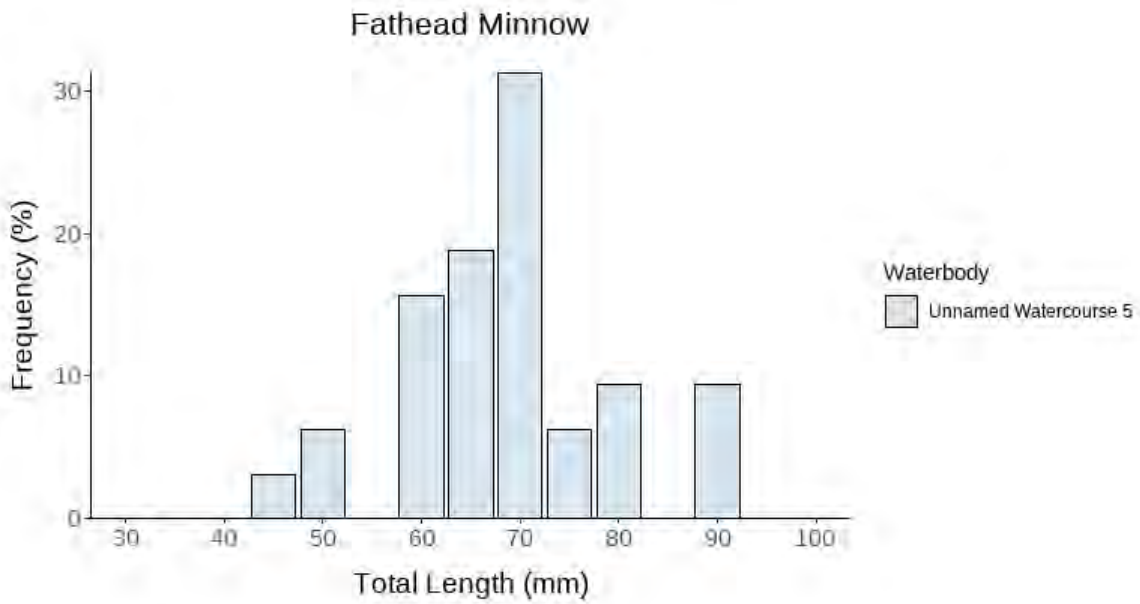


Figure B1-5: Length Frequency Distribution for Fathead Minnow

Notes: Individual sample sizes for Fathead Minnow are as follows: Unnamed Watercourse 5 (n=29). Figures represent waterbodies or watercourses where greater than 10 individuals of Fathead Minnow were captured. A full list of species occurrence in each waterbody is presented in Table A1-2.

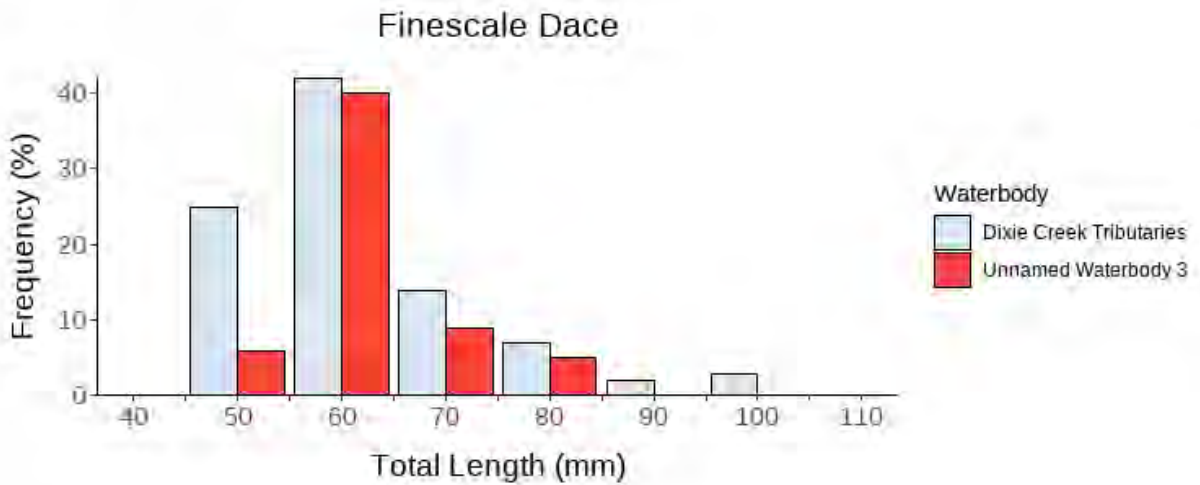


Figure B1-6: Length Frequency Distribution for Finescale Dace

Notes: Individual sample sizes for Finescale Dace are as follows: Dixie Creek Tributaries (n=111) and Unnamed Waterbody 3 (n=60). Figures represent waterbodies or watercourses where greater than 10 individuals of Finescale Dace were captured. A full list of species occurrence in each waterbody is presented in Table A1-2.

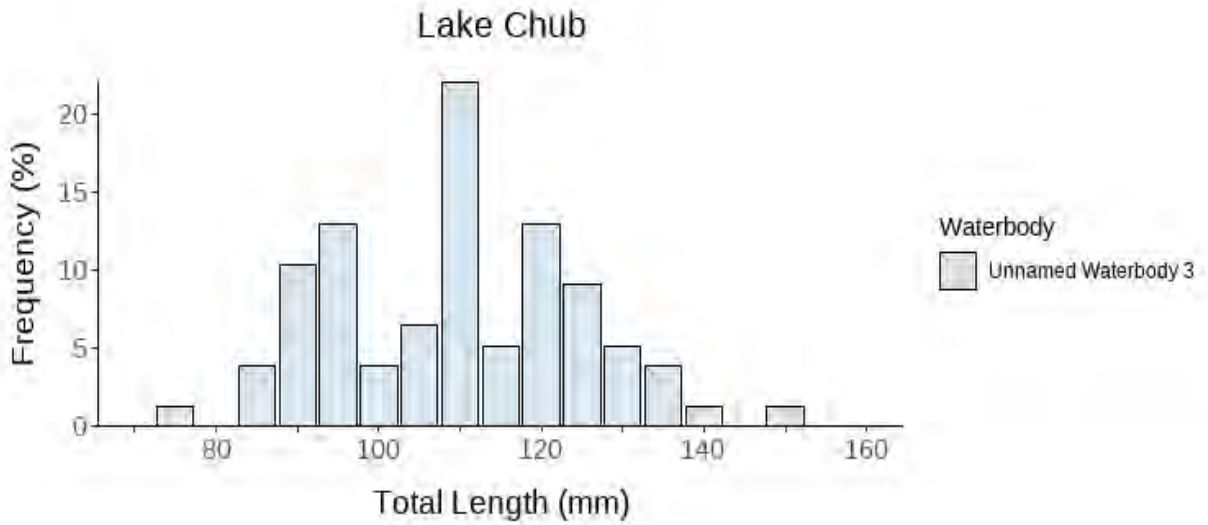


Figure B1-7: Length Frequency Distribution for Lake Chub

Notes: Individual sample sizes for Lake Chub are as follows: Unnamed Waterbody 3 (n=77). Figures represent waterbodies or watercourses where greater than 10 individuals of Lake Chub were captured. A full list of species occurrence in each waterbody is presented in Table A1-2.

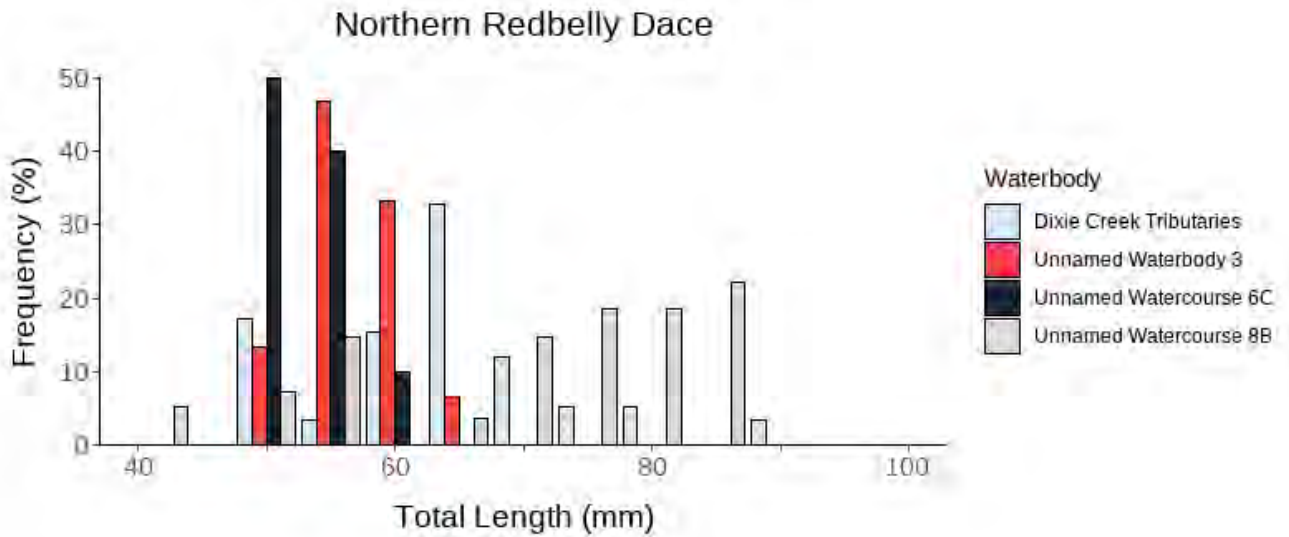


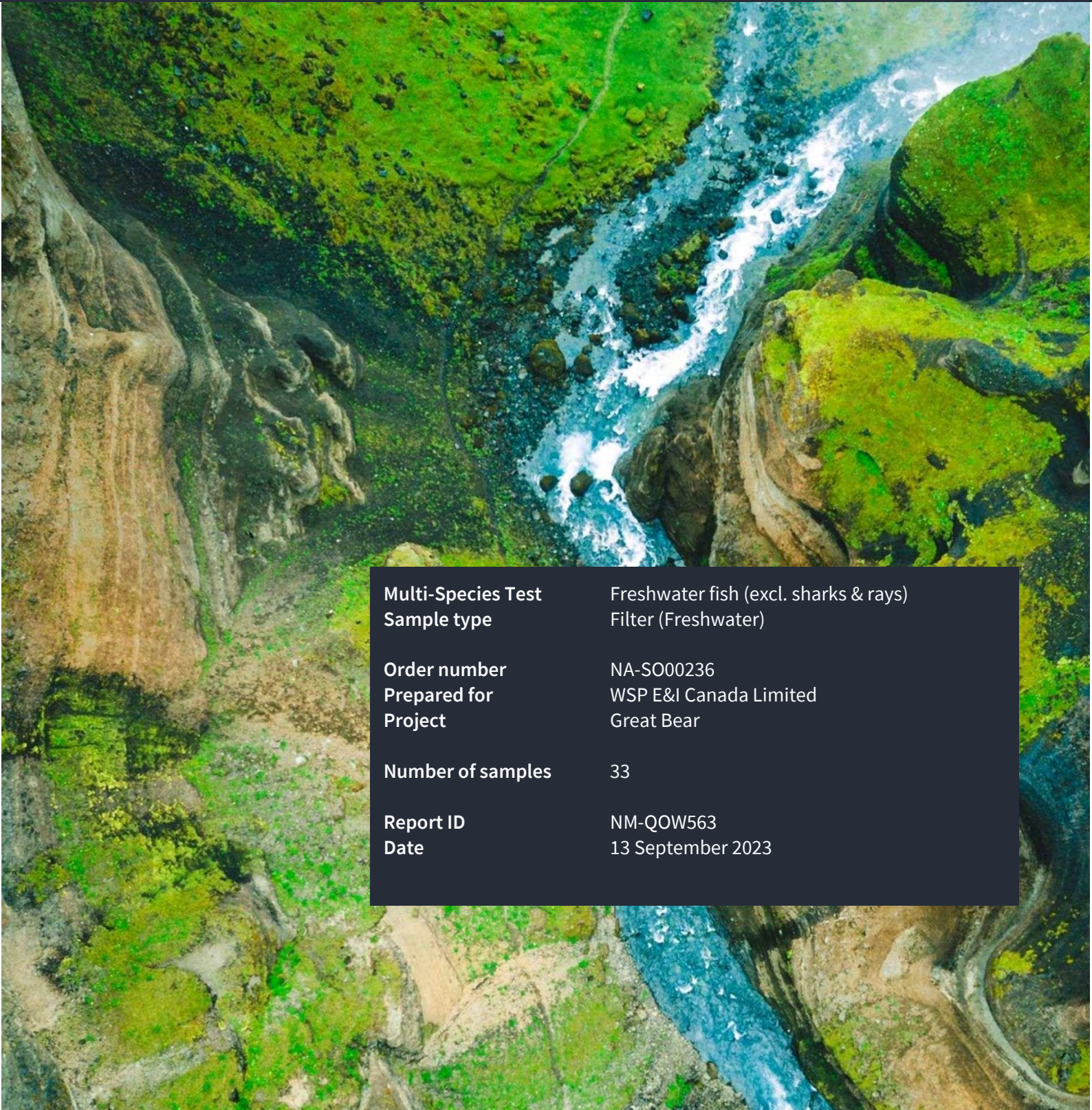
Figure B1-8: Length Frequency Distribution for Northern Redbelly Dace

Notes: Individual sample sizes for Northern Redbelly Dace are as follows: Dixie Creek Tributaries (n=58), Unnamed Watercourse 6C (n=10), Unnamed Waterbody 3 (n=15) and Unnamed Watercourse 8B (n=27). Figures represent waterbodies or watercourses where greater than 10 individuals of Northern Redbelly Dace were captured. A full list of species occurrence in each waterbody is presented in Table A1-2.



Environmental DNA Report

Freshwater fish (excl. sharks & rays)



Multi-Species Test	Freshwater fish (excl. sharks & rays)
Sample type	Filter (Freshwater)
Order number	NA-SO00236
Prepared for Project	WSP E&I Canada Limited Great Bear
Number of samples	33
Report ID	NM-QOW563
Date	13 September 2023



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Data Tables: Accompanying spreadsheet with results at the individual sample level: species detected, metrics and quality control: NM-QOW563.NA-SO00236.Fish.Results.xlsx

- Data Description
- Species Data Table: Percentages
- Species Data Table: Read Counts
- Metrics by Sample Table
- Quality Control Table

Throughout the report you'll see reference to 'OTU'. This stands for Operational Taxonomic Unit; an OTU is broadly equivalent to a species in most cases.

Executive Summary

Field Samples submitted:	33
Field Samples reported:	33
Field Blanks submitted:	2
Species Richness:	36
Average Species Richness per sample:	13
Total number of IUCN Red List Species:	0
Total number of Invasive Species:	2

Reported samples are those that passed Quality Control and are included in the Species Data Table

Please be careful when sharing this report, it contains biodiversity information that may be sensitive, particularly with respect to endangered or protected species. Please share responsibly. If the report is shared, we kindly ask that the report is shared in its entirety - to limit the possibility of any information being taken out of context.

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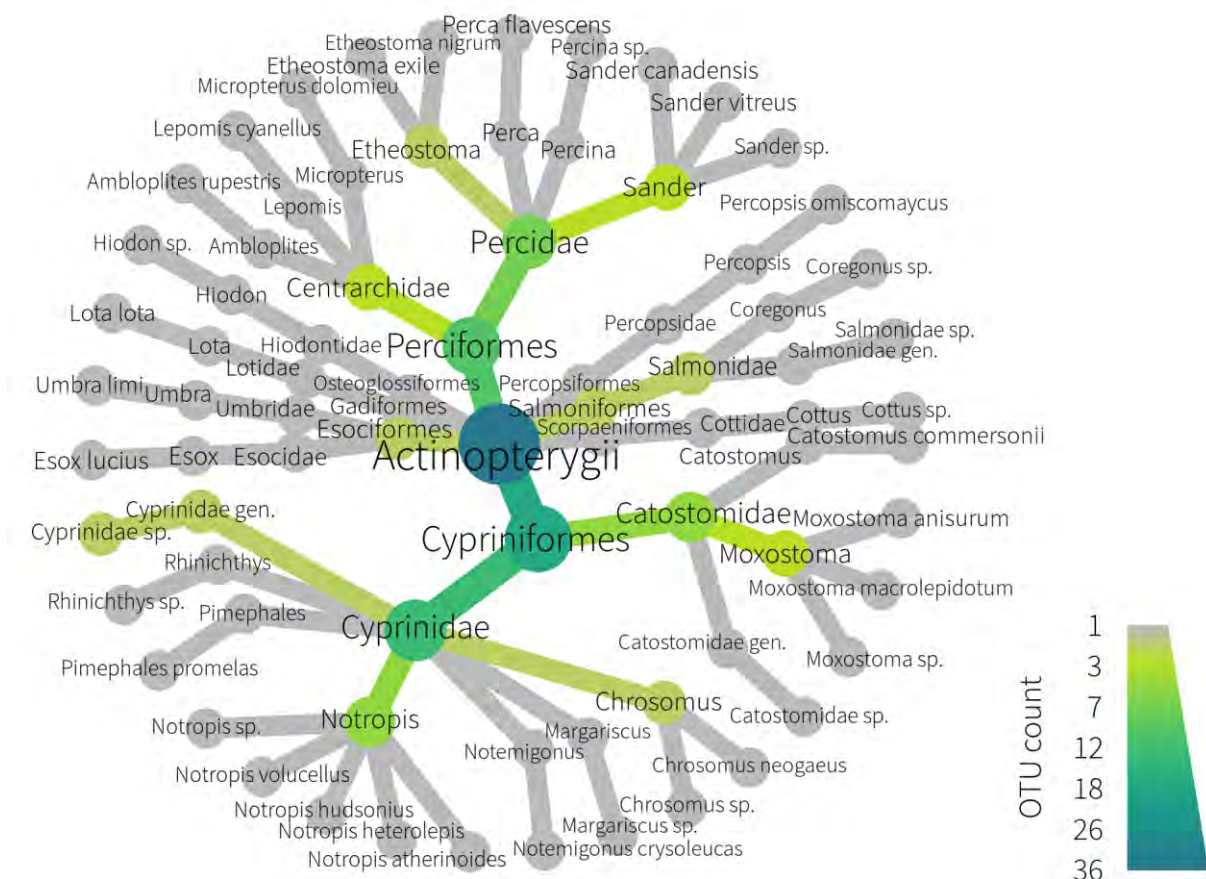
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REPORT

Taxonomic Composition

This chart provides a view of the species detected in your samples and their taxonomic relationship, (names on the same branch are more similar than those on different branches). The chart is structured with the highest taxonomic rank at the centre (e.g., kingdom, phylum, class), moving through the ranks of order, family, genus, species as you move to the outer edge. Note that the centre and outer ranks will change depending on the **test** applied and the number of species detected. The legend in the bottom right of the chart indicates how to relate the colour in the branches to the number of species. The colour scale goes from grey - indicating very few species, to blue - indicating a lot of species.





Taxonomic Resolution

This table provides the number of **OTUs** detected and the percentage of OTUs identified to each taxonomic level.

Depending on completeness of **reference databases** for the region where you sampled, some OTUs may not match to a reference at species level. Global DNA reference databases contain millions of barcodes, but gaps remain, particularly in regions and taxonomic groups that are more diverse and less studied. Coverage is expected to improve over time and data tables can be updated to include new information at a future date.

Number of OTUs	Phylum	Class	Order	Family	Genus	Species
36	100%	100%	100%	100%	88.89%	61.11%

Want to increase the number of species named to species level? If you have specimens of species you have identified, we can sequence the DNA and add the species to our reference databases. We will then be able to enhance the reference library and report if the species is detected. Please contact us about this service and we can send you our barcoding kits, but note that we only offer these kits for fish and amphibians.

IUCN Red List Species

These are the IUCN (International Union for Conservation of Nature) Red List species detected in your samples. These are detected species that are designated as one of the IUCN Red List Threatened Categories (Vulnerable, Endangered and Critically Endangered). An increase in the number of threatened species is generally associated with a positive trend in **biodiversity** or habitat condition.

No species designated Vulnerable, Endangered or Critically Endangered were detected in the samples.

The Data Tables contain further information for all species, including their designations as Least Concern or Near Threatened status.



Invasive Species

These are **Invasive species** detected in your samples. These species are invasive according to the Global Register of Introduced and Invasive Species (GRIIS) in the country where sampling occurred. GRIIS is an IUCN Invasive Species Specialist Group initiative. The Convention on Biological Diversity defines an invasive species as one whose introduction and/or spread threatens biological diversity. An increase in the number of invasive species is generally associated with enhanced pressures at your site and reduced resilience of the native community. Please note: this label is only available for animals; and GRIIS lists marine species as invasive for a country, even if the species is known to be invasive in only one marine area bordering the country.

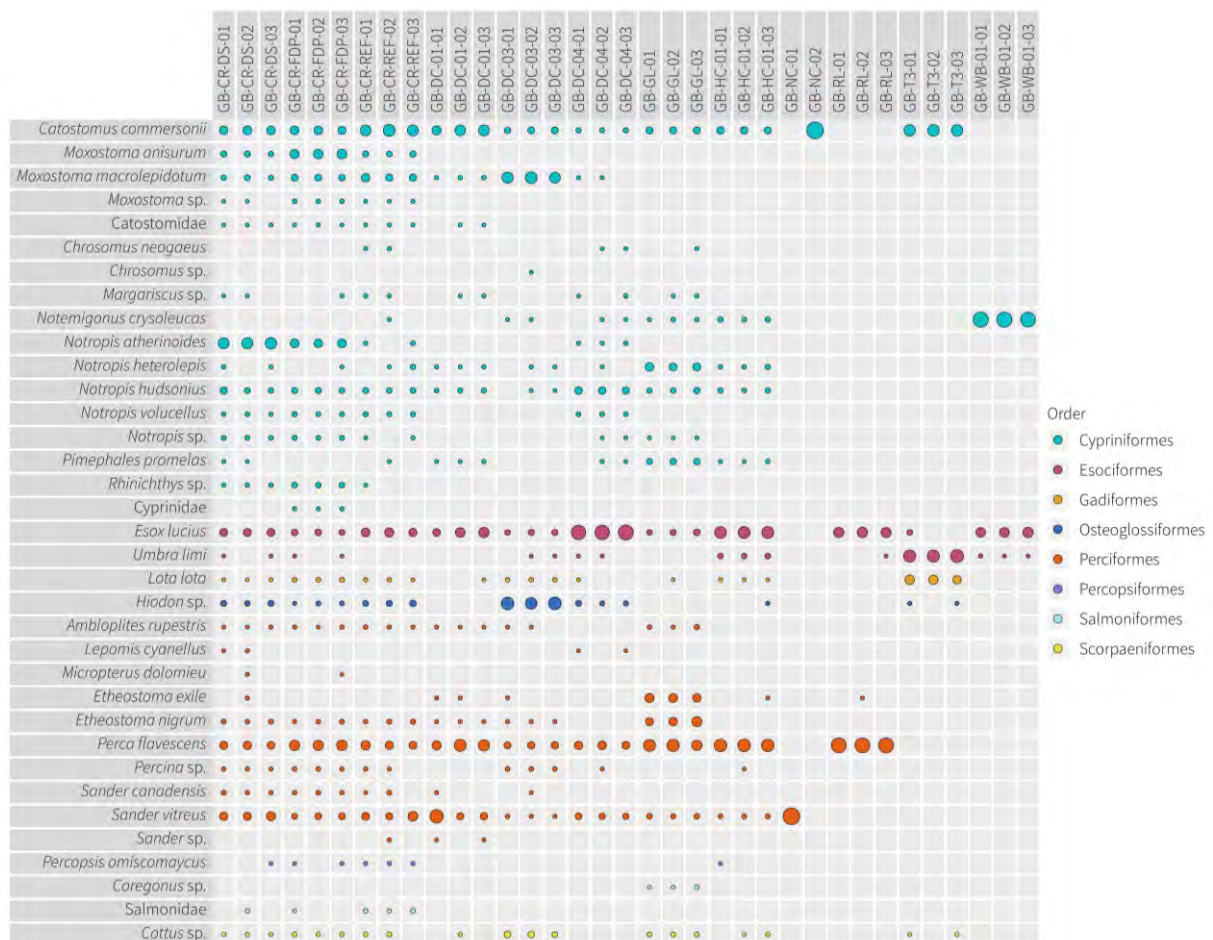
Species	Common name
<i>Esox lucius</i>	Northern Pike
<i>Micropterus dolomieu</i>	Smallmouth Bass
Number of species	2



Community Composition

This chart lists the species found in each sample. The presence of a bubble means a species was detected in that sample. The chart displays at species level, unless the number of species detected is too great to display clearly in the document. In these cases, the chart displays at a higher taxonomic level. The full species level chart is provided as an appendix.

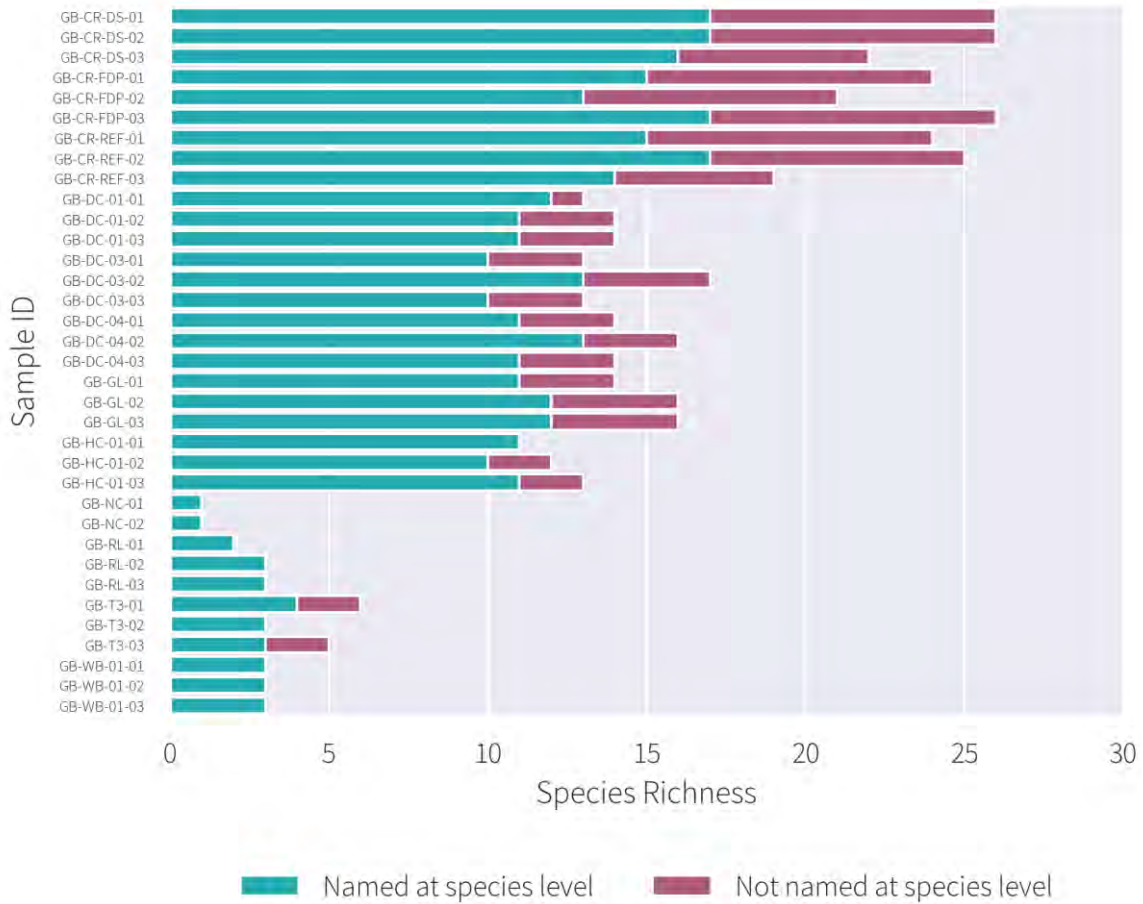
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Species Richness

This is the total count of OTUs detected in each sample. The blue portion of each bar indicates the number of OTUs identified to a species.

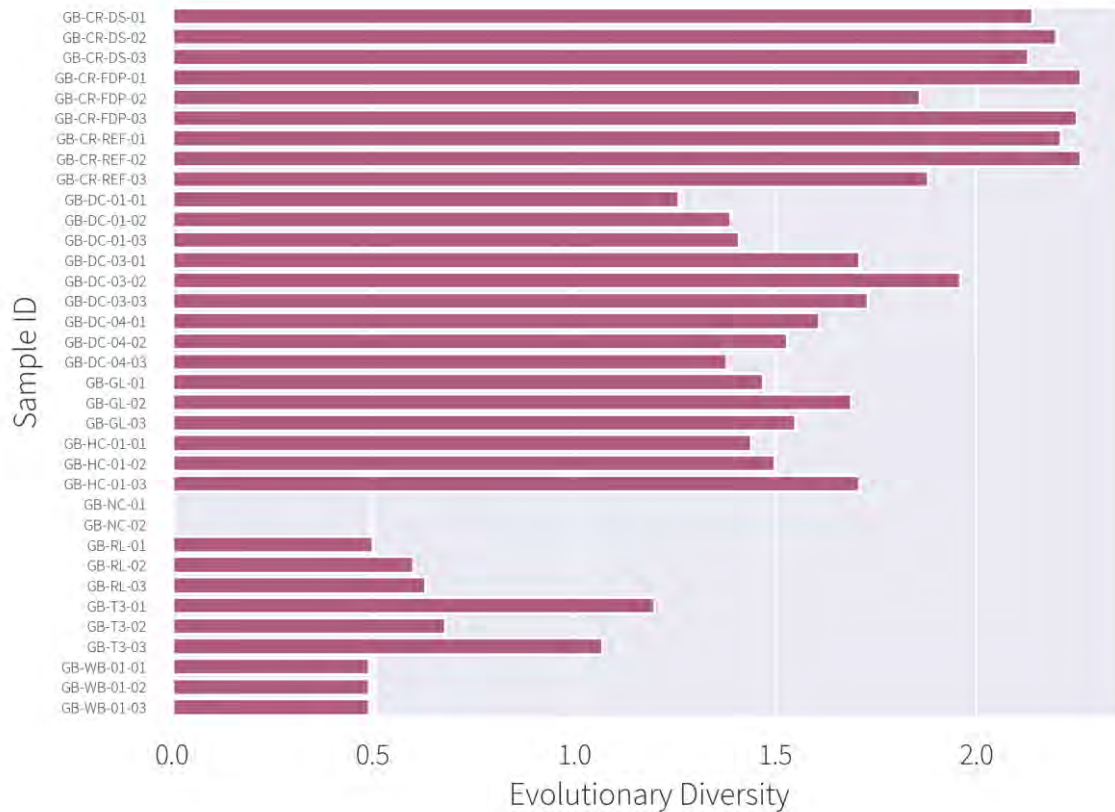


High Species Richness generally indicates a healthier and functioning ecosystem and is the simplest biodiversity metric that is consistently reported in biodiversity monitoring.



Evolutionary Diversity

Evolutionary Diversity calculated for each sample. This is a measure of the variety of species types that occurred in your samples.



Evolutionary Diversity is a strong complementary indicator of biodiversity progress alongside Species Richness. Increasing Evolutionary Diversity can indicate an increasing resilience of the community.

Looking for something more?

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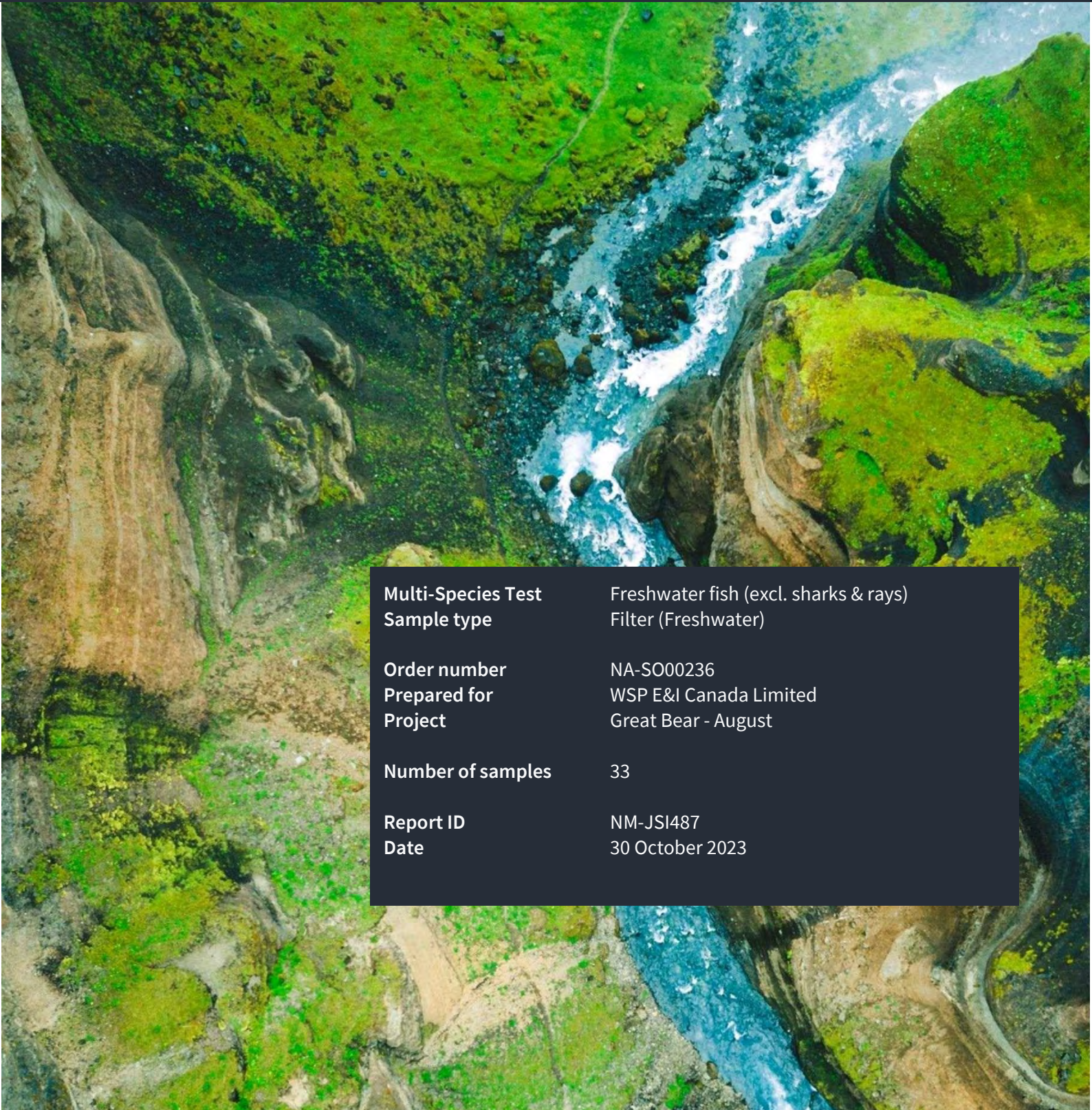
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Environmental DNA Report

Freshwater fish (excl. sharks & rays)



Multi-Species Test	Freshwater fish (excl. sharks & rays)
Sample type	Filter (Freshwater)
Order number	NA-SO00236
Prepared for Project	WSP E&I Canada Limited Great Bear - August
Number of samples	33
Report ID	NM-JSI487
Date	30 October 2023



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Throughout the report you'll see reference to 'OTU'. This stands for Operational Taxonomic Unit; an OTU is broadly equivalent to a species in most cases.

Executive Summary

Field Samples submitted:	33
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Species Richness:	31
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Total number of Invasive Species:	2

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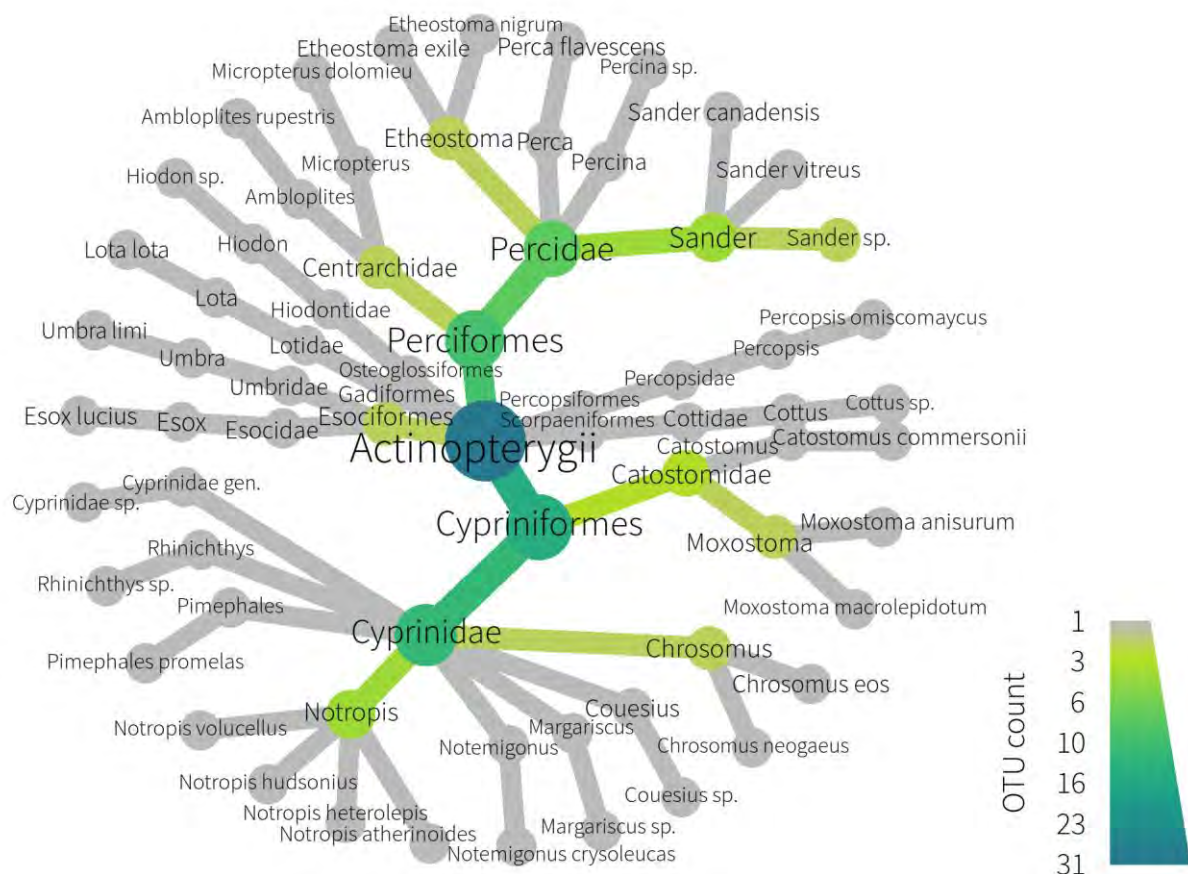
Something exciting or unexpected that you'd like to discuss further, our team of experts are looking forward to speaking with you: www.naturemetrics.com/contact



REPORT

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Taxonomic Resolution

This table provides the number of **OTUs** detected and the percentage of OTUs identified to each taxonomic level.

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Number of OTUs	Phylum	Class	Order	Family	Genus	Species
31	100%	100%	100%	100%	96.77%	70.97%

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Species	Common name
<i>Esox lucius</i>	Northern Pike
<i>Micropterus dolomieu</i>	Smallmouth Bass
Number of species	2

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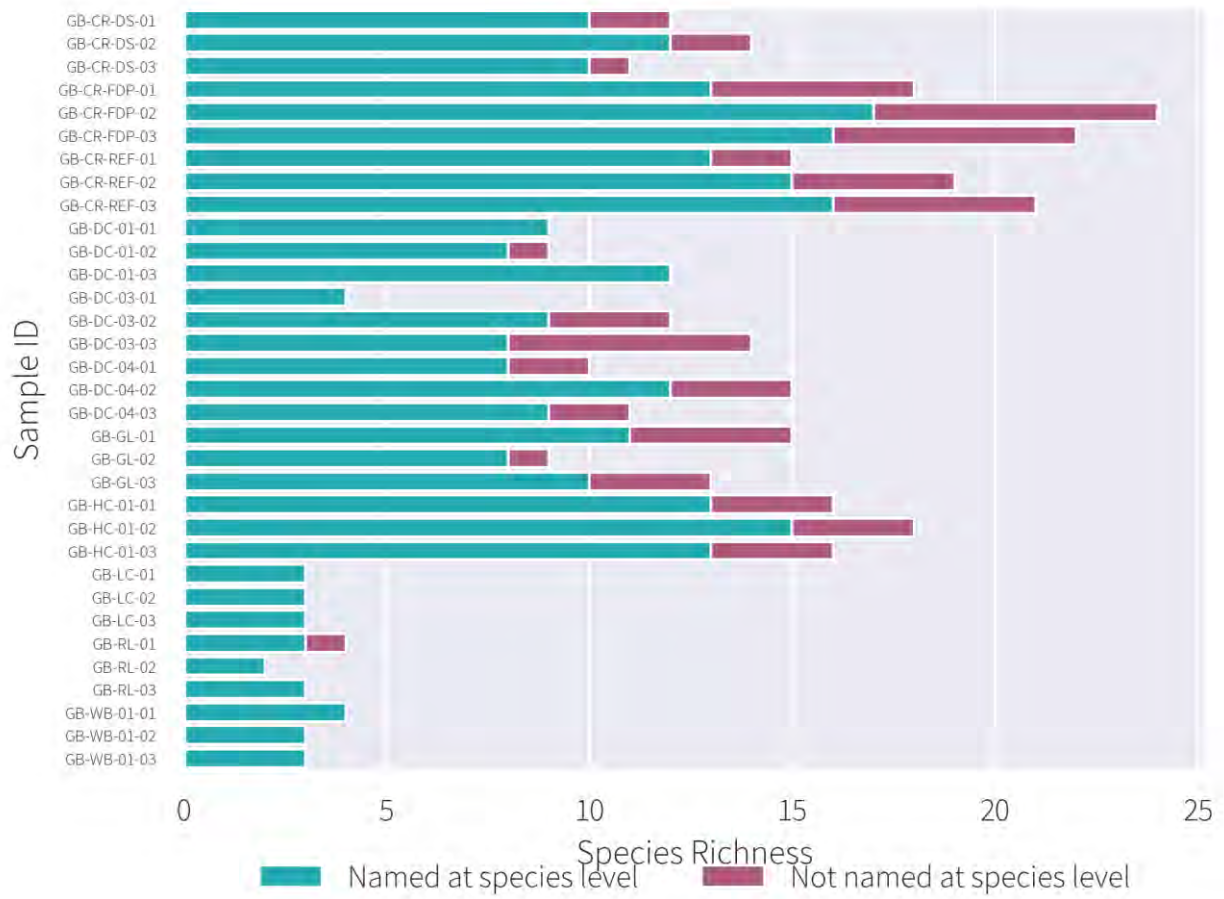
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Chart attached separately.



Species Richness

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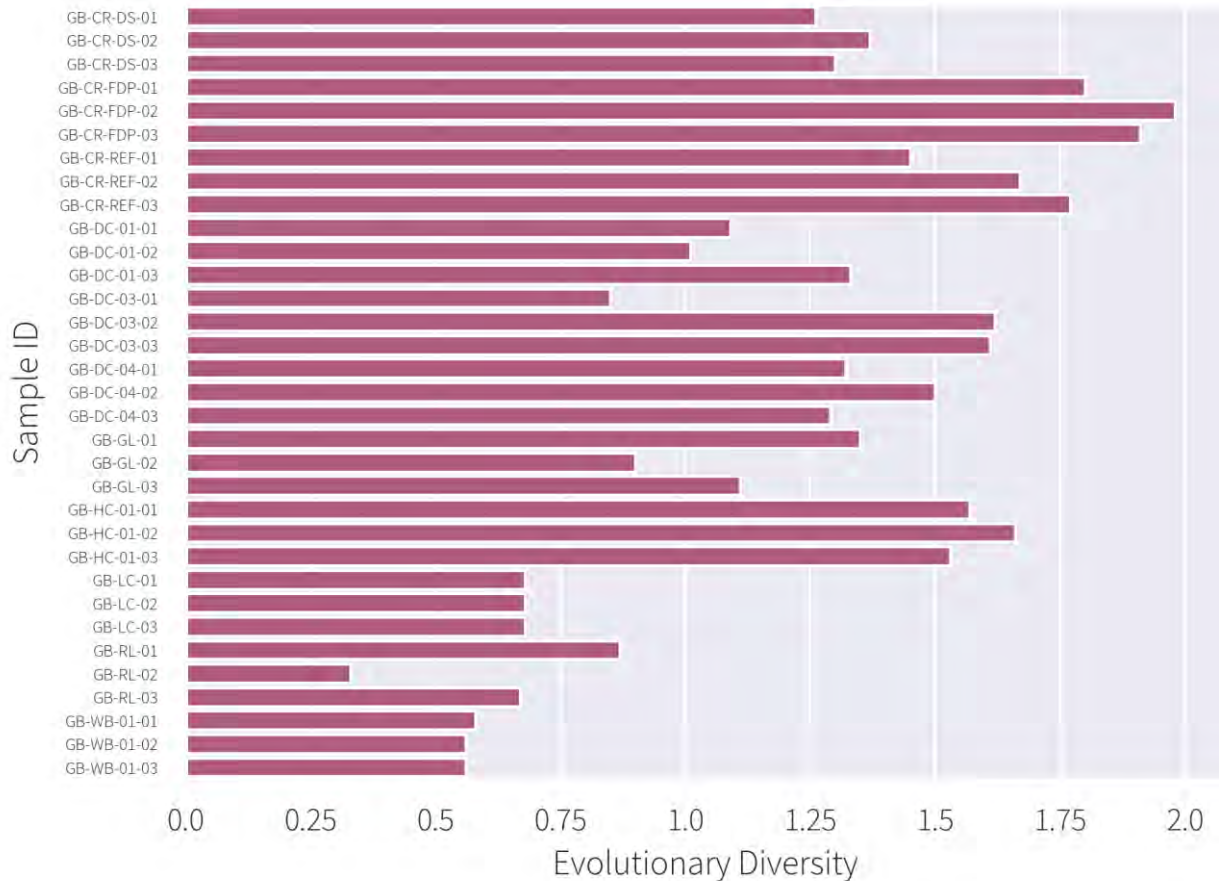


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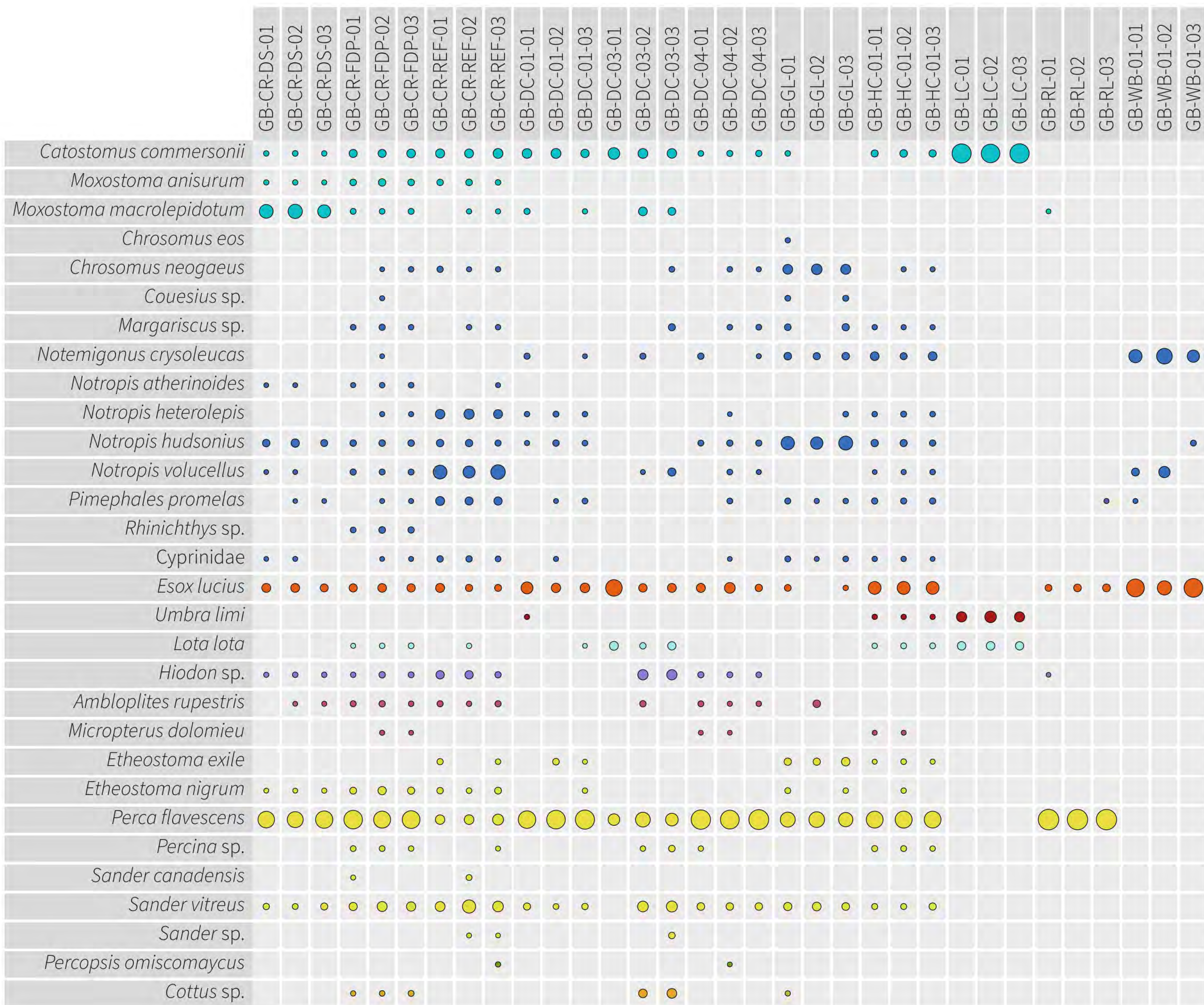
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END OF REPORT

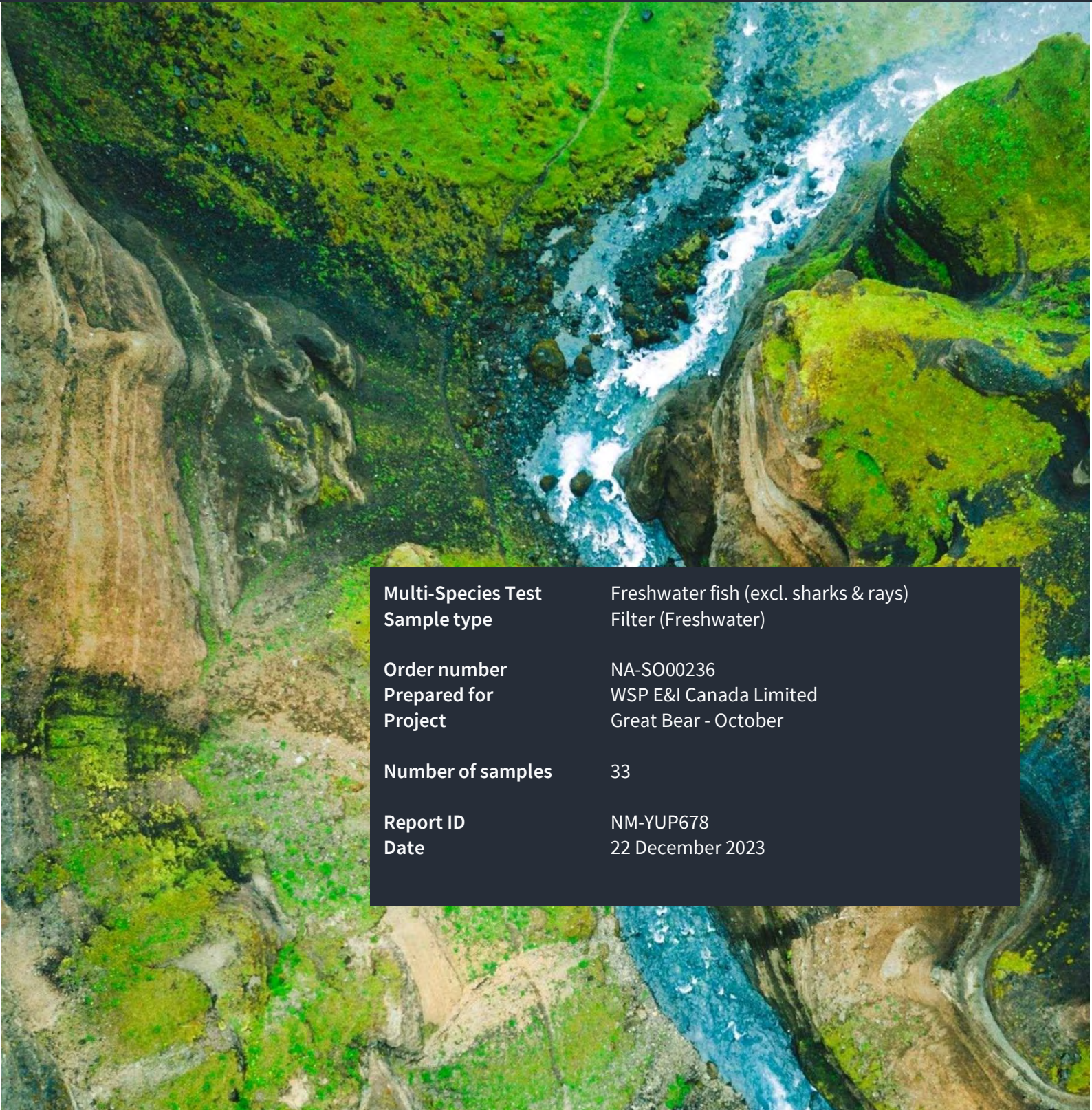
Contact: [Customer Support Helpdesk](https://www.naturemetrics.com/contact)
www.naturemetrics.com/contact





Environmental DNA Report

Freshwater fish (excl. sharks & rays)



Multi-Species Test	Freshwater fish (excl. sharks & rays)
Sample type	Filter (Freshwater)
Order number	NA-SO00236
Prepared for Project	WSP E&I Canada Limited Great Bear - October
Number of samples	33
Report ID	NM-YUP678
Date	22 December 2023



Thank you for choosing NatureMetrics

Your Nature Intelligence Partner

Welcome to your report

Your report consists of:

This document: Providing you with our world class insights and metrics.

Data Tables: Accompanying spreadsheet with results at the individual sample level: species detected, metrics and quality control: NM-YUP678.NA-SO00236.Fish.Results.xlsx

- Data Description
- Species Data Table: Percentages
- Species Data Table: Read Counts
- Metrics by Sample Table
- Quality Control Table

Throughout the report you'll see reference to 'OTU'. This stands for Operational Taxonomic Unit; an OTU is broadly equivalent to a species in most cases.

Executive Summary

Field Samples submitted:	33
Field Samples reported:	32
Field Blanks submitted:	3
Species Richness:	34
Average Species Richness per sample:	12
Total number of IUCN Red List Species:	0
Total number of Invasive Species:	2

Reported samples are those that passed Quality Control and are included in the Species Data Table

Please be careful when sharing this report, it contains biodiversity information that may be sensitive, particularly with respect to endangered or protected species. Please share responsibly. If the report is shared, we kindly ask that the report is shared in its entirety - to limit the possibility of any information being taken out of context.

New to our reports? Our [Report Interpretation Guide](#) is here to help:
www.naturemetrics.co.uk/report-interpretation-guide

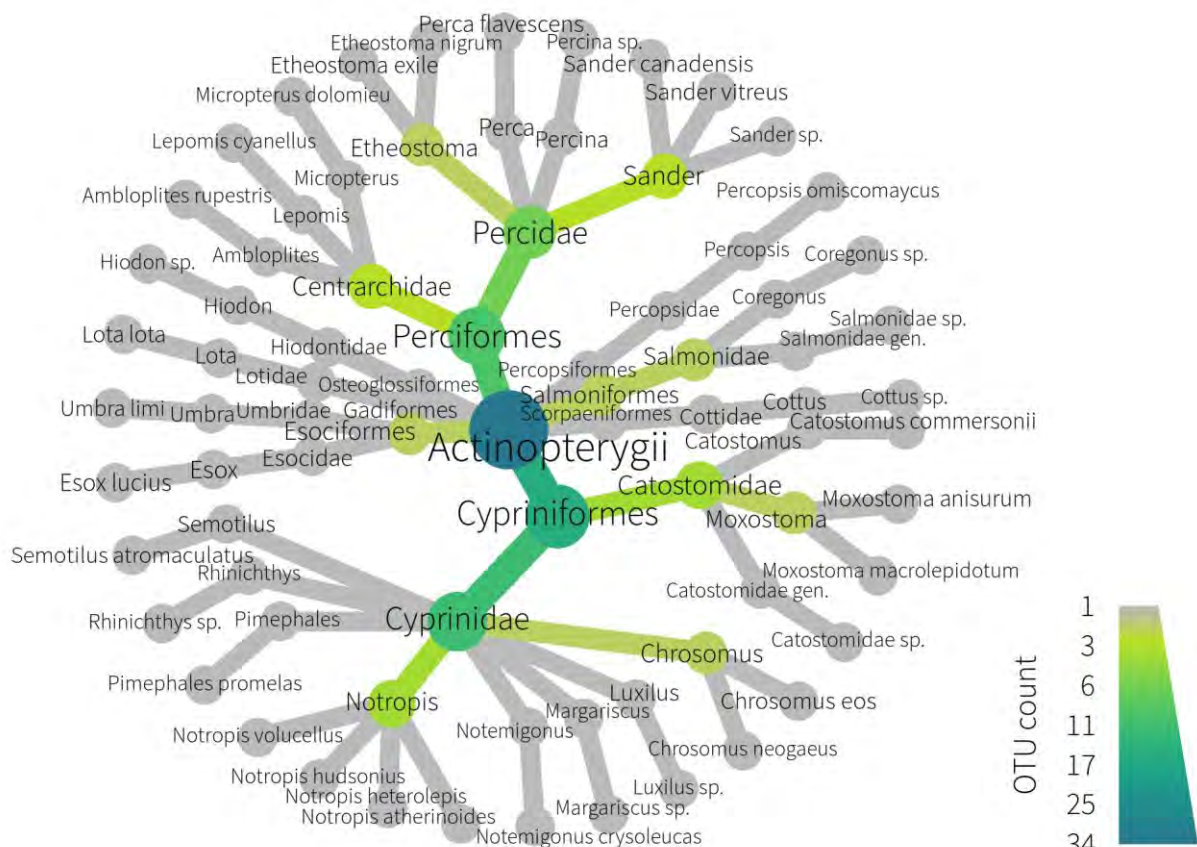
Something exciting or unexpected that you'd like to discuss further, our team of experts are looking forward to speaking with you: www.naturemetrics.com/contact



REPORT

Taxonomic Composition

This chart provides a view of the species detected in your samples and their taxonomic relationship, (names on the same branch are more similar than those on different branches). The chart is structured with the highest taxonomic rank at the centre (e.g., kingdom, phylum, class), moving through the ranks of order, family, genus, species as you move to the outer edge. Note that the centre and outer ranks will change depending on the **test** applied and the number of species detected. The legend in the bottom right of the chart indicates how to relate the colour in the branches to the number of species. The colour scale goes from grey - indicating very few species, to blue - indicating a lot of species.





Taxonomic Resolution

This table provides the number of **OTUs** detected and the percentage of OTUs identified to each taxonomic level.

Depending on completeness of **reference databases** for the region where you sampled, some OTUs may not match to a reference at species level. Global DNA reference databases contain millions of barcodes, but gaps remain, particularly in regions and taxonomic groups that are more diverse and less studied. Coverage is expected to improve over time and data tables can be updated to include new information at a future date.

Number of OTUs	Phylum	Class	Order	Family	Genus	Species
34	100%	100%	100%	100%	94.12%	70.59%

Want to increase the number of species named to species level? If you have specimens of species you have identified, we can sequence the DNA and add the species to our reference databases. We will then be able to enhance the reference library and report if the species is detected. Please contact us about this service and we can send you our barcoding kits, but note that we only offer these kits for fish and amphibians.

IUCN Red List Species

These are the IUCN (International Union for Conservation of Nature) Red List species detected in your samples. These are detected species that are designated as one of the IUCN Red List Threatened Categories (Vulnerable, Endangered and Critically Endangered). An increase in the number of threatened species is generally associated with a positive trend in **biodiversity** or habitat condition.

No species designated Vulnerable, Endangered or Critically Endangered were detected in the samples.

The Data Tables contain further information for all species, including their designations as Least Concern or Near Threatened status.



Invasive Species

These are the **Invasive species** detected in your samples. These species are invasive according to the Global Register of Introduced and Invasive Species (GRIIS) in the country where sampling occurred. GRIIS is an IUCN Invasive Species Specialist Group initiative. The Convention on Biological Diversity defines an invasive species as one whose introduction and/or spread threatens biological diversity. An increase in the number of invasive species is generally associated with enhanced pressures at your site and reduced resilience of the native community. Please note: this label is only available for animals; and GRIIS lists marine species as invasive for a country, even if the species is known to be invasive in only one marine area bordering the country.

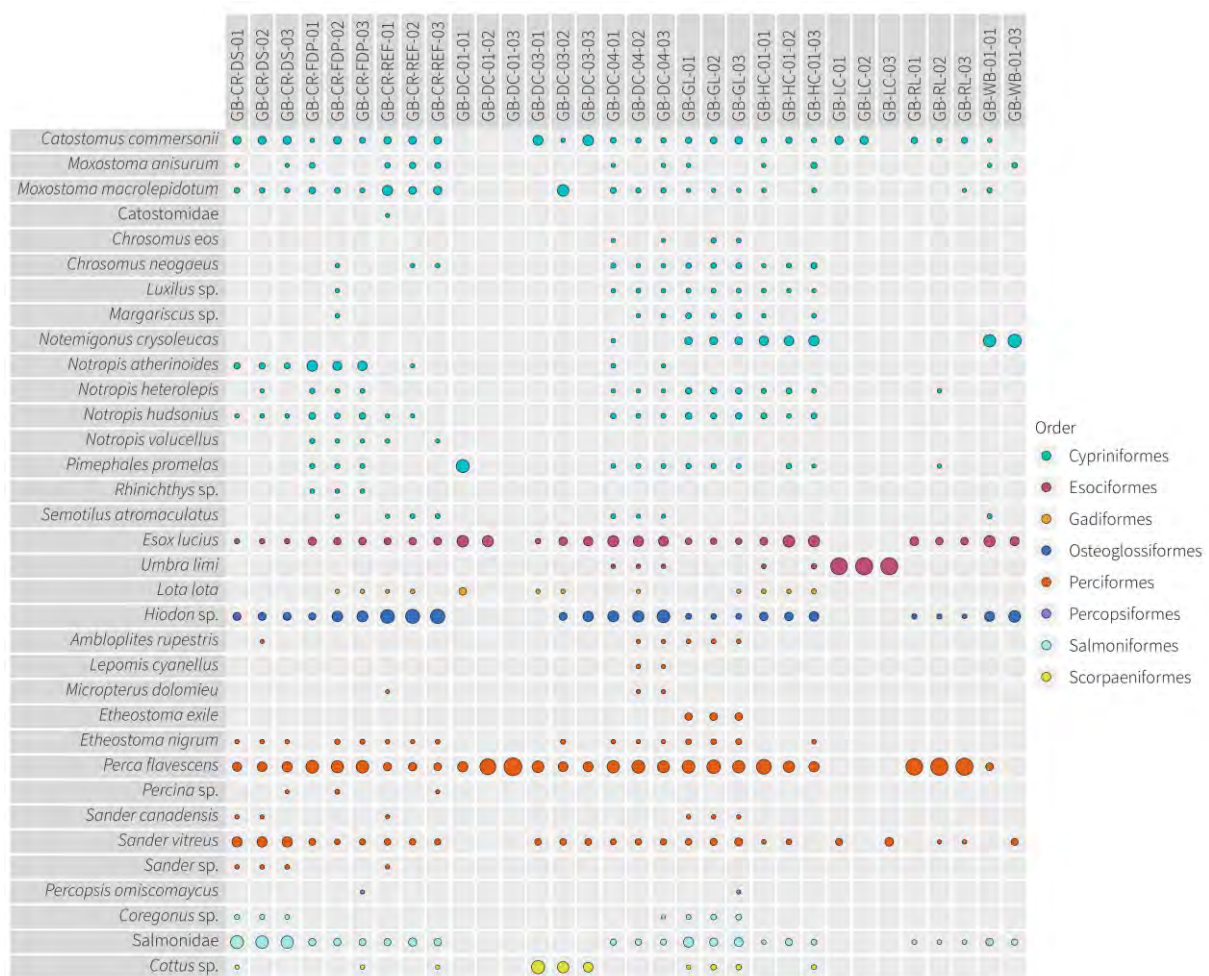
Species	Common name
<i>Esox lucius</i>	Northern Pike
<i>Micropterus dolomieu</i>	Smallmouth Bass
Number of species	2



Community Composition

This chart lists the species found in each sample. The presence of a bubble means a species was detected in that sample. The chart displays at species level, unless the number of species detected is too great to display clearly in the document. In these cases, the chart displays at a higher taxonomic level. The full species level chart is provided as an appendix.

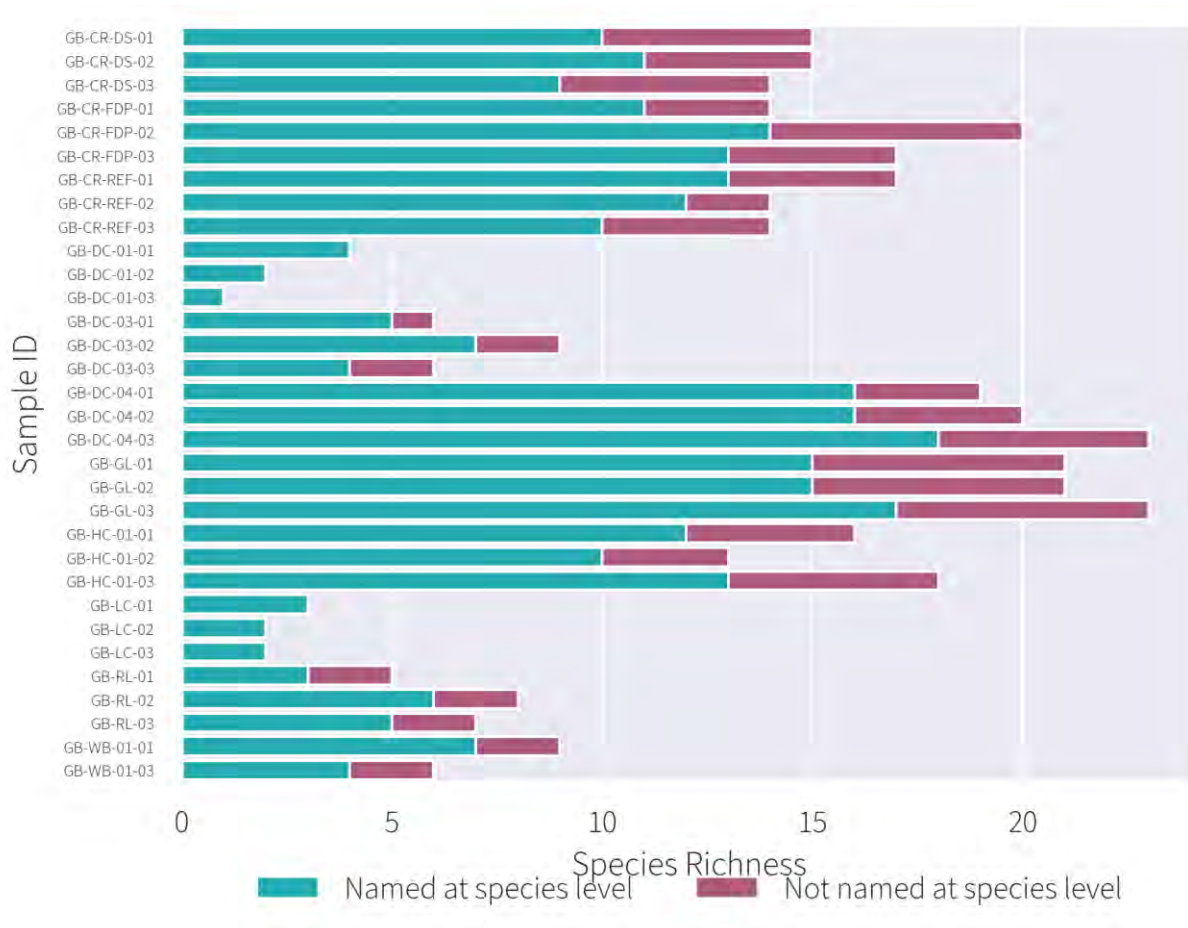
The size of the bubbles represents the proportion of **DNA sequences** within a sample. A larger bubble size can indicate a stronger **eDNA** signal. This signal may be linked to abundance of species in the environment but should be interpreted only as a coarse measure because the signal is also impacted by biological (e.g., biomass, life stage, activity, body condition), environmental (e.g., temperature, pH, salinity, conductivity), and technical factors (e.g., **primer bias**, **PCR** stochasticity).





Species Richness

This is the total count of OTUs detected in each sample. The blue portion of each bar indicates the number of OTUs identified to a species.

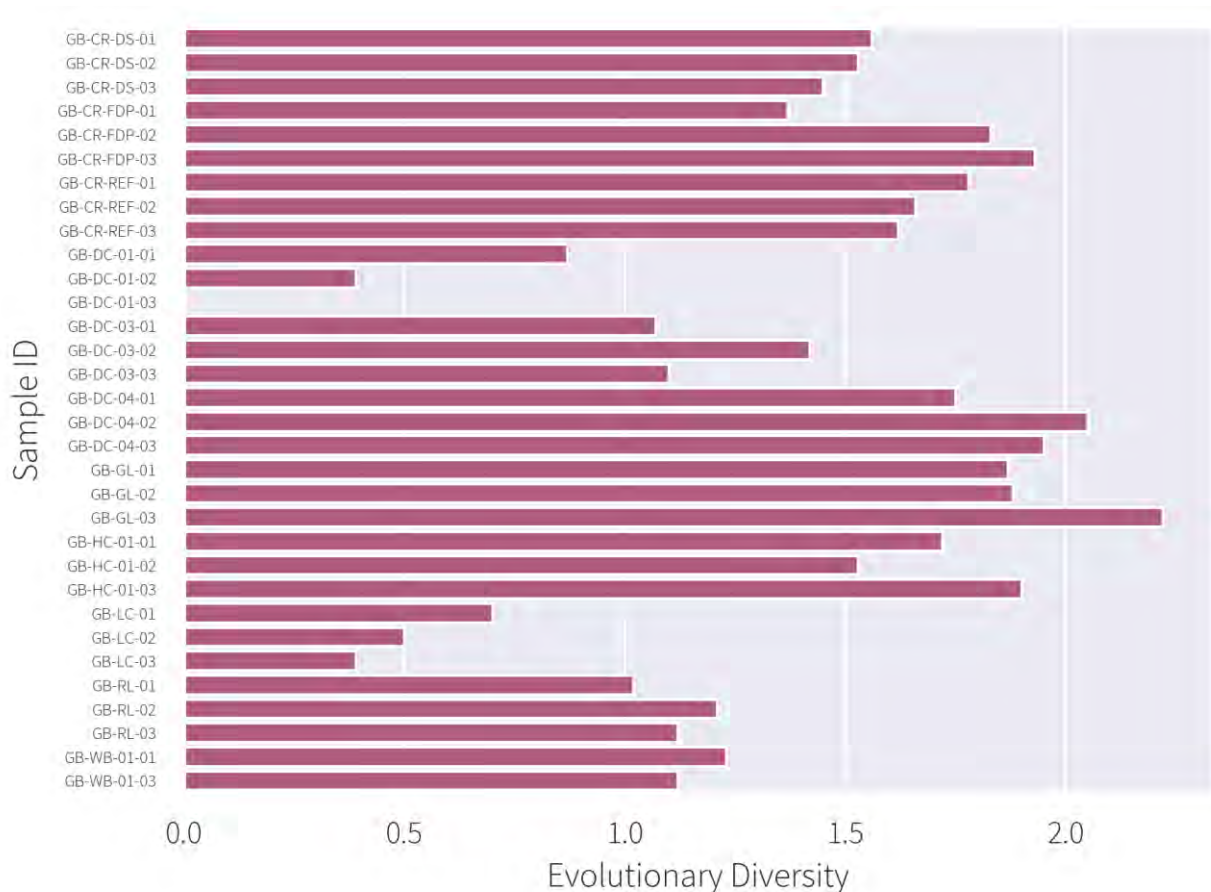


High Species Richness generally indicates a healthier and functioning ecosystem and is the simplest biodiversity metric that is consistently reported in biodiversity monitoring.



Evolutionary Diversity

Evolutionary Diversity calculated for each sample. This is a measure of the variety of species types that occurred in your samples.



Evolutionary Diversity is a strong complementary indicator of biodiversity progress alongside Species Richness. Increasing Evolutionary Diversity can indicate an increasing resilience of the community.

Looking for something more?

We also offer comparative reporting. This includes statistical comparison of metrics and communities according to categories that you define. For instance, these might include waterbody, Site, Management Regime, or anything else that is a focus of your project. Please contact us for further details.

END OF REPORT

Contact: [Customer Support Helpdesk](#)
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Nature Metrics Ltd
www.naturemetrics.com

Broad-scale Fisheries Monitoring Bulletin

GULLROCK LAKE - FMZ 4 - 2018-2023

Gullrock Lake facts

Location: BYSHE
Surface area: 6867 hectares
Maximum depth: 16.0 metres
Average depth: 7.6 metres
Water clarity: 2.3 metres

Monitoring activities

Fish netting - yes
Fish contaminants - yes
Zooplankton - yes
Water chemistry - yes
Bathymetry - no
Water temperature/dissolved oxygen - yes
Aquatic invasive species - yes

Netting summary

Netting period(s): August 9 to August 11 2019
Number of net sets: 45
Number of fish species caught: 14



Figure 1. Map of Ontario with FMZ 4 highlighted

About Broad-scale Fisheries Monitoring

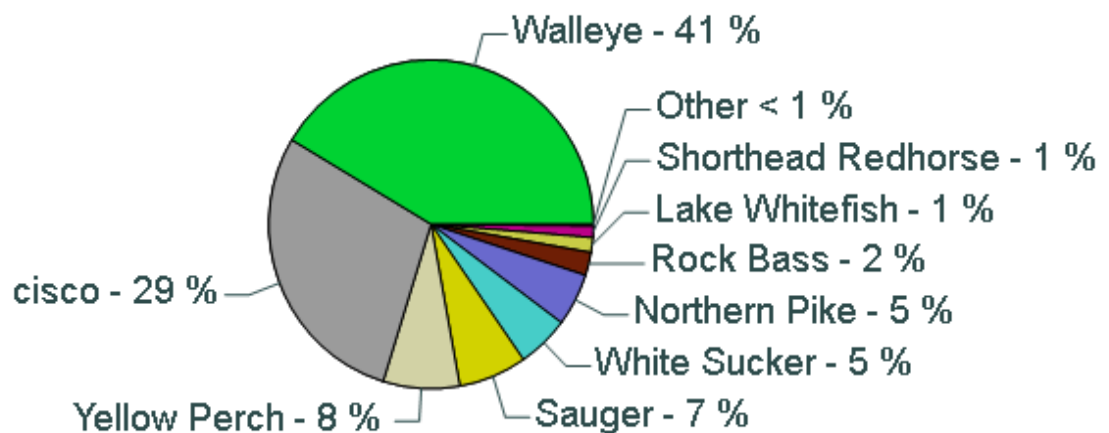
The Broad-scale Fisheries Monitoring program collects information from representative lakes in fisheries management zones across the province to help biologists manage our fisheries effectively. This bulletin provides a snapshot of recent monitoring activities and netting results. The sampling approach allows us to measure and evaluate the health of Ontario's lakes and their fish communities, and track changes through time over broad areas of Ontario. To learn more about the sampling program visit [Methods for monitoring fish populations](#).

Fish netting results

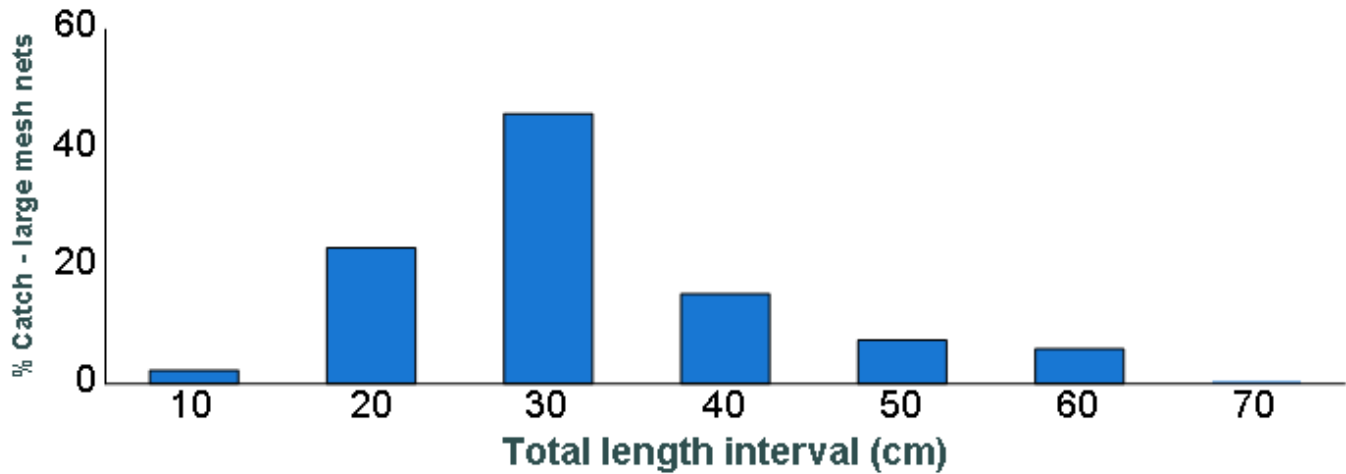
Fish populations were surveyed using large and small mesh nets to provide information on fish species present and their characteristics, such as growth, age, and abundance. The catch data (depicted in the chart below) show that 10 species were surveyed in large mesh nets. Additional fish species observed in small mesh nets were Emerald Shiner, Rainbow Smelt, Spottail Shiner, and Trout-perch.

Fish species	Total catch %	Maximum length (cm)	Minimum length (cm)	Average length (cm)
Walleye	41	70.4	18.4	37.3
cisco	29	36.0	15.8	27.8
Yellow Perch	8	28.4	14.1	21.1
Sauger	7	35.7	18.2	29.8
White Sucker	5	58.4	34.4	44.3
Northern Pike	5	100.2	40.0	62.8
Rock Bass	2	25.6	13.6	20.4
Lake Whitefish	1	54.9	32.6	45.5
Shorthead Redhorse	1	52.8	39.8	47.9
Burbot	< 1	56.2	56.2	56.2

Proportion of fish caught in large mesh nets

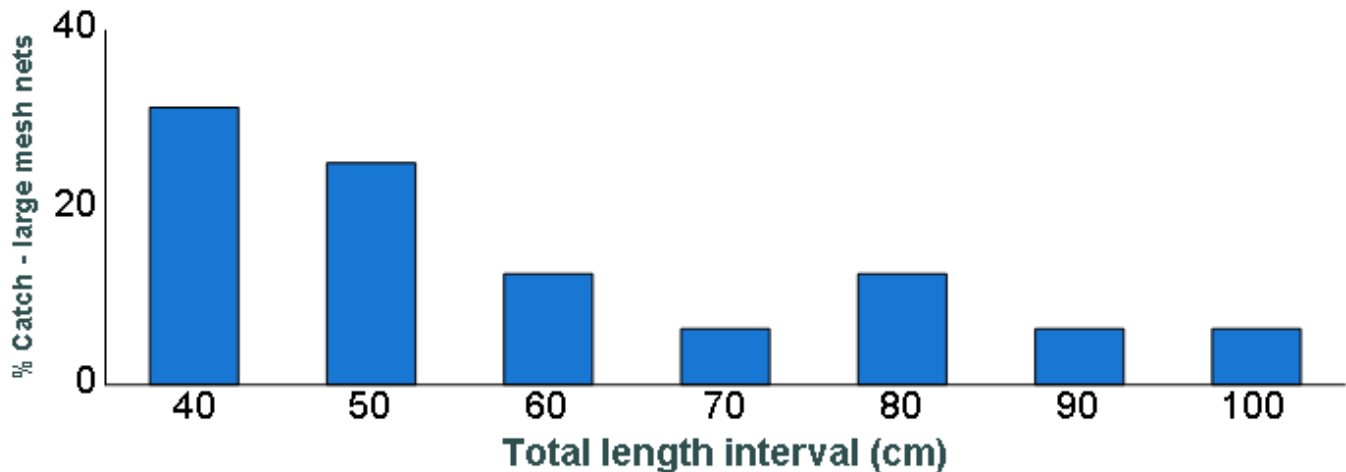


Length distribution of Walleye



Catch results are presented in 10-cm length intervals, labelled with the lower limit (e.g., the "20 cm" interval represents fish between 20 cm and 29 cm). The size of Walleye ranged from 18 to 70 cm.

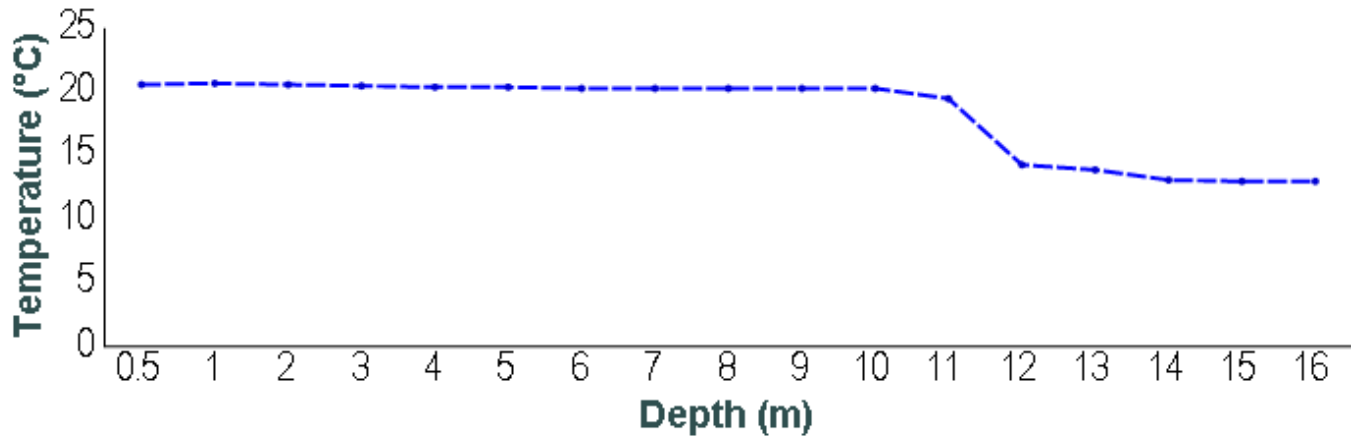
Length distribution of Northern Pike



Catch results are presented in 10-cm length intervals, labelled with the lower limit (e.g., the "20 cm" interval represents fish between 20 cm and 29 cm). The size of Northern Pike ranged from 40 to 100 cm.

Water chemistry and temperature

Water samples were collected in May 2019 and sent to the Ministry of Environment and Climate Change for analysis. Water temperature, oxygen levels, and water transparency were measured in August 2019. The graph shows the temperature of Gullrock Lake with increasing depth. The temperature at the surface was 20.6 degrees Celsius and declined to 13.0 degrees Celsius at the bottom of the lake.



Aquatic invasive species

Field crews searched for aquatic invasive species and spiny water flea were observed during monitoring. Zooplankton samples are being processed to determine if any new invasive species are present. Any species new to Ontario or an invasive species that is a new record for a waterbody is reported to the Invading Species Hotline (www.invadingspecies.com).

Fish contaminants

Levels of contaminants in fish flesh (e.g., mercury, PCB's, mirex, organochlorine pesticides, and other organic chemicals) will be reported in: [The Guide to Eating Ontario Sport Fish](#).

We are committed to providing [accessible customer service](#). For alternate formats, communications supports, or more information, please contact the Ministry of Natural Resources and Forestry at 1-800-667-1940 (TTY phone number: 1-866-686-6072), send an email to mnr.nric.mnr@ontario.ca, or visit ontario.ca/fishing.

ontario.ca/fishing

Broad-scale Fisheries Monitoring Bulletin

PAKWASH LAKE - FMZ 4 - 2008-2012

Pakwash Lake facts

Location: District of Kenora
Surface area: 8638 hectares
Maximum depth: 17.4 metres
Average depth: 6.8 metres
Water clarity: 1.7 metres



Figure 1. Outline of Pakwash Lake

Monitoring activities

Fish netting - yes
Fish contaminants - yes
Zooplankton - yes
Water chemistry - yes
Bathymetry - no
Water temperature/dissolved oxygen - yes
Aquatic invasive species - yes



Figure 2. Map of Ontario with FMZ 4 highlighted

Netting summary

Netting period(s): June 15 to June 18 2009
Number of net sets: 34
Number of fish species caught: 14

About Broad-scale Fisheries Monitoring

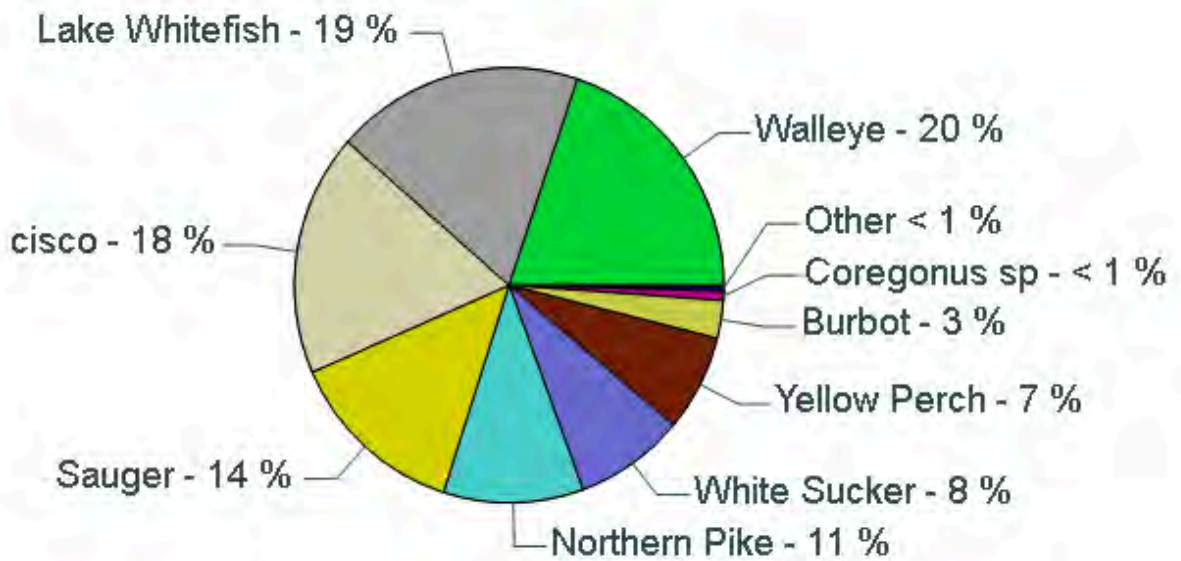
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Fish netting results

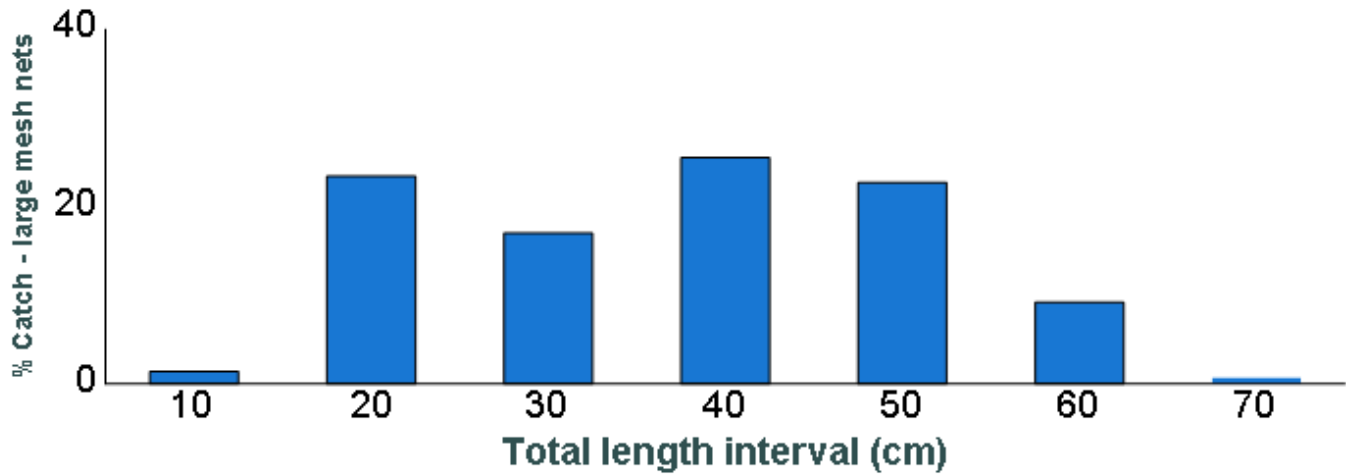
Fish populations were surveyed using large and small mesh nets to provide information on fish species present and their characteristics, such as growth, age, and abundance. The catch data (depicted in the chart below) show that 10 species were surveyed in large mesh nets. Additional fish species observed in small mesh nets were carps and minnows, Common Shiner, Spottail Shiner, and Trout-perch.

Fish species	Total catch %	Maximum length (cm)	Minimum length (cm)	Average length (cm)
Walleye	20	71.1	18.9	42.5
Lake Whitefish	19	52.0	19.4	40.9
cisco	18	41.1	19.1	28.0
Sauger	14	38.5	19.3	28.5
Northern Pike	11	111.0	23.3	62.9
White Sucker	8	56.9	16.5	45.6
Yellow Perch	7	29.5	14.0	21.0
Burbot	3	71.9	40.4	59.5
Coregonus sp	< 1	38.5	33.7	36.4
Rock Bass	< 1	23.5	20.0	21.7

Proportion of fish caught in large mesh nets

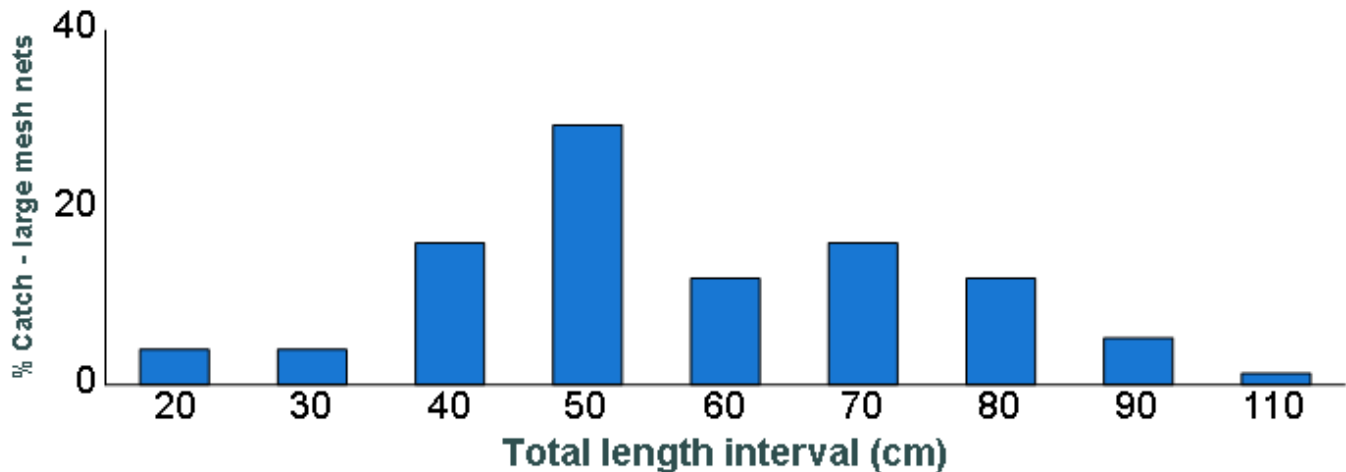


Length distribution of Walleye



Catch results are presented in 10-cm length intervals, labelled with the lower limit (e.g., the "20 cm" interval represents fish between 20 cm and 29 cm). The size of Walleye ranged from 18 to 71 cm.

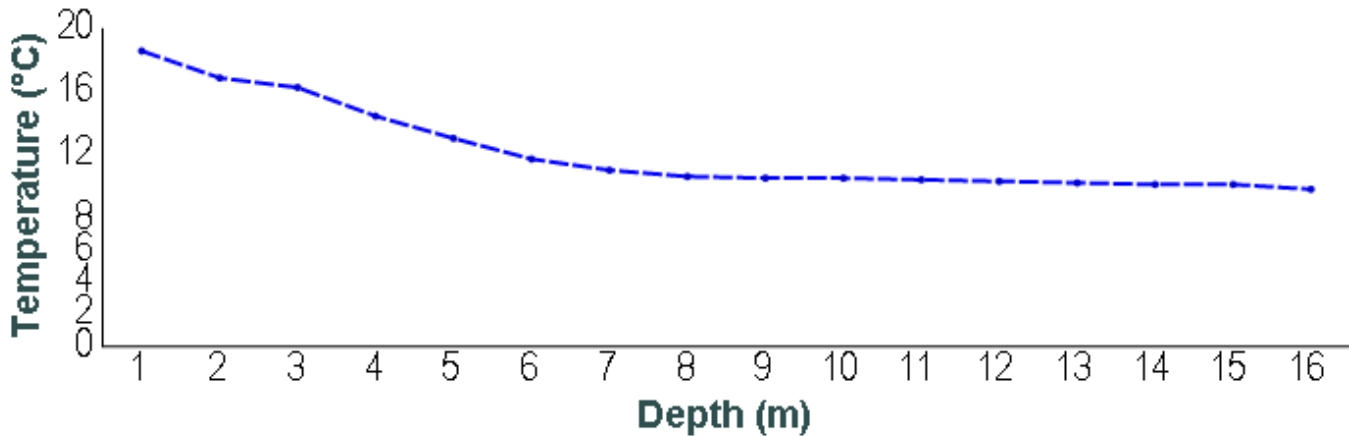
Length distribution of Northern Pike



Catch results are presented in 10-cm length intervals, labelled with the lower limit (e.g., the "20 cm" interval represents fish between 20 cm and 29 cm). The size of Northern Pike ranged from 23 to 111 cm.

Water chemistry and temperature

Water samples were collected in May 2009 and sent to the Ministry of Environment and Climate Change for analysis. Water temperature, oxygen levels, and water transparency were measured in June 2009. The graph shows the temperature of Pakwash Lake with increasing depth. The temperature at the surface was 18.6 degrees Celsius and declined to 9.9 degrees Celsius at the bottom of the lake.



Aquatic invasive species

Field crews searched for aquatic invasive species. Zooplankton samples are being processed to determine if any new invasive species are present. Any species new to Ontario or an invasive species that is a new record for a waterbody is reported to the Invading Species Hotline (www.invadingspecies.com).

Fish contaminants

Levels of contaminants in fish flesh (e.g., mercury, PCB's, mirex, organochlorine pesticides, and other organic chemicals) will be reported in:

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ontario.ca/fishing

Broad-scale Fisheries Monitoring Bulletin

PAKWASH LAKE - FMZ 4 - 2013-2017

Pakwash Lake facts

Location: District of Kenora
Surface area: 8638 hectares
Maximum depth: 17.4 metres
Average depth: 6.8 metres
Water clarity: 1.3 metres



Monitoring activities

Fish netting - yes
Fish contaminants - yes
Zooplankton - yes
Water chemistry - yes
Bathymetry - no
Water temperature/dissolved oxygen - yes
Aquatic invasive species - yes

Figure 1. Outline of Pakwash Lake

Netting summary

Netting period(s): August 9 to August 12 2014
Number of net sets: 44
Number of fish species caught: 18



Figure 2. Map of Ontario with FMZ 4 highlighted

About Broad-scale Fisheries Monitoring

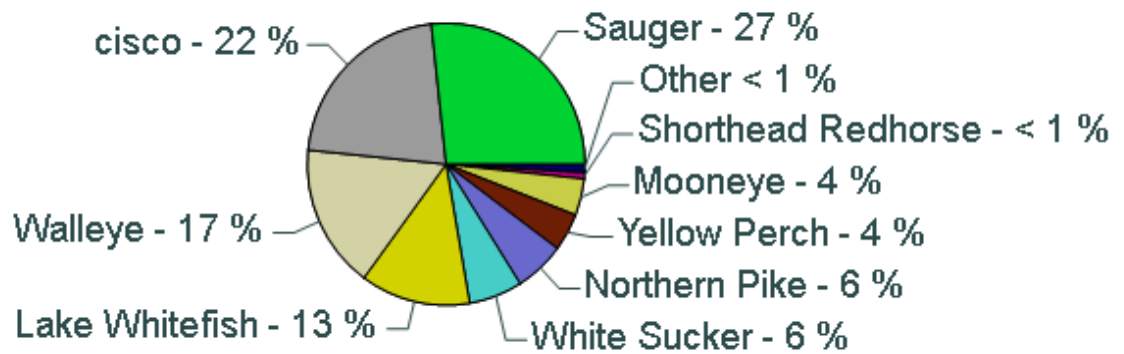
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Fish netting results

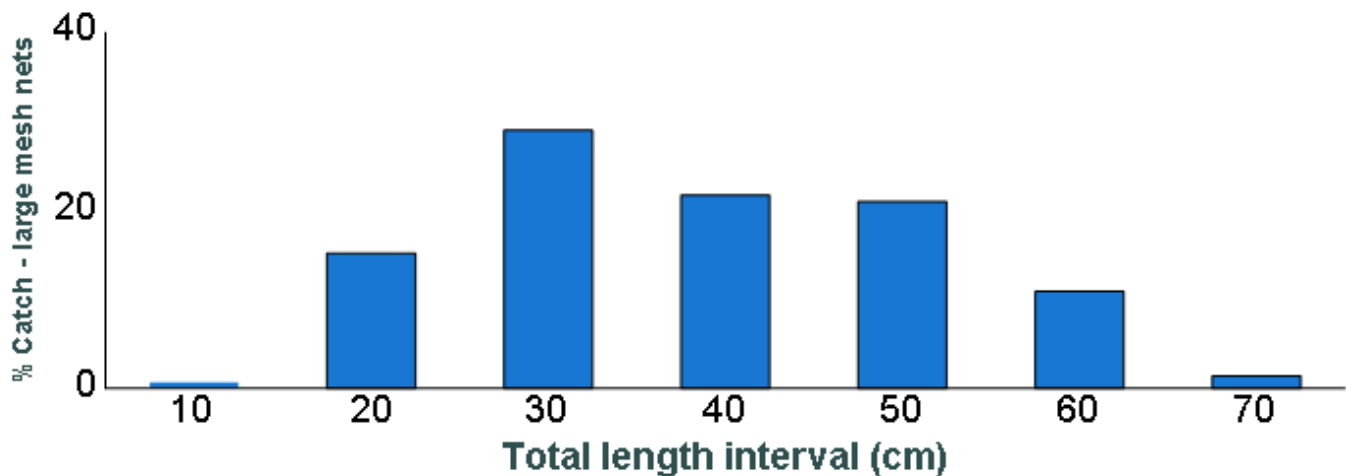
Fish populations were surveyed using large and small mesh nets to provide information on fish species present and their characteristics, such as growth, age, and abundance. The catch data (depicted in the chart below) show that 13 species were surveyed in large mesh nets. Additional fish species observed in small mesh nets were Emerald Shiner, Mimic Shiner, Rainbow Smelt, Spottail Shiner, and Trout-perch.

Fish species	Total catch %	Maximum length (cm)	Minimum length (cm)	Average length (cm)
Sauger	27	39.1	19.2	29.6
cisco	22	38.7	17.8	26.9
Walleye	17	73.5	18.3	42.6
Lake Whitefish	13	51.6	17.9	39.4
White Sucker	6	54.6	29.8	43.3
Northern Pike	6	94.5	34.4	61.5
Yellow Perch	4	29.4	14.1	19.3
Mooneye	4	40.7	33.4	36.9
Shorthead Redhorse	< 1	45.8	28.8	38.8
Silver Redhorse	< 1	52.2	32.5	43.5
Smallmouth Bass	< 1	43.3	34.4	38.9
Burbot	< 1	64.9	60.8	62.9
Rock Bass	< 1	18.5	18.5	18.5

Proportion of fish caught in large mesh nets

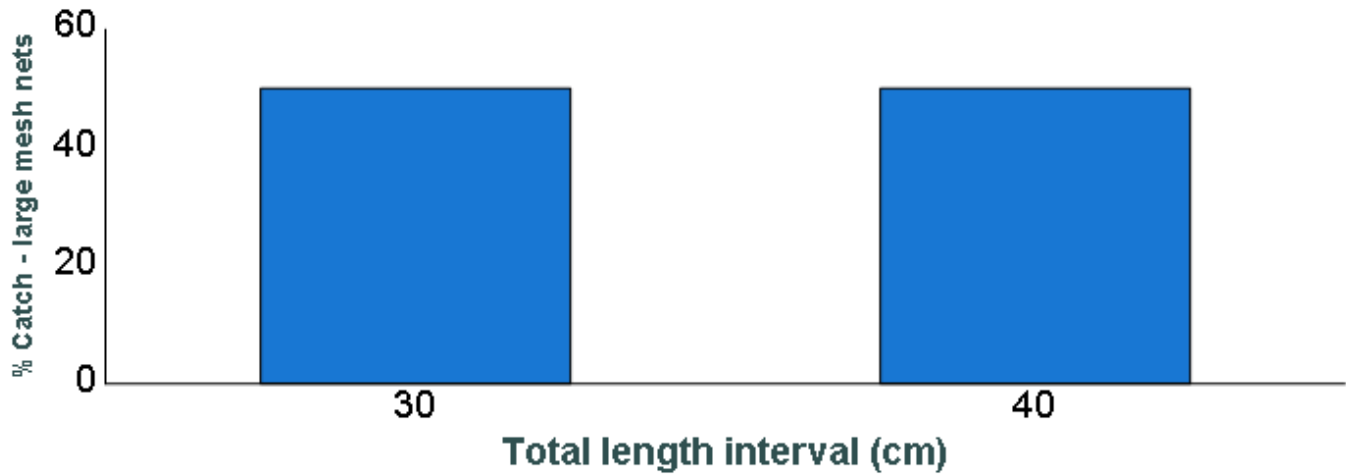


Length distribution of Walleye



Catch results are presented in 10-cm length intervals, labelled with the lower limit (e.g., the "20 cm" interval represents fish between 20 cm and 29 cm). The size of Walleye ranged from 18 to 73 cm.

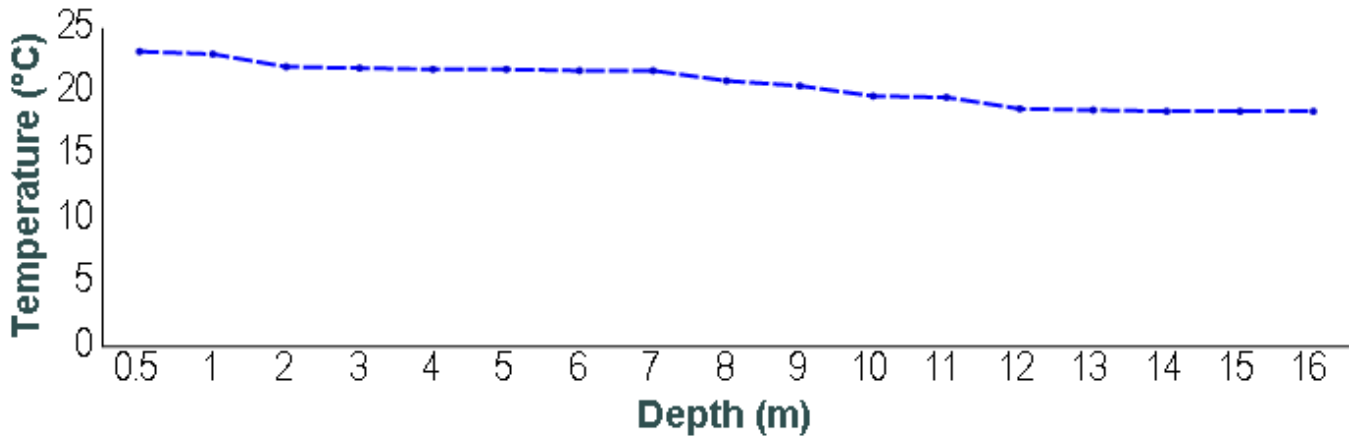
Length distribution of Smallmouth Bass



Catch results are presented in 10-cm length intervals, labelled with the lower limit (e.g., the "20 cm" interval represents fish between 20 cm and 29 cm). The size of Smallmouth Bass ranged from 34 to 43 cm.

Water chemistry and temperature

Water samples were collected in May 2014 and sent to the Ministry of Environment and Climate Change for analysis. Water temperature, oxygen levels, and water transparency were measured in August 2014. The graph shows the temperature of Pakwash Lake with increasing depth. The temperature at the surface was 23.2 degrees Celsius and declined to 18.5 degrees Celsius at the bottom of the lake.



Aquatic invasive species

Field crews searched for aquatic invasive species and rainbow smelt were observed during monitoring. Zooplankton samples are being processed to determine if any new invasive species are present. Any species new to Ontario or an invasive species that is a new record for a waterbody is reported to the Invading Species Hotline (www.invadingspecies.com).

Fish contaminants

Levels of contaminants in fish flesh (e.g., mercury, PCB's, mirex, organochlorine pesticides, and other organic chemicals) will be reported in: [The Guide to Eating Ontario Sport Fish](#).

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ontario.ca/fishing

Broad-scale Fisheries Monitoring Bulletin

PAKWASH LAKE - FMZ 4 - 2018-2023

Pakwash Lake facts

Location: District of Kenora
Surface area: 8638 hectares
Maximum depth: 17.4 metres
Average depth: 6.8 metres
Water clarity: 2.3 metres



Figure 1. Outline of Pakwash Lake

Monitoring activities

Fish netting - yes
Fish contaminants - yes
Zooplankton - yes
Water chemistry - yes
Bathymetry - no
Water temperature/dissolved oxygen - yes
Aquatic invasive species - yes



Figure 2. Map of Ontario with FMZ 4 highlighted

Netting summary

Netting period(s): June 21 to June 23 2019
Number of net sets: 45
Number of fish species caught: 16

About Broad-scale Fisheries Monitoring

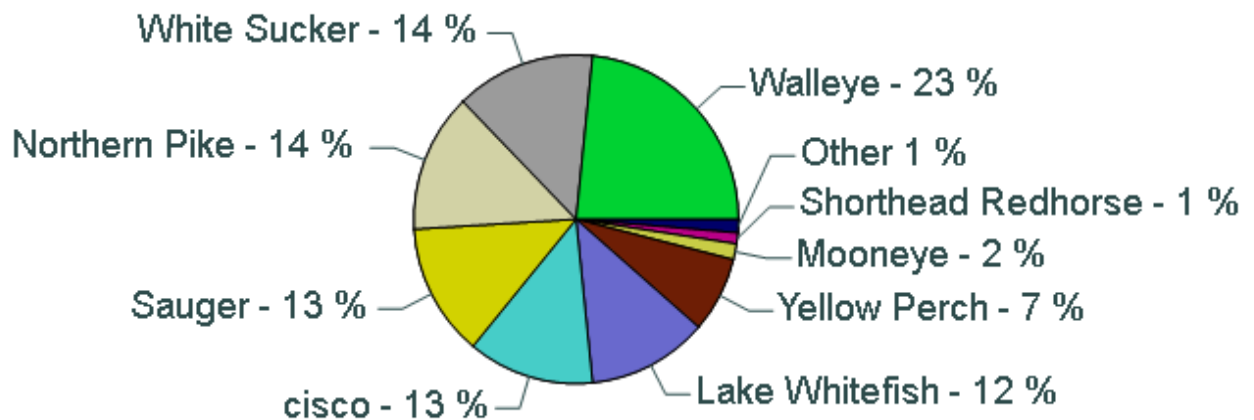
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Fish netting results

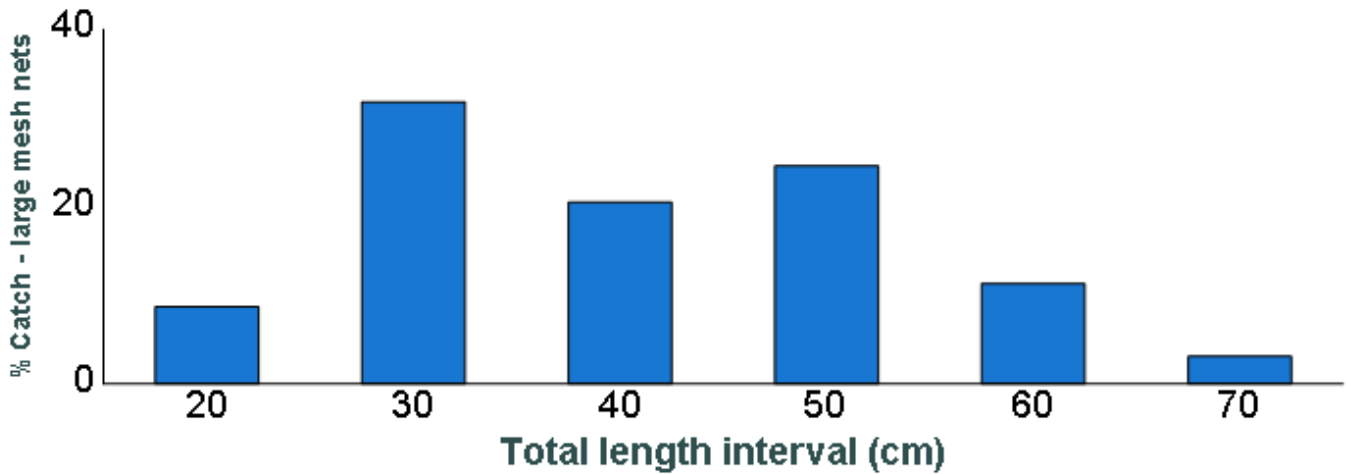
Fish populations were surveyed using large and small mesh nets to provide information on fish species present and their characteristics, such as growth, age, and abundance. The catch data (depicted in the chart below) show that 12 species were surveyed in large mesh nets. Additional fish species observed in small mesh nets were Emerald Shiner, Logperch, Spottail Shiner, and Trout-perch.

Fish species	Total catch %	Maximum length (cm)	Minimum length (cm)	Average length (cm)
Walleye	23	79.3	21.4	45.7
White Sucker	14	57.4	27.1	43.2
Northern Pike	14	104.3	37.4	68.3
Sauger	13	41.0	20.7	30.0
cisco	13	45.3	22.5	32.0
Lake Whitefish	12	53.0	18.8	41.8
Yellow Perch	7	30.4	13.1	22.9
Mooneye	2	39.4	29.5	36.6
Shorthead Redhorse	1	60.9	42.0	49.5
Burbot	< 1	68.1	49.2	58.5
Smallmouth Bass	< 1	44.8	38.9	41.6
Rock Bass	< 1	14.2	14.2	14.2

Proportion of fish caught in large mesh nets

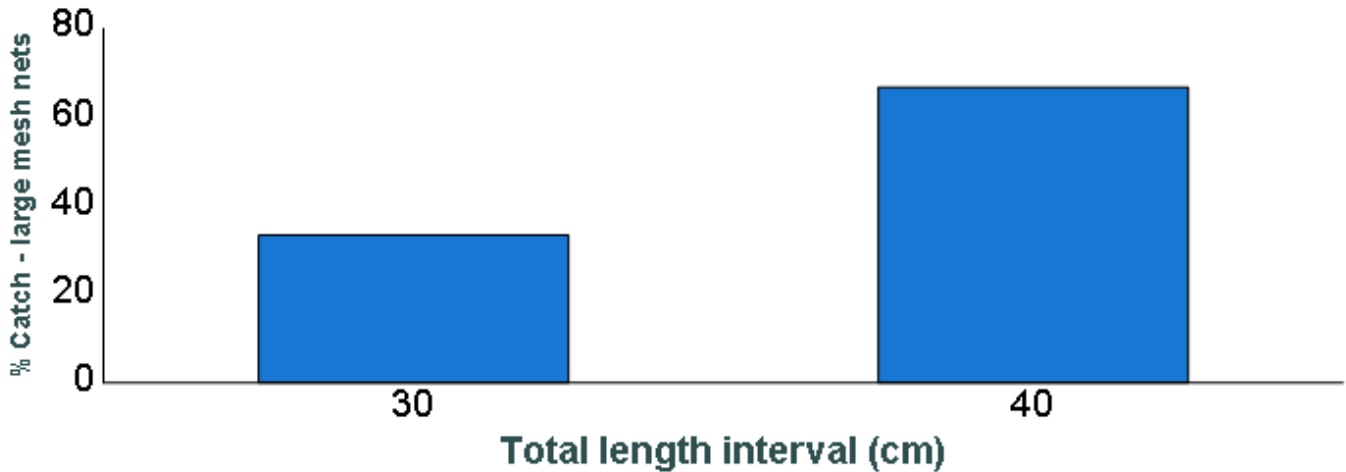


Length distribution of Walleye



Catch results are presented in 10-cm length intervals, labelled with the lower limit (e.g., the "20 cm" interval represents fish between 20 cm and 29 cm). The size of Walleye ranged from 21 to 79 cm.

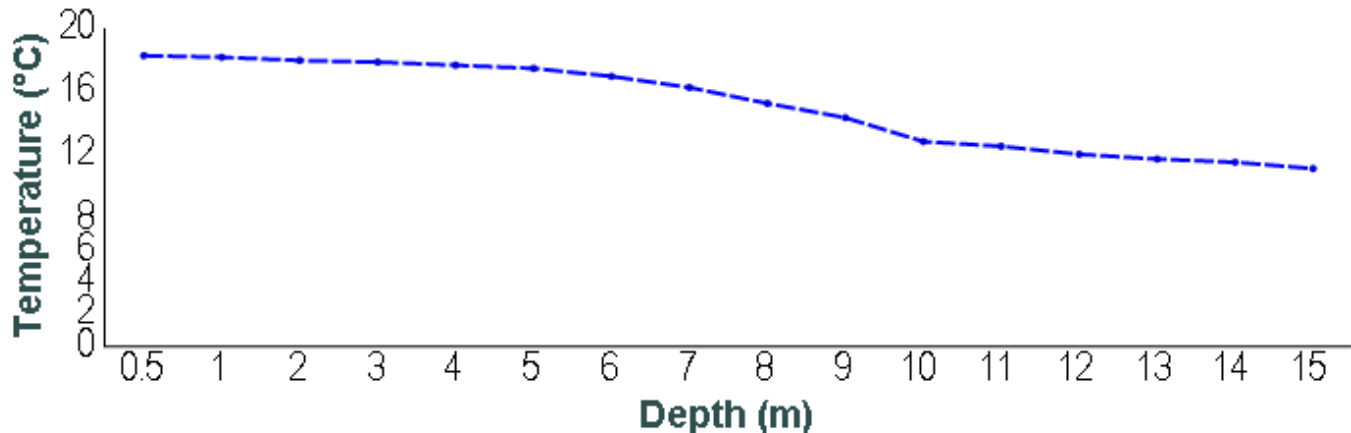
Length distribution of Smallmouth Bass



Catch results are presented in 10-cm length intervals, labelled with the lower limit (e.g., the "20 cm" interval represents fish between 20 cm and 29 cm). The size of Smallmouth Bass ranged from 38 to 44 cm.

Water chemistry and temperature

Water samples were collected in May 2019 and sent to the Ministry of Environment and Climate Change for analysis. Water temperature, oxygen levels, and water transparency were measured in June 2019. The graph shows the temperature of Pakwash Lake with increasing depth. The temperature at the surface was 18.3 degrees Celsius and declined to 11.2 degrees Celsius at the bottom of the lake.



Aquatic invasive species

Field crews searched for aquatic invasive species. Zooplankton samples are being processed to determine if any new invasive species are present. Any species new to Ontario or an invasive species that is a new record for a waterbody is reported to the Invading Species Hotline (www.invadingspecies.com).

Fish contaminants

Levels of contaminants in fish flesh (e.g., mercury, PCB's, mirex, organochlorine pesticides, and other organic chemicals) will be reported in:

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ontario.ca/fishing

Appendix C

Fish Tissue Data

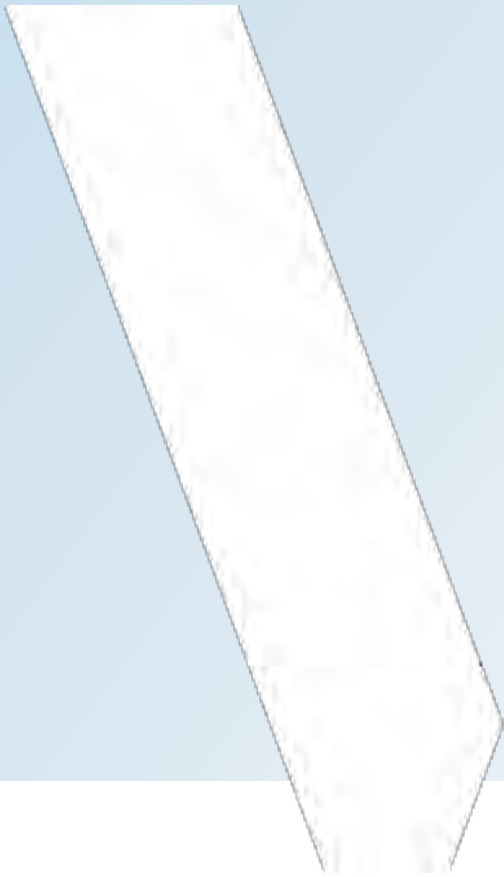




Table C1-1: 2022 Large-bodied, Skinless, Boneless Dorsal Muscle Fillet Data

Waterbody	Species	Sample ID	Total Length (cm)	Total Weight (g)	Aluminium (Al)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwf	Zinc (Zn)
Dixie Creek	Northern Pike	DC03-GN3-F1-NRPK	350	210	32.20	0.082	0.001	0.080	0.178	41.50	0.014	0.887	0.402	0.207	0.050	0.126	0.692	3.400
		DC04-GN1-F1-NRPK	595	1,070	8.10	0.109	0.001	0.029	0.149	10.60	0.006	0.350	0.210	0.118	0.040	0.090	0.469	4.810
		DC04-GN1-F2-NRPK	535	810	5.28	0.112	0.001	0.021	0.157	7.28	0.010	0.906	0.301	0.144	0.040	0.118	0.638	4.600
		DC04-GN1-F3-NRPK	512	750	3.12	0.200	0.001	0.017	0.140	5.06	0.004	0.628	0.278	0.102	0.040	0.124	0.599	4.070
		DC04-GN2-F4-NRPK	643	1,680	1.93	0.150	0.001	0.010	0.127	2.58	0.004	0.448	0.482	0.206	0.040	0.116	0.560	4.120
		DC04-GN2-F5-NRPK	268	120	8.53	0.106	0.001	0.024	0.181	10.60	0.010	1.180	0.277	0.139	0.040	0.107	0.566	4.400
		DC04-GN3-F6-NRPK	468	590	0.94	0.093	0.001	0.010	0.152	2.24	0.004	0.950	0.390	0.214	0.040	0.119	0.607	3.910
		DC04-GN3-F7-NRPK	360	230	4.77	0.099	0.001	0.023	0.159	6.10	0.006	0.676	0.396	0.468	0.040	0.138	0.742	3.740
		DC04-GN3-F8-NRPK	359	270	2.69	0.111	0.001	0.010	0.161	4.30	0.004	1.150	0.295	0.331	0.040	0.124	0.629	4.000
		DC04-GN4-F9-NRPK	410	440	2.69	0.101	0.001	0.010	0.158	4.30	0.004	0.402	0.306	0.393	0.040	0.132	0.663	3.540
		DC04-GN4-F10-NRPK	335	210	1.85	0.092	0.001	0.010	0.153	3.08	0.004	1.040	0.367	0.524	0.040	0.131	0.689	3.700
		Mean	440	580	6.55	0.114	0.001	0.022	0.156	8.88	0.006	0.783	0.337	0.259	0.041	0.120	0.623	4.026
		Median	410	440	3.12	0.106	0.001	0.017	0.157	5.06	0.004	0.887	0.306	0.207	0.040	0.124	0.629	4.000
	Minimum	268	120	0.94	0.082	0.001	0.010	0.127	2.24	0.004	0.350	0.210	0.102	0.040	0.090	0.469	3.400	
	Maximum	643	1,680	32.20	0.200	0.001	0.080	0.181	41.50	0.014	1.180	0.482	0.524	0.050	0.138	0.742	4.810	
	Standard Error	36	143	2.67	0.010	0.000	0.006	0.005	0.005	3.38	0.001	0.090	0.023	0.044	0.001	0.004	0.023	0.132
	Standard Deviation	119	475	8.86	0.033	0.000	0.020	0.015	11.20	0.003	0.299	0.077	0.147	0.003	0.013	0.076	0.439	
	White Sucker	DC04-GN4-F11-WHSK	229	110	1.58	0.087	0.001	0.010	0.201	3.49	0.004	0.371	0.103	0.131	0.040	0.143	0.808	2.910
Lake Whitefish	CR-FDP-GN1-F2-LWF	420	1,180	0.75	0.079	0.001	0.010	0.206	4.56	0.004	0.156	0.064	0.080	0.040	0.313	1.505	3.110	
Northern Pike	CR-REF-GN1-F1-NRPK	440	410	1.60	0.444	0.001	0.010	0.163	3.40	0.004	0.396	0.204	0.154	0.040	0.165	0.833	5.050	
	CR-REF-GN2-F2-NRPK	475	509	0.40	0.247	0.001	0.010	0.159	2.60	0.004	1.450	0.172	0.145	0.040	0.155	0.764	4.550	
	CR-DS-GN1-F2-NRPK	583	1,100	0.41	0.093	0.001	0.010	0.144	1.64	0.004	0.181	0.320	0.397	0.040	0.162	0.802	3.590	
	CR-DS-GN1-F3-NRPK	440	460	0.40	0.150	0.001	0.010	0.157	1.30	0.004	1.030	0.226	0.309	0.040	0.152	0.791	4.150	
	CR-DS-GN2-F4-NRPK	420	440	0.83	0.321	0.001	0.010	0.126	2.32	0.004	0.411	0.200	0.259	0.040	0.163	0.760	3.960	
	Mean	472	584	0.73	0.251	0.001	0.010	0.150	2.25	0.004	0.694	0.224	0.253	0.040	0.159	0.790	4.260	
	Median	440	460	0.41	0.247	0.001	0.010	0.157	2.32	0.004	0.411	0.204	0.259	0.040	0.162	0.791	4.150	
Minimum	420	410	0.40	0.093	0.001	0.010	0.126	1.30	0.004	0.181	0.172	0.145	0.040	0.152	0.760	3.590		
Maximum	583	1,100	1.60	0.444	0.001	0.010	0.163	3.40	0.004	1.450	0.320	0.397	0.040	0.165	0.833	5.050		
Standard Error	29	130	0.23	0.062	0.000	0.000	0.007	0.37	0.000	0.236	0.025	0.048	0.000	0.003	0.013	0.251		
Standard Deviation	65	291	0.52	0.139	0.000	0.000	0.015	0.83	0.000	0.528	0.057	0.107	0.000	0.006	0.030	0.561		
Walleye	CR-REF-GN1-F3-WAL	435	600	0.46	0.214	0.001	0.010	0.159	2.03	0.004	0.075	0.431	0.220	0.040	0.215	1.024	3.620	
	CR-REF-GN2-F4-WAL	355	350	0.50	0.118	0.001	0.010	0.141	2.60	0.004	0.086	0.256	0.324	0.040	0.181	0.819	3.540	
	CR-DS-GN1-F1-WAL	616	2,190	0.80	0.097	0.001	0.010	0.117	1.91	0.004	0.102	0.504	0.525	0.040	0.240	1.127	3.510	
Mean	469	1,047	0.59	0.143	0.001	0.010	0.139	2.18	0.004	0.088	0.397	0.356	0.040	0.212	0.990	3.557		
Median	435	600	0.50	0.118	0.001	0.010	0.141	2.03	0.004	0.086	0.431	0.324	0.040	0.215	1.024	3.540		
Minimum	355	350	0.46	0.097	0.001	0.010	0.117	1.91	0.004	0.075	0.256	0.220	0.040	0.181	0.819	3.510		
Maximum	616	2,190	0.80	0.214	0.001	0.010	0.159	2.60	0.004	0.102	0.504	0.525	0.040	0.240	1.127	3.620		
Standard Error	77	576	0.11	0.036	0.000	0.000	0.012	0.21	0.000	0.008	0.074	0.090	0.000	0.017	0.090	0.033		
Standard Deviation	134	998	0.19	0.063	0.000	0.000	0.021	0.37	0.000	0.014	0.127	0.155	0.000	0.030	0.157	0.057		
White Sucker	CR-FDP-GN1-F1-WHSK	510	1,450	0.55	0.062	0.001	0.010	0.181	2.68	0.004	0.284	0.163	0.194	0.040	0.266	1.470	2.640	
	CR-DS-GN2-F5-WHSK	530	1,920	0.40	0.076	0.001	0.010	0.238	3.76	0.004	0.117	0.249	0.333	0.040	0.136	0.747	2.910	
	CR-DS-GN3-F6-WHSK	473	1,180	0.40	0.153	0.001	0.010	0.136	1.41	0.004	0.211	0.233	0.082	0.040	0.166	0.907	3.740	
	CR-DS-GN3-F7-WHSK	409	810	0.40	0.223	0.001	0.010	0.187	2.01	0.004	0.242	0.065	0.080	0.040	0.318	1.639	3.240	
	Mean	481	1,340	0.44	0.128	0.001	0.010	0.186	2.47	0.004	0.214	0.178	0.172	0.040	0.222	1.191	3.133	
Median	492	1,315	0.40	0.115	0.001	0.010	0.184	2.35	0.004	0.227	0.198	0.138	0.040	0.216	1.188	3.075		
Minimum	409	810	0.40	0.062	0.001	0.010	0.136	1.41	0.004	0.117	0.065	0.080	0.040	0.136	0.747	2.640		
Maximum	530	1,920	0.55	0.223	0.001	0.010	0.238	3.76	0.004	0.284	0.249	0.333	0.040	0.318	1.639	3.740		
Standard Error	27	234	0.04	0.037	0.000	0.000	0.021	0.50	0.000	0.035	0.042	0.060	0.000	0.043	0.215	0.237		
Standard Deviation	53	467	0.08	0.075	0.000	0.000	0.042	1.01	0.000	0.071	0.084	0.120	0.000	0.085	0.431	0.474		



Table C1-1: 2022 Large-bodied, Skinless, Boneless Dorsal Muscle Fillet Data

Waterbody	Species	Sample ID	Total Length (cm)	Total Weight (g)	Aluminium (Al)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwt	Zinc (Zn)	
Genessee Lake	Northern Pike	GL-GN1-F1-NRPK	545	880	1.01	0.114	0.001	0.012	0.145	6.12	0.013	0.344	0.255	0.305	0.040	0.182	0.847	5.720	
		GL-GN2-F1-NRPK	490	680	1.51	0.045	0.001	0.010	0.188	3.33	0.006	0.872	0.195	0.156	0.040	0.192	0.928	4.720	
		GL-GN2-F2-NRPK	415	360	0.40	0.019	0.001	0.010	0.064	0.85	0.004	0.177	0.065	0.064	0.040	0.072	0.344	2.030	
		GL-GN2-F3-NRPK	470	560	0.77	0.035	0.001	0.010	0.161	1.89	0.004	0.208	0.154	0.122	0.040	0.161	0.742	4.100	
		GL-GN2-F4-NRPK	450	480	0.57	0.041	0.001	0.010	0.171	2.50	0.004	0.151	0.161	0.129	0.040	0.170	0.846	4.320	
		GL-GN2-F5-NRPK	935	5,670	1.19	0.052	0.001	0.014	0.141	2.42	0.004	0.133	0.670	0.494	0.040	0.172	0.811	3.640	
		GL-GN3-F1-NRPK	234	50	0.59	0.033	0.001	0.010	0.341	5.15	0.007	4.060	0.094	0.066	0.040	0.195	1.026	34.300	
		GL-GN4-F1-NRPK	545	790	0.49	0.044	0.001	0.010	0.192	2.88	0.004	0.251	0.457	0.330	0.040	0.206	0.958	5.380	
		GL-GN4-F2-NRPK	855	2,920	0.40	0.088	0.001	0.010	0.122	2.03	0.004	0.095	1.180	1.400	0.040	0.175	0.902	4.670	
		Mean	549	1,377	0.05	0.052	0.001	0.011	0.169	0.05	0.006	0.699	0.359	0.341	0.040	0.169	0.823	7.653	
		Median	490	680	0.04	0.044	0.001	0.010	0.161	0.04	0.004	0.208	0.195	0.156	0.040	0.175	0.847	4.670	
	Minimum	234	50	0.02	0.019	0.001	0.010	0.023	0.02	0.001	0.133	0.054	0.044	0.000	0.017	0.344	0.609		
	Maximum	935	5,670	0.11	0.114	0.001	0.029	0.341	0.11	0.013	4.060	0.670	0.494	0.040	0.206	1.026	34.300		
	Standard Error	73	603	0.01	0.010	0.000	0.002	0.030	0.01	0.001	0.425	0.068	0.051	0.004	0.021	0.066	3.429		
	Standard Deviation	218	1,808	0.03	0.030	0.000	0.006	0.089	0.03	0.003	1.274	0.204	0.153	0.013	0.064	0.198	10.288		
	Yellow Perch	GL-GN1-F4-YLP	220	90	3.05	0.028	0.002	0.011	0.299	14.10	0.022	6.490	0.146	0.156	0.040	0.298	1.319	21.200	
		GL-GN1-F5-YLP	165	40	1.22	0.033	0.003	0.010	0.317	9.07	0.016	9.640	0.072	0.050	0.040	0.299	1.391	19.300	
		GL-GN1-F6-YLP	155	37	1.81	0.039	0.002	0.023	0.342	13.50	0.026	5.980	0.091	0.065	0.040	0.295	1.117	18.700	
		GL-GN1-F7-YLP	156	35	0.96	0.031	0.002	0.010	0.354	12.00	0.010	5.130	0.049	0.056	0.040	0.286	1.254	16.800	
		GL-GN1-F8-YLP	146	27	2.73	0.063	0.004	0.010	0.328	17.20	0.010	9.120	0.052	0.052	0.040	0.320	1.245	17.500	
		GL-GN1-F9-YLP	146	32	2.20	0.049	0.003	0.011	0.307	16.00	0.017	22.200	0.055	0.040	0.040	0.312	1.451	23.200	
		GL-GN1-F10-YLP	157	37	1.63	0.053	0.004	0.010	0.353	15.60	0.015	18.100	0.056	0.036	0.040	0.338	1.470	18.500	
		GL-GN1-F11-YLP	162	45	1.76	0.047	0.002	0.010	0.297	11.20	0.016	4.300	0.088	0.060	0.040	0.291	1.164	18.600	
		Mean	163	43	0.04	0.043	0.003	0.012	0.325	0.04	0.017	10.120	0.076	0.064	0.040	0.305	1.301	19.225	
		Median	157	37	0.04	0.043	0.003	0.010	0.323	0.04	0.016	7.805	0.064	0.054	0.040	0.299	1.286	18.650	
		Minimum	146	27	0.03	0.028	0.002	0.010	0.297	0.03	0.010	4.300	0.049	0.036	0.040	0.286	1.117	16.800	
		Maximum	220	90	0.06	0.063	0.004	0.023	0.354	0.06	0.026	22.200	0.204	0.156	0.040	0.338	1.470	23.200	
		Standard Error	8	7	0.00	0.004	0.000	0.002	0.008	0.00	0.002	2.314	0.012	0.014	0.000	0.006	0.046	0.729	
		Standard Deviation	24	20	0.01	0.012	0.001	0.005	0.023	0.01	0.005	6.546	0.033	0.038	0.000	0.017	0.129	2.062	
Unnamed Waterbody 2		Northern Pike	WB-2-GN1-F1-NRPK	475	600	2.17	0.159	0.001	0.010	0.186	3.55	0.004	0.723	0.580	0.278	0.040	0.171	0.753	3.960
Unnamed Waterbody 6		Northern Pike	WB-6-GN1-F1-NRPK	591	1,280	2.88	0.106	0.001	0.012	0.180	5.03	0.004	0.288	0.245	0.117	0.040	0.197	0.921	4.570
			WB-6-GN1-F2-NRPK	544	950	5.06	0.178	0.001	0.012	0.164	7.63	0.007	0.414	0.236	0.106	0.040	0.182	0.813	4.550
			WB-6-GN1-F3-NRPK	585	1,180	1.30	0.098	0.001	0.010	0.105	2.99	0.004	0.122	0.260	0.109	0.040	0.149	0.677	3.880
	WB-6-GN1-F4-NRPK		586	1,300	1.93	0.127	0.001	0.010	0.132	3.49	0.007	0.238	0.262	0.104	0.040	0.173	0.797	3.820	
	WB-6-GN2-F1-NRPK		531	870	1.36	0.073	0.001	0.011	0.129	2.76	0.007	0.638	0.211	0.098	0.040	0.155	0.735	3.970	
	WB-6-GN2-F2-NRPK		520	960	1.27	0.092	0.001	0.010	0.158	3.71	0.004	0.962	0.244	0.103	0.040	0.162	0.786	5.320	
	WB-6-GN2-F3-NRPK		536	860	1.29	0.094	0.001	0.014	0.160	4.21	0.004	0.535	0.193	0.104	0.040	0.181	0.830	4.680	
	WB-6-GN2-F4-NRPK		543	940	0.45	0.074	0.001	0.010	0.143	2.52	0.004	0.143	0.214	0.095	0.040	0.160	0.808	3.380	
	WB-6-GN4-F1-NRPK		556	270	2.25	0.069	0.001	0.021	0.123	4.92	0.004	0.426	0.369	0.212	0.040	0.147	0.826	4.440	
	WB-6-GN4-F2-NRPK		539	800	0.48	0.076	0.001	0.010	0.124	3.37	0.004	0.432	0.325	0.202	0.040	0.151	0.795	5.130	
	Mean		553	941	0.10	0.099	0.001	0.021	0.142	0.10	0.005	0.420	0.256	0.125	0.040	0.166	0.799	4.374	
	Median	544	945	0.09	0.093	0.001	0.011	0.138	0.09	0.004	0.420	0.245	0.105	0.040	0.161	0.803	4.495		
	Minimum	520	270	0.07	0.069	0.001	0.010	0.105	0.07	0.004	0.122	0.193	0.095	0.040	0.147	0.677	3.380		
	Maximum	591	1,300	0.18	0.178	0.001	0.104	0.180	0.18	0.007	0.962	0.369	0.212	0.040	0.197	0.921	5.320		
	Standard Error	8	93	0.01	0.010	0.000	0.009	0.007	0.01	0.000	0.080	0.017	0.014	0.000	0.005	0.020	0.193		
	Standard Deviation	25	295	0.03	0.033	0.000	0.029	0.023	0.03	0.001	0.252	0.054	0.044	0.000	0.017	0.063	0.609		
	Unnamed Watercourse 7	Northern Pike	WC-7-GN4-F1-NRPK	340	210	1.64	0.138	0.010	0.014	0.244	4.21	0.004	0.172	0.313	0.132	0.010	0.143	0.711	3.730

Notes:
Metal concentration values are expressed in mg/kg wet weight except the Selenium (Se) dwt column which is expressed in mg/kg dry weight.
*- summary statistics not applicable for sample size of n=1



Table C1-2: 2023 Large-bodied, Skinless, Boneless Dorsal Muscle Fillet Data

Waterbody	Species	Sample ID	Total Length (mm)	Total Weight (g)	Aluminium (Al)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwet	Zinc (Zn)	
Dixie Creek	Northern Pike	DC-02-GN1-F1-NP	195	-	7.24	0.193	0.0037	0.019	0.416	17.80	0.0125	39.5	0.0241	0.025	<0.040	0.201	0.917	35.8	
		DC-02-GN1-F2-NP	285	-	0.66	0.103	0.0031	0.010	0.351	9.74	0.0057	22.6	0.0443	0.033	<0.040	0.188	0.82	37.8	
		DC-02-GN2-F4-NP	300	-	9.29	0.0885	0.0033	0.022	0.395	23.70	0.0059	12	0.0681	0.049	<0.040	0.205	0.871	38.2	
		DC-03-GN1-F1-NP	221	28	7.76	0.236	0.0077	0.022	0.417	24.60	0.0062	6.16	0.11	0.083	<0.040	0.26	1.13	28.2	
		DC-03-GN1-F2-NP	235	30	0.64	0.0481	0.0036	0.010	0.429	12.20	0.0040	7.39	0.101	0.060	<0.040	0.22	0.985	34.1	
		DC-04-GN1-F1-NP-L	485	-	1.98	0.0742	0.0010	0.018	0.191	4.10	0.0040	1.19	0.813	0.416	<0.040	0.153	0.724	5.67	
		DC-04-GN1-F2-NP-L	405	389	1.18	0.0792	0.0010	0.012	0.214	2.97	0.0040	0.453	0.374	0.232	<0.040	0.14	0.626	3.49	
			Mean	304	-	4.11	0.1174	0.0033	0.016	0.3447	13.59	0.0060	12.7561	0.2192	0.128	-	0.1953	0.8676	26.1800
			Median	285	-	1.98	0.0885	0.0033	0.018	0.3950	12.20	0.0057	7.3900	0.1010	0.060	-	0.2010	0.8710	34.1000
			Minimum	195	-	0.64	0.0481	0.0010	0.010	0.1910	2.97	0.0040	0.4530	0.0241	0.025	-	0.1400	0.6260	3.4900
			Maximum	485	-	9.29	0.2360	0.0077	0.022	0.4290	24.60	0.0125	39.5000	0.08130	0.0416	-	0.2600	1.1300	38.2000
			Standard Error	40	-	1.44	0.0263	0.0008	0.002	0.0380	3.31	0.0011	5.2783	0.1084	0.055	-	0.0153	0.0629	5.7204
			Standard Deviation	106	-	3.81	0.0695	0.0022	0.005	0.1006	8.76	0.0030	13.9652	0.2869	0.145	-	0.0405	0.1665	15.1347
		White Sucker	DC-02-GN1-F3-WS	115	-	72.80	0.0811	0.0067	0.174	0.896	108.00	0.0352	11.8	0.0372	0.033	0.105	0.188	0.781	24.6
			DC-02-GN2-F5-YP	158	-	1.07	0.0354	0.0044	0.010	0.268	9.71	0.0108	29.2	0.0339	0.025	0.04	0.259	0.98	17.2
			DC-02-GN2-F6-YP	154	-	9.42	0.0512	0.0055	0.027	0.344	23.80	0.0178	15.5	0.037	0.023	0.04	0.302	1.2	13.8
		Yellow Perch	DC-04-GN1-F3-YP	167	50	12.00	0.0616	0.0055	0.030	0.318	27.30	0.0159	42.8	0.126	0.083	0.05	0.177	0.786	18.2
			DC-04-GN1-F4-YP	142	31	6.81	0.0704	0.0052	0.020	0.389	20.50	0.0126	62.5	0.114	0.066	0.056	0.226	0.927	17.8
			DC-04-GN1-F5-YP	150	33	8.67	0.0524	0.0052	0.020	0.291	18.90	0.0263	44.5	0.194	0.106	0.04	0.191	0.718	19
			Mean	154	-	7.59	0.0542	0.0052	0.021	0.3220	20.04	0.0167	38.9000	0.1010	0.061	0.0452	0.2310	0.9222	17.2000
			Median	154	-	8.67	0.0524	0.0052	0.020	0.3180	20.50	0.0159	42.8000	0.1140	0.066	0.0400	0.2260	0.9270	17.8000
		Minimum	142	-	1.07	0.0354	0.0044	0.010	0.2680	9.71	0.0108	15.5000	0.0339	0.023	0.0400	0.1770	0.7180	13.8000	
		Maximum	167	-	12.00	0.0704	0.0055	0.030	0.3890	27.30	0.0263	62.5000	0.1940	0.106	0.0560	0.3020	1.2000	19.0000	
		Standard Error	4	-	1.83	0.0058	0.0002	0.003	0.0211	2.96	0.0027	7.8904	0.0300	0.016	0.0033	0.0228	0.0839	8.9900	
		Standard Deviation	9	-	4.10	0.0131	0.0005	0.008	0.0471	6.62	0.0060	17.6436	0.0672	0.036	0.0074	0.0509	0.1876	2.0100	
Chukuni River	Lake Whitefish	CR-FDP-GN1-F12-LKWF-L	420	830	1.61	0.098	0.0010	0.010	0.273	5.10	<0.0040	0.371	0.0957	0.054	<0.040	0.327	1.36	3.49	
	Northern Pike	CR-REF-GN3-F16-NP-L	470	510	4.44	0.36	0.0026	0.050	0.143	6.52	<0.0040	0.524	0.411	0.401	<0.040	0.192	0.977	8.81	
		CR-REF-GN3-F17-NP-L	668	1,950	1.26	0.35	0.0010	0.010	0.127	1.98	<0.0040	0.229	0.332	0.277	<0.040	0.189	0.755	6.77	
		CR-REF-GN3-F18-NP-L	550	790	1.07	0.389	0.0010	0.010	0.125	2.43	<0.0040	0.339	0.312	0.220	<0.040	0.162	0.777	4.92	
		CR-FDP-GN1-F1-NP-L	480	520	1.44	0.194	0.0010	0.026	0.215	3.63	<0.0040	0.856	0.481	0.390	<0.040	0.135	0.646	6.56	
		CR-FDP-GN2-F4-NP-L	500	640	1.74	0.139	0.0010	0.010	0.161	3.22	<0.0040	0.869	0.301	0.174	<0.040	0.168	0.765	6.41	
		CR-FDP-GN3-F15-NP-L	620	1,110	1.11	0.308	0.0011	0.010	0.106	3.01	<0.0040	0.943	0.608	0.244	<0.040	0.161	0.761	7.64	
		CR-DS-GN3-F14-NP-L	455	510	0.87	0.197	0.0010	0.010	0.163	1.90	<0.0040	0.535	0.293	0.270	<0.040	0.162	0.703	4.89	
		Mean	535	861	1.70	0.277	0.001	0.018	0.149	3.24	-	0.614	0.391	0.282	-	0.167	0.769	6.57	
		Median	500	640	1.26	0.308	0.001	0.010	0.143	3.01	-	0.535	0.332	0.270	-	0.162	0.761	6.56	
		Minimum	455	510	0.87	0.139	0.001	0.010	0.106	1.90	-	0.229	0.293	0.174	-	0.135	0.646	4.89	
		Maximum	668	1,950	4.44	0.389	0.003	0.050	0.215	6.52	-	0.943	0.608	0.401	-	0.192	0.977	8.81	
		Standard Error	31	199	0.47	0.037	0.000	0.006	0.013	0.60	-	0.106	0.044	0.032	-	0.007	0.039	0.53	
		Standard Deviation	82	527	1.24	0.098	0.001	0.015	0.036	1.58	-	0.280	0.118	0.085	-	0.019	0.103	1.40	
	Silver Redhorse	CR-FDP-GN1-F11-SVRH-L	513	1,510	1.49	0.159	0.0011	<0.010	0.182	5.76	<0.0040	0.183	0.18	0.077	<0.040	0.312	1.52	3	
	Walleye	CR-REF-GN3-F30-WAE-L	330	280	0.83	0.119	0.0010	0.012	0.117	1.63	0.0040	0.1	0.287	0.243	<0.040	0.189	0.952	3.06	
		CR-REF-GN3-F31-WAE-L	320	260	2.60	0.116	0.0010	0.010	0.11	3.90	0.0040	0.122	0.355	0.236	<0.040	0.193	0.973	3.13	
		CR-REF-GN3-F32-WAE-L	401	600	1.39	0.0477	0.0010	0.010	0.214	3.02	0.0040	0.105	0.372	0.252	<0.040	0.213	0.889	4.03	
		CR-REF-GN3-F33-WAE-L	418	640	0.92	0.068	0.0010	0.010	0.185	3.64	0.0040	0.089	0.477	0.446	<0.040	0.246	1.08	4.39	
		CR-FDP-GN1-F4-WAE-L	391	490	1.76	0.0374	0.001	0.012	0.193	5.12	0.0437	0.182	0.305	0.120	<0.040	0.2	0.907	3.81	
		CR-FDP-GN1-F5-WAE-L	404	510	1.57	0.0982	0.0010	0.012	0.125	2.49	0.0040	0.123	0.367	0.129	<0.040	0.186	0.88	3.46	
CR-FDP-GN1-F6-WAE-L		385	480	1.24	0.0978	0.0010	0.023	0.175	2.84	0.0040	0.115	0.339	0.149	<0.040	0.196	0.917	3.55		
CR-FDP-GN1-F7-WAE-L		313	260	1.19	0.056	0.0010	0.010	0.144	2.45	0.0040	0.149	0.207	0.087	<0.040	0.184	0.854	3.47		
CR-FDP-GN1-F8-WAE-L		460	870	0.45	0.25	0.0010	0.013	0.191	3.33	0.0040	0.089	0.857	0.426	<0.040	0.198	0.938	3.47		
CR-FDP-GN1-F9-WAE-L		513	1,010	0.40	0.0884	0.0014	0.010	0.166	2.94	0.0040	0.069	0.755	0.390	<0.040	0.227	0.962	3.48		
CR-FDP-GN1-F10-WAE-L		492	1,030	0.44	0.0982	0.001	0.010	0.204	3.50	0.0040	0.096	0.624	0.279	<0.040	0.24	1.04	3.28		
CR-FDP-GN2-F3-WAE-WB		260	150	1.70	0.0628	0.0043	0.010	0.307	7.93	0.0040	0.747	0.139	0.078	<0.040	0.244	0.978	12.2		
CR-DS-GN1-F9-WAE-L		415	650	0.44	0.065	0.0010	0.030	0.146	1.89	0.0040	0.079	0.318	0.158	<0.040	0.235	1.08	3.11		
CR-DS-GN1-F6-WAE-L		429	640	0.49	0.0725	0.0010	0.010	0.124	1.71	0.0040	0.077	0.504	0.230	<0.040	0.182	0.85	3.13		
CR-DS-GN1-F7-WAE-L		425	690	<0.40	0.093	0.0010	0.010	0.238	1.71	0.0040	0.131								



Table C1-2: 2023 Large-bodied, Skinless, Boneless Dorsal Muscle Fillet Data

Waterbody	Species	Sample ID	Total Length (mm)	Total Weight (g)	Aluminium (Al)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwt	Zinc (Zn)
Chukuni River	White Sucker	CR-DS-GN3-F5-WAE-L	470	800	<0.40	0.0598	0.0010	0.018	0.19	2.28	0.0040	0.099	0.436	0.374	<0.040	0.19	0.852	3.67
		CR-DS-GN3-F6-WAE-L	430	680	0.61	0.0626	0.0010	0.010	0.178	2.36	0.0040	0.124	0.352	0.321	<0.040	0.21	0.966	3.45
		Mean	390	544	1.04	0.089	0.001	0.013	0.182	3.01	0.008	0.144	0.407	0.249	-	0.205	0.926	3.91
		Median	404	570	0.92	0.073	0.001	0.010	0.185	2.57	0.004	0.115	0.352	0.236	-	0.198	0.917	3.47
		Minimum	260	150	0.40	0.037	0.001	0.010	0.110	1.63	0.004	0.069	0.139	0.078	-	0.164	0.760	3.06
		Maximum	513	1,030	2.60	0.250	0.004	0.030	0.307	7.93	0.048	0.747	0.857	0.498	-	0.246	1.080	12.20
		Standard Error	14	52	0.13	0.010	0.000	0.001	0.009	0.28	0.003	0.028	0.039	0.025	-	0.005	0.017	0.38
		Standard Deviation	67	248	0.58	0.046	0.001	0.006	0.045	1.35	0.012	0.136	0.186	0.122	-	0.023	0.079	1.84
		CR-REF-GN3-F15-WHSC-L	420	720	3.02	0.114	<0.0010	0.016	0.178	5.84	0.0040	0.274	0.075	0.078	<0.040	0.189	0.997	3.12
		CR-FDP-GN3-F9-WHSC-L	280	240	2.71	0.188	<0.0010	0.014	0.272	6.56	0.0040	0.58	0.0509	0.025	<0.040	0.237	1.2	3.83
		CR-FDP-GN3-F10-WHSC-L	300	270	1.14	0.172	<0.0010	0.010	0.187	3.82	0.0040	0.311	0.0631	0.030	<0.040	0.211	1.11	3.07
		CR-FDP-GN3-F11-WHSC-L	345	420	0.97	0.198	<0.0010	0.010	0.153	3.64	0.0040	0.2	0.0731	0.026	<0.040	0.3	1.42	3.37
		CR-FDP-GN3-F12-WHSC-L	361	570	1.09	0.288	<0.0010	0.010	0.278	4.45	0.0040	0.26	0.0714	0.031	<0.040	0.156	0.79	3.88
		CR-FDP-GN3-F13-WHSC-L	448	910	1.65	0.112	<0.0010	0.010	0.271	5.86	0.0040	0.23	0.0999	0.031	<0.040	0.251	1.21	3.51
		CR-FDP-GN3-F14-WHSC-L	480	1,430	1.09	0.124	<0.0010	0.010	0.45	6.10	0.0040	0.183	0.14	0.074	<0.040	0.215	1.02	3.46
		CR-DS-GN1-F1-WHSC-L	390	700	0.52	0.132	<0.0010	0.010	0.331	4.10	0.0040	0.267	0.0946	0.045	<0.040	0.17	0.82	3.34
		CR-DS-GN1-F2-WHSC-L	410	800	0.45	0.152	<0.0010	0.010	0.394	6.09	0.0051	0.224	0.164	0.093	<0.040	0.195	0.938	3.7
		CR-DS-GN1-F3-WHSC-L	272	240	<0.40	0.251	<0.0010	0.014	0.232	3.91	0.0040	0.223	0.094	0.045	<0.040	0.248	1.2	4.08
		CR-DS-GN1-F4-WHSC-L	362	540	0.60	0.149	<0.0010	0.013	0.34	4.16	0.0040	0.145	0.0681	0.037	<0.040	0.276	1.34	3.5
		Mean	370	622	1.32	0.171	-	0.012	0.281	4.96	0.004	0.263	0.090	0.047	-	0.223	1.095	3.53
	Median	362	570	1.09	0.152	-	0.010	0.272	4.45	0.004	0.230	0.075	0.037	-	0.215	1.110	3.50	
	Minimum	272	240	0.45	0.112	-	0.010	0.153	3.64	0.004	0.145	0.051	0.025	-	0.156	0.790	3.07	
	Maximum	480	1,430	3.02	0.288	-	0.016	0.450	6.56	0.005	0.580	0.164	0.093	-	0.300	1.420	4.08	
	Standard Error	20	107	0.28	0.017	-	0.001	0.028	0.34	0.000	0.035	0.010	0.007	-	0.013	0.061	0.09	
	Standard Deviation	68	353	0.89	0.057	-	0.002	0.093	1.12	0.000	0.115	0.034	0.024	-	0.044	0.202	0.31	
	CR-REF-GN2-F1-YLP	180	70	11.60	0.112	0.0132	0.069	0.275	23.00	0.0158	4.19	0.0284	0.025	<0.040	0.357	1.42	15.6	
	CR-REF-GN3-F19-YLP	340	420	1.03	0.0844	0.0010	0.010	0.147	2.96	0.0040	0.153	0.243	0.204	<0.040	0.309	1.39	4.4	
	CR-REF-GN3-F20-YLP	280	220	1.16	0.0613	0.0010	0.010	0.171	3.58	0.0040	0.466	0.111	0.080	<0.040	0.425	1.88	5.16	
	CR-REF-GN3-F21-YLP	281	330	0.77	0.107	0.0010	0.010	0.139	2.24	0.0040	0.377	0.203	0.151	<0.040	0.326	1.46	4.33	
	CR-REF-GN3-F22-YLP	295	350	1.13	0.0943	0.0010	0.010	0.164	2.67	0.0040	0.284	0.151	0.102	<0.040	0.349	1.53	4.9	
	CR-REF-GN3-F23-YLP	275	280	1.08	0.0758	0.0010	0.010	0.208	3.34	0.0040	0.416	0.131	0.130	<0.040	0.41	1.87	5.18	
	CR-REF-GN3-F24-YLP	260	230	1.84	0.0697	0.0010	0.010	0.164	2.32	0.0040	0.208	0.13	0.121	<0.040	0.362	1.72	4.92	
	CR-REF-GN3-F25-YLP	242	200	1.33	0.0493	0.0010	0.010	0.142	2.84	0.0040	0.273	0.0639	0.042	<0.040	0.407	1.84	4.97	
	CR-REF-GN3-F26-YLP	263	300	0.57	0.0726	0.0010	0.013	0.136	2.15	0.0040	0.669	0.0781	0.053	<0.040	0.353	1.6	4.64	
	CR-REF-GN3-F27-YLP	228	150	1.82	0.0514	0.0010	0.014	0.154	4.03	0.0040	1.22	0.0483	0.019	<0.040	0.355	1.58	4.98	
	CR-REF-GN3-F28-YLP	241	190	1.11	0.0702	0.0010	0.010	0.144	3.27	0.0040	0.873	0.0784	0.078	<0.040	0.424	1.89	4.94	
	CR-FDP-GN1-F2-YLP-L	251	170	5.80	0.0368	0.0010	0.018	0.194	8.76	0.0134	0.758	0.0871	0.041	<0.040	0.195	0.873	5.73	
	CR-FDP-GN1-F3-YLP-L	254	210	3.36	0.0781	0.0010	0.013	0.152	5.58	0.0040	0.297	0.137	0.060	<0.040	0.266	1.25	4.44	
	CR-FDP-GN2-F1-YLP	225	140	3.18	0.12	0.0052	0.016	0.574	10.70	0.007	3.86	0.134	0.081	<0.040	0.303	1.2	16.2	
	CR-FDP-GN2-F2-YLP-L	262	230	1.48	0.0752	0.0010	0.018	0.245	3.08	0.0040	0.276	0.238	0.106	<0.040	0.255	1.1	4.96	
	CR-FDP-GN3-F6-YLP-L	260	240	1.45	0.164	0.0010	0.016	0.183	2.80	0.0040	0.308	0.133	0.045	<0.040	0.308	1.39	4.46	
	CR-FDP-GN3-F7-YLP-L	272	290	0.79	0.0535	0.0010	0.010	0.141	2.64	0.0040	0.34	0.238	0.079	<0.040	0.34	1.55	3.24	
	CR-FDP-GN3-F8-YLP-L	272	270	<0.40	0.113	0.0010	0.035	0.161	2.29	0.0040	0.357	0.249	0.084	<0.040	0.262	1.12	4.11	
	CR-DS-GN1-F8-YLP-L	241	170	0.55	0.0547	0.0010	0.015	0.156	2.30	0.0040	0.389	0.122	0.046	<0.040	0.275	1.28	4.15	
	CR-DS-GN1-F9-YLP-L	241	200	0.79	0.0569	0.0010	0.019	0.187	2.81	0.0040	0.278	0.146	0.055	<0.040	0.248	1.1	4.97	
	CR-DS-GN1-F10-YLP-L	231	180	0.40	0.0331	0.0010	0.012	0.208	2.19	0.0040	0.594	0.0926	0.086	<0.040	0.22	1.01	5.23	
	CR-DS-GN1-F11-YLP-L	211	130	1.16	0.0437	0.0010	0.012	0.205	2.88	0.0040	0.246	0.103	0.069	<0.040	0.223	1	4.75	
	CR-DS-GN2-F1-YLP-L	233	150	0.76	0.0392	0.0010	0.022	0.156	2.64	0.0040	0.278	0.16	0.151	<0.040	0.239	1.08	4.01	
	CR-DS-GN3-F7-YLP-L	230	160	2.43	0.0625	0.0010	0.030	0.159	5.43	0.0040	0.683	0.128	0.127	<0.040	0.219	0.998	4.11	
	CR-DS-GN3-F8-YLP-L	325	150	1.75	0.038	0.0010	0.010	0.156	3.56	0.0042	0.294	0.144	0.090	<0.040	0.219	0.969	4.13	
	CR-DS-GN3-F9-YLP-L	236	170	2.10	0.0575	0.0010	0.020	0.181	4.06	0.0068	0.372	0.119	0.110	<0.040	0.248	1.13	4.01	
	CR-DS-GN3-F10-YLP-L	350	200	1.02	0.028	0.0010	0.025	0.204	3.29	0.0040	0.27	0.116	0.110	<0.040	0.243	1.13	4.12	
	CR-DS-GN3-F11-YLP-L	352	210	0.97	0.0408	0.0010	0.010	0.198	3.04	0.0065	0.266	0.124	0.100	<0.040	0.216	0.99	4.56	
	CR-DS-GN3-F12-YLP-L	270	250	0.47	0.0786	0.0010	0.010	0.17	2.46	0.0040	0.252	0.299	0.197	<0.040	0.232	1.07	3.98	
	CR-DS-GN3-F13-YLP-L	284	250	1.31	0.0926	0.0010	0.010	0.137	3.29	0.0040	0.221	0.242	0.227	<0.040	0.254	1.22	3.87	
	Mean	263	217	1.83	0.070	0.002	0.017	0.187	4.21	0.005	0.649	0.143	0.096	-	0.295	1.321	5.30	
	Median	260	205	1.16	0.066	0.001	0.013	0.164	3.00	0.004	0.324	0.131	0.085	-	0.271	1.235	4.60	
	Minimum	180	70	0.40	0.028	0.001	0.010	0.136	2.15	0.004	0.153	0.028	0.019	-	0.195	0.873	3.24	
	Maximum	352	420	11.60	0.164	0.013	0.069	0.574	23.00	0.016	4.190	0.299	0.227	-	0.425	1.890	16.20	
	Standard Error	7	13	0.40	0.006	0.000	0.002	0.015	0.73	0.001	0.173	0.012	0.009	-	0.013	0.056	0.53	
	Standard Deviation	40	73	2.18	0.031	0.002	0.012	0.080	4.02	0.003	0.947	0.066	0.052	-	0.069	0.308	2.93	



Table C1-2: 2023 Large-bodied, Skinless, Boneless Dorsal Muscle Fillet Data

Waterbody	Species	Sample ID	Total Length (mm)	Total Weight (g)	Aluminium (Al)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwt	Zinc (Zn)	
Genesee Lake	Northern Pike	GL-GN2-F1-NRPK-L	550	930	0.42	0.0514	<0.0010	0.015	0.143	2.34	0.0138	0.452	0.389	0.225	<0.040	0.206	0.979	4.82	
		GL-GN2-F5-NRPK-L	640	1,340	2.86	0.0906	<0.0010	0.010	0.11	13.10	0.0040	0.41	0.873	0.576	<0.040	0.178	0.942	3.69	
		GL-GN1-F3-NRPK-L	612	1,380	<0.40	0.054	<0.0010	0.010	0.103	1.26	0.0040	0.55	0.645	0.318	<0.040	0.187	0.882	5.17	
		GL-GN1-F8-NRPK-L	420	434	0.58	0.0326	<0.0010	0.012	0.185	2.18	0.0040	0.486	0.209	0.120	<0.040	0.175	0.874	5.25	
		GL-SN1-F1-NP-WB	220	45	2.52	0.0383	<0.0010	0.010	0.305	13.50	0.0040	3.37	0.0907	0.067	<0.040	0.2	0.946	34.4	
		Mean	488	826	1.60	0.053	-	0.011	0.169	6.48	0.006	1.054	0.441	0.261	-	0.189	0.925	10.67	
		Median	550	930	1.55	0.051	-	0.010	0.143	2.34	0.004	0.486	0.389	0.225	-	0.187	0.942	5.17	
		Minimum	220	45	0.42	0.033	-	0.010	0.103	1.26	0.004	0.410	0.091	0.067	-	0.175	0.874	3.69	
		Maximum	640	1,380	2.86	0.091	-	0.015	0.305	13.50	0.014	3.370	0.873	0.576	-	0.206	0.979	34.40	
		Standard Error	77	259	0.64	0.010	-	0.001	0.037	2.79	0.002	0.580	0.143	0.090	-	0.006	0.020	5.94	
		Standard Deviation	172	580	1.27	0.023	-	0.002	0.083	6.24	0.004	1.296	0.319	0.201	-	0.014	0.045	13.28	
		Walleye	GL-GN1-F1-WALL-L	332	303	<0.40	0.0336	<0.0010	0.010	0.144	2.34	0.0163	0.111	0.24	0.182	<0.040	0.174	0.856	3.69
			GL-GN1-F2-WALL-L	343	315	0.81	0.0306	<0.0010	0.010	0.143	5.96	0.0265	0.134	0.415	0.266	<0.040	0.176	0.843	3.75
			GL-GN1-F4-WALL-L	465	890	0.66	0.034	<0.0010	0.011	0.118	2.22	0.0043	0.104	0.51	0.379	<0.040	0.205	1.07	3.13
			GL-GN1-F5-WALL-L	346	354	1.59	0.0312	<0.0010	0.012	0.146	3.09	0.0054	0.135	0.285	0.259	<0.040	0.184	0.894	3.81
			GL-GN1-F6-WALL-L	501	1,139	1.99	0.0347	<0.0010	0.010	0.132	3.64	0.0048	0.103	0.415	0.245	<0.040	0.204	0.984	3.61
			GL-GN1-F7-WALL-L	351	344	1.96	0.037	<0.0010	0.010	0.173	3.34	0.0147	0.148	0.315	0.152	<0.040	0.202	0.894	4.15
			Mean	390	557	1.40	0.034	-	0.011	0.143	3.43	0.012	0.123	0.363	0.247	-	0.191	0.924	3.69
			Median	349	349	1.59	0.034	-	0.011	0.144	3.22	0.010	0.123	0.365	0.252	-	0.193	0.894	3.72
			Minimum	332	303	0.66	0.031	-	0.010	0.118	2.22	0.004	0.103	0.240	0.152	-	0.174	0.843	3.13
			Maximum	501	1,139	1.99	0.037	-	0.012	0.173	5.96	0.027	0.148	0.510	0.379	-	0.205	1.070	4.15
			Standard Error	30	148	0.28	0.001	-	0.000	0.007	0.55	0.004	0.008	0.041	0.032	-	0.006	0.036	0.14
			Standard Deviation	73	363	0.63	0.002	-	0.001	0.018	1.36	0.009	0.019	0.101	0.079	-	0.014	0.087	0.33
		White Sucker	GL-GN2-F4-WHSC	160	44	1.77	0.167	0.0057	0.024	6.34	3.68	0.116	14.2	0.0161	0.014	0.061	0.288	1.38	15.9
		Yellow Perch	GL-GN3-F1-YLPR	97	9	4.15	0.0382	0.0015	0.027	0.174	20.70	0.499	2.28	0.0338	0.029	0.058	0.096	0.358	9.15
			GL-GN2-F2-YLPR	182	63	4.67	0.044	0.0027	0.017	0.27	14.80	0.173	4.47	0.119	0.079	0.040	0.287	1.22	17.6
			GL-GN2-F3-YLPR	153	34	4.08	0.0506	0.0039	0.013	0.298	12.30	0.169	6.19	0.0832	0.065	0.040	0.296	1.19	21.2
			GL-GN2-F6-YLPR	158	41	3.77	0.0468	0.0025	0.017	0.333	12.40	0.014	6.71	0.0725	0.057	0.040	0.312	1.27	18.7
			GL-GN2-F7-YLPR	165	48	3.56	0.0396	0.0017	0.014	0.426	13.70	0.0066	5.03	0.0711	0.054	0.040	0.28	1.18	20.5
			GL-GN2-F8-YLPR	151	38	5.05	0.0978	0.0034	0.020	0.71	19.60	0.0241	7.98	0.0614	0.046	0.040	0.282	1.16	18.3
			GL-GN2-F9-YLPR	163	42	5.37	0.0473	0.0029	0.022	0.315	15.80	0.0112	13.6	0.0795	0.064	0.040	0.304	1.12	19.9
			GL-GN2-F10-YLPR	165	48	0.72	0.05	0.003	0.030	0.397	2.53	0.0454	4.46	0.0579	0.036	0.040	0.283	1.19	14.6
			GL-GN2-F11-YLPR	149	33	7.40	0.0656	0.0032	0.016	0.48	33.00	0.0465	8.8	0.0508	0.041	0.040	0.279	1.08	20.1
				GL-GN2-F12-YLPR	148	32	9.13	0.0324	0.0018	0.018	0.326	19.90	0.012	5.64	0.064	0.044	0.040	0.229	0.976
			Mean	153	39	4.79	0.051	0.003	0.019	0.373	16.47	0.100	6.516	0.069	0.052	0.042	0.265	1.074	17.75
			Median	156	40	4.41	0.047	0.003	0.018	0.330	15.30	0.035	5.915	0.068	0.050	0.040	0.283	1.170	18.50
			Minimum	97	9	0.72	0.032	0.002	0.013	0.174	2.53	0.007	2.280	0.034	0.029	0.040	0.096	0.358	9.15
			Maximum	182	63	9.13	0.098	0.004	0.030	0.710	33.00	0.499	13.600	0.119	0.079	0.058	0.312	1.270	21.20
			Standard Error	7	4	0.22	0.006	0.000	0.002	0.046	2.48	0.049	0.983	0.007	0.005	0.002	0.020	0.084	1.13
			Standard Deviation	22	14	2.26	0.019	0.001	0.006	0.146	7.83	0.154	3.109	0.023	0.015	0.006	0.063	0.265	3.57
	Unnamed Waterbody 2	Northern Pike	WB-2-MT1-F1-NRP	124	9	1.19	0.0986	0.0173	0.025	0.502	10.30	0.0118	4.44	0.0616	0.041	<0.040	0.212	0.976	48.1
			WB-2-GN3-F1-NRP	457	526	<0.40	0.183	0.0010	0.010	0.123	1.92	0.0040	0.443	0.373	0.170	<0.040	0.176	0.899	4.14
			WB-2-GN2-F1-NRP	643	1,522	<0.40	0.222	0.0010	0.014	0.107	1.84	0.0040	0.36	0.639	0.323	<0.040	0.174	0.787	3.61
			WB-2-GN2-F2-NRP	349	248	<0.40	0.143	0.0010	0.011	0.146	2.20	0.0040	0.52	0.178	0.082	<0.040	0.167	0.85	3.79
				Mean	393	576	1.19	0.162	0.005	0.015	0.220	4.07	0.006	1.441	0.313	0.154	-	0.182	0.878
			Median	403	387	1.19	0.163	0.001	0.013	0.135	2.06	0.004	0.482	0.276	0.126	-	0.175	0.875	3.97
			Minimum	124	9	1.19	0.099	0.001	0.010	0.107	1.84	0.004	0.360	0.062	0.041	-	0.167	0.787	3.61
			Maximum	643	1,522	1.19	0.222	0.017	0.025	0.502	10.30	0.012	4.440	0.639	0.323	-	0.212	0.976	48.10
			Standard Error	108	333	#DIV/0!	0.026	0.004	0.003	0.095	2.08	0.002	1.000	0.126	0.062	-	0.010	0.040	11.06
			Standard Deviation	217	665	#DIV/0!	0.053	0.008	0.007	0.189	4.16	0.004	2.001	0.253	0.125	-	0.020	0.080	22.13

Table C1-2: 2023 Large-bodied, Skinless, Boneless Dorsal Muscle Fillet Data

Waterbody	Species	Sample ID	Total Length (mm)	Total Weight (g)	Aluminium (Al)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwt	Zinc (Zn)
Unnamed Waterbody 6	Yellow Perch	WB-6-GN1-F2-YP	145	35	84.70	0.052	0.0017	0.176	0.801	86.10	0.0431	3.99	0.0609	0.044	0.091	0.26	1.04	15.2
		WB-6-GN1-F3-YP	175	66	52.60	0.0585	0.0021	0.107	0.809	57.80	0.029	5.08	0.0371	0.027	0.061	0.286	1.09	16.8
		WB-6-GN1-F4-YP	190	72	24.80	0.0522	0.0019	0.053	0.778	30.60	0.0221	2.84	0.0491	0.018	0.040	0.3	1.18	13.4
		WB-6-GN1-F5-YP	185	66	32.80	0.0332	0.0018	0.072	0.326	37.40	0.0162	5.36	0.0848	0.046	0.040	0.243	0.979	16.3
		WB-6-GN1-F6-YP	185	75	15.50	0.0476	0.0019	0.030	0.616	20.80	0.0177	4.46	0.0458	0.028	0.040	0.306	1.23	13.6
		WB-6-GN1-F7-YP	161	46	16.90	0.0456	0.0025	0.036	0.808	20.50	0.0197	3.62	0.0639	0.026	0.040	0.29	1.03	18.3
		WB-6-GN1-F8-YP	142	33	31.00	0.0453	0.0019	0.069	0.741	38.80	0.0292	3.81	0.0578	0.042	0.040	0.286	1.09	16.3
		WB-6-GN1-F9-YP	168	41	14.50	0.051	0.0021	0.033	0.731	25.10	0.0216	6.05	0.036	0.025	0.040	0.27	1.1	17.6
		WB-6-GN1-F10-YP	173	50	18.90	0.0427	0.0028	0.046	0.699	23.70	0.0234	8.98	0.0789	0.055	0.040	0.263	0.988	17
		WB-6-SN1-F1-YP-WB	100	10	13.90	0.066	0.0021	0.030	0.698	26.80	0.0242	3.96	0.0454	0.026	<0.040	0.255	0.909	18.8
		WB-6-GN2-F1-YP	132	28	14.90	0.0605	0.0018	0.032	0.712	21.20	0.0227	3.15	0.0386	0.028	0.040	0.282	1.08	18.8
		WB-6-GN2-F2-YP	150	37	20.20	0.0355	0.0017	0.044	0.623	25.90	0.0178	3.91	0.0605	0.035	0.040	0.243	0.96	15.5
		Mean	159	47	28.39	0.049	0.002	0.061	0.695	34.56	0.024	4.601	0.055	0.033	0.047	0.274	1.056	16.47
		Median	165	44	19.55	0.049	0.002	0.045	0.722	26.35	0.022	3.975	0.053	0.028	0.040	0.276	1.060	16.55
		Minimum	100	10	13.90	0.033	0.002	0.030	0.326	20.50	0.016	2.840	0.036	0.018	0.040	0.243	0.909	13.40
		Maximum	190	75	84.70	0.066	0.003	0.176	0.809	86.10	0.043	8.980	0.085	0.055	0.091	0.306	1.230	18.80
Standard Error	8	6	6.05	0.003	0.000	0.012	0.038	5.60	0.002	0.478	0.005	0.003	0.005	0.006	0.027	0.52		
Standard Deviation	26	20	20.97	0.010	0.000	0.043	0.133	19.41	0.007	1.656	0.016	0.011	0.016	0.021	0.092	1.81		
Unnamed Watercourse 1	Northern Pike	WB-6-GN1-F1-NP-L	475	556	3.67	0.0925	<0.0010	0.012	0.222	5.80	0.006	0.714	0.362	0.249	<0.040	0.194	0.916	4.13
		WC-1-EF3-F1-NRP	163	23	1.13	0.158	0.0103	0.016	0.465	10.30	0.0051	5.65	0.0891	0.060	<0.040	0.232	1.12	33.9
	Northern Pike	WC-1-EF3-F2-NRP	160	25	1.63	0.246	0.009	0.020	0.542	17.10	0.0074	7.87	0.102	0.080	<0.040	0.267	1.24	35.4
		WC-1-EF1-F1-NRP	145	18	1.33	0.203	0.0087	0.016	0.518	9.39	0.0099	7.97	0.0561	0.044	<0.040	0.244	1.24	50.6
	Mean	156	22	1.36	0.202	0.009	0.017	0.51	12.26	0.007	7.16	0.082	0.061	-	0.248	0.248	40	
	Median	160	23	1.33	0.203	0.009	0.016	0.52	10.30	0.007	7.87	0.089	0.060	-	0.244	0.244	35	
	Minimum	145	18	1.13	0.158	0.009	0.016	0.47	9.39	0.005	5.65	0.056	0.044	-	0.232	0.232	34	
	Maximum	163	25	1.63	0.246	0.010	0.020	0.54	17.10	0.010	7.97	0.102	0.080	-	0.267	0.267	51	
	Standard Error	6	2	0.15	0.025	0.000	0.010	0.02	2.43	0.001	0.76	0.014	0.010	-	0.010	0.010	5	
	Standard Deviation	10	4	0.25	0.044	0.001	0.002	0.04	4.21	0.002	1.31	0.024	0.018	-	0.018	0.018	9	
Unnamed Watercourse 3	White Sucker	WC-3-EF1-77-WS	172	58	28.30	0.112	0.0023	0.083	0.97	59.00	0.0107	9.38	0.0783	0.080	0.051	0.138	0.527	18.2
		WC-3-EF1-78-WS	192	86	3.37	0.0742	0.0010	0.016	0.754	14.20	0.0040	6.43	0.0409	0.030	0.040	0.142	0.533	16.5
	Mean	182	72	15.84	0.093	0.002	0.050	0.862	36.60	0.007	7.905	0.060	0.055	0.046	0.140	0.530	17.35	
	Median	182	72	15.84	0.093	0.002	0.050	0.862	36.60	0.007	7.905	0.060	0.055	0.046	0.140	0.530	17.35	
	Minimum	172	58	3.37	0.074	0.001	0.016	0.754	14.20	0.004	6.430	0.041	0.030	0.040	0.138	0.527	16.50	
	Maximum	192	86	28.30	0.112	0.002	0.083	0.970	59.00	0.011	9.380	0.078	0.080	0.051	0.142	0.533	18.20	
	Standard Error	10	14	12.47	0.019	0.001	0.034	0.108	22.40	0.003	1.475	0.019	0.025	0.005	0.002	0.003	0.85	
	Standard Deviation	14	20	17.63	0.027	0.001	0.047	0.153	31.68	0.005	2.086	0.026	0.035	0.008	0.003	0.004	1.20	
Unnamed Watercourse 7	Northern Pike	WC-7-GN1-F1-NP-L	330	181	1.78	0.0934	<0.0010	0.013	0.196	3.28	<0.0040	5.01	0.245	0.152	<0.040	0.144	0.653	12.4
		WC-7-GN1-F2-NP-L	360	277	2.47	0.105	<0.0010	0.014	0.195	4.25	<0.0040	0.778	0.543	0.357	<0.040	0.134	0.654	4.33
	Mean	345	229	2.13	0.099	-	0.014	0.196	3.77	-	2.894	0.394	0.255	-	0.139	0.654	8.365	
	Median	345	229	2.13	0.099	-	0.014	0.196	3.77	-	2.894	0.394	0.255	-	0.139	0.654	8.365	
	Minimum	330	181	1.78	0.093	-	0.013	0.195	3.28	-	0.778	0.245	0.152	-	0.134	0.653	4.330	
	Maximum	360	277	2.47	0.105	-	0.014	0.196	4.25	-	5.010	0.543	0.357	-	0.144	0.654	12.400	
	Standard Error	15	48	0.35	0.006	-	0.001	0.001	0.49	-	2.116	0.149	0.103	-	0.005	0.001	4.035	
	Standard Deviation	21	68	0.49	0.008	-	0.001	0.001	0.69	-	2.992	0.211	0.145	-	0.007	0.001	5.706	
	Yellow Perch	WC-7-GN1-F3-YP	100	10	5.96	0.0522	0.0069	0.030	0.469	14.90	0.0086	14.6	0.0641	0.054	<0.040	0.213	0.771	19.2

Notes:
Metal concentration values are expressed in mg/kg wet weight except the Selenium (Se) dwt column which is expressed in mg/kg dry weight.
“-” summary statistics not applicable for sample size of n=1
Values below the detection limit were set at the detection limit for summary statistics



Table C1-3: 2024 Large-bodied, Skinless, Boneless Dorsal Muscle Fillet Data

Waterbody	Species	Sample ID	Total Length (mm)	Total Weight (g)	Aluminium (Al)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwt	Zinc (Zn)	
Chukuni River	Northern Pike	CR-REF-F1-NRPK	540	630	0.40	0.697	0.0018	0.010	0.122	1.58	0.004	0.504	0.44	0.4010	0.04	0.164	0.856	4.43	
		CR-FDP-F1-NRPK	430	430	0.40	0.303	0.001	0.010	0.118	1.76	0.004	0.345	0.329	0.1950	0.04	0.18	0.812	4.85	
		CR-FDP-F2-NRPK	470	510	0.40	0.102	0.001	0.010	0.1	1.26	0.004	0.299	0.317	0.3300	0.04	0.144	0.709	3.38	
		CR-FDP-F3-NRPK	450	510	0.55	0.174	0.001	0.010	0.099	1.8	0.004	0.234	0.458	0.4060	0.04	0.159	0.767	3.8	
		CR-FDP-F4-NRPK	465	560	0.40	0.21	0.001	0.010	0.096	1.54	0.004	0.328	0.246	0.1730	0.04	0.134	0.641	5.13	
		CR-FDP-F5-NRPK	385	370	0.40	0.0876	0.001	0.010	0.109	1.52	0.004	0.226	0.164	0.1660	0.04	0.136	0.664	3.17	
		CR-FDP-F6-NRPK	360	340	0.40	0.147	0.001	0.010	0.084	1.42	0.004	0.307	0.124	0.1340	0.04	0.133	0.73	3.16	
		CR-DS-F1-NRPK	531	850	0.53	0.376	0.001	0.028	0.104	1.73	0.004	0.623	0.42	0.4420	0.04	0.155	0.771	6.13	
		CR-DS-F2-NRPK	-	730	0.43	0.294	0.0013	0.016	0.112	3.4	0.0040	0.206	0.666	0.5070	0.04	0.144	0.721	3.72	
		CR-DS-F5-NRPK	415	340	0.78	0.233	0.0010	0.010	0.128	2.77	0.0040	0.838	0.37	0.3860	0.04	0.156	0.754	5.5	
		CR-DS-F6-NRPK	480	610	0.66	0.175	0.0010	0.010	0.114	2.1	0.0040	0.18	0.316	0.2960	0.04	0.158	0.716	5.23	
			Mean	453	535	0.49	0.2544	0.0011	0.012	0.1078	1.90	0.0040	0.3718	0.3500	0.3124	-	0.1512	0.7401	4.4091
			Median	458	510	0.40	0.2100	0.0010	0.010	0.1090	1.73	0.0040	0.3070	0.3290	0.3300	-	0.1550	0.7300	4.4300
		Minimum	360	340	0.40	0.0876	0.0010	0.010	0.0840	1.26	0.0040	0.1800	0.1240	0.1340	-	0.1330	0.6410	3.1600	
		Maximum	540	850	0.78	0.6970	0.0018	0.028	0.1280	3.40	0.0040	0.8380	0.6660	0.5070	-	0.1800	0.8560	6.1300	
		Standard Error	18	49	0.04	0.0516	0.0001	0.002	0.0038	0.19	0.0000	0.0614	0.0451	0.0386	-	0.0044	0.0186	0.3096	
		Standard Deviation	58	164	0.13	0.1710	0.0002	0.006	0.0128	0.64	0.0000	0.2036	0.1497	0.1280	-	0.0145	0.0617	1.0267	
		White Sucker	CR-FDP-F7-WS	390	640	0.40	0.129	0.001	0.010	0.207	2.6	0.004	0.128	0.124	0.1150	0.04	0.166	0.721	3.32
			CR-FDP-F8-WS	400	730	0.40	0.0509	0.001	0.010	0.19	3.11	0.004	0.186	0.142	0.1330	0.04	0.2	0.909	3.1
			CR-FDP-F9-WS	485	1,240	0.40	0.119	0.001	0.010	0.182	3.11	0.004	0.233	0.11	0.1160	0.04	0.187	0.842	2.75
			CR-FDP-F10-WS	560	1,920	0.40	0.0483	0.001	0.010	0.184	3.63	0.004	0.11	0.323	0.2690	0.04	0.197	0.988	3.07
			CR-DS-F3-WS	418	880	0.40	0.138	0.001	0.010	0.176	3.29	0.004	0.155	0.0723	0.0733	0.04	0.204	0.99	2.93
			CR-DS-F4-WS	431	920	0.40	0.183	0.001	0.010	0.216	4.21	0.004	0.136	0.136	0.1380	0.04	0.225	1.07	3.03
			CR-DS-F7-WS	410	700	22.00	0.0357	0.001	0.080	0.188	45.7	0.0081	0.54	0.222	0.1970	0.046	0.181	0.944	2.75
			CR-DS-F8-WS	465	1,010	0.89	0.115	0.001	0.010	0.233	4.23	0.004	0.245	0.165	0.1640	0.04	0.255	1.15	3.31
			CR-DS-F9-WS	415	800	0.40	0.0963	0.001	0.010	0.222	2.7	0.004	0.342	0.0893	0.0735	0.04	0.215	1.02	3.11
			CR-DS-F10-WS	410	860	0.40	0.14	0.001	0.010	0.188	2.68	0.004	0.188	0.112	0.1250	0.04	0.278	1.21	3.13
			Mean	444	1,007	2.61	0.1055	0.0010	0.0170	0.1986	7.53	0.0044	0.2263	0.1496	0.1404	0.0406	0.2108	0.9844	3.0500
		Median	418	880	0.40	0.1170	0.0010	0.0100	0.1890	3.20	0.0040	0.1870	0.1300	0.1290	0.0400	0.2020	0.9890	3.0850	
		Minimum	400	700	0.40	0.0357	0.0010	0.0100	0.1760	2.60	0.0040	0.1100	0.0723	0.0733	0.0400	0.1660	0.7210	2.7500	
		Maximum	560	1,920	22.00	0.1830	0.0010	0.0800	0.2330	45.70	0.0081	0.5400	0.3230	0.2690	0.0460	0.2780	1.2100	3.3200	
		Standard Error	17	126	2.16	0.0150	0.0000	0.0070	0.0061	4.25	0.0004	0.0411	0.0233	0.0185	0.0006	0.0108	0.0452	0.0622	
		Standard Deviation	52	379	6.82	0.0475	0.0000	0.0221	0.0194	13.43	0.0013	0.1298	0.0738	0.0585	0.0019	0.0342	0.1430	0.1967	

Notes:
 Metal concentration values are expressed in mg/kg wet weight except the Selenium (Se) dwt column which is expressed in mg/kg dry weight.
 "-" summary statistics not applicable for sample size of n=1
 Values below the detection limit were set at the detection limit for summary statistics



Table C1-4: 2022 Summary Statistics for Contaminants of Concern in Small-Bodied Fish

Waterbody	Fish Species	Descriptive Statistics	Total Length (mm)	Fresh Weight (g)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwt	Zinc (Zn)	
WB-3	Lake Chub	Sample Size (n)	20	20	4	4	4	4	4	4	4	4	4	4	4	4	
		No. MDL (n)	-	-	0	0	0	0	0	0	0	0	0	4	0	0	0
		Minimum	104	9	0.06	0.00	0.01	1.00	0.01	5.62	0.06	0.076	0.04	0.34	1.35	38.20	
		Maximum	139	20	0.12	0.01	0.03	1.94	0.02	7.55	0.08	0.094	0.04	0.40	1.62	44.70	
		Mean	117	13	0.09	0.00	0.02	1.49	0.02	6.89	0.07	0.084	-	0.37	1.49	41.35	
		Median	116	12	0.09	0.00	0.02	1.52	0.02	7.20	0.07	0.084	-	0.37	1.49	41.25	
		Standard deviation	9	3	0.03	0.00	0.01	0.44	0.00	0.86	0.01	0.008	-	0.03	0.12	2.77	
Standard error	2	1	0.01	0.00	0.00	0.22	0.00	0.43	0.00	0.004	-	0.01	0.06	1.38			
WC-3	Brook Stickleback	Sample Size (n)	32	32	1	1	1	1	1	1	1	1	1	1	1	1	
		No. MDL (n)	-	-	0	0	0	0	0	0	0	0	1	0	0	0	
		Minimum	41	1	0.29	0.01	0.03	1.08	0.01	6.69	0.04	0.063	0.04	0.19	0.97	23.70	
		Maximum	60	2	0.29	0.01	0.03	1.08	0.01	6.69	0.04	0.063	0.04	0.19	0.97	23.70	
		Mean	52	1	0.29	0.01	0.03	1.08	0.01	6.69	0.04	0.063	0.04	0.19	0.97	23.70	
		Median	53	1	0.29	0.01	0.03	1.08	0.01	6.69	0.04	0.063	0.04	0.19	0.97	23.70	
		Standard deviation	4	0	-	-	-	-	-	-	-	-	-	-	-	-	
	Standard error	1	0	-	-	-	-	-	-	-	-	-	-	-	-		
	Central Mudminnow	Sample Size (n)	20	20	4	4	4	4	4	4	4	4	4	4	4	4	
		No. MDL (n)	-	-	0	0	0	0	0	0	0	0	3	0	0	0	
		Minimum	78	4	0.22	0.01	0.03	0.53	0.01	7.59	0.06	0.082	0.04	0.18	0.84	48.30	
		Maximum	116	13	0.27	0.01	0.04	0.67	0.02	12.10	0.11	0.146	0.05	0.20	0.90	67.30	
		Mean	92	7	0.24	0.01	0.04	0.60	0.01	9.36	0.08	0.106	0.04	0.19	0.87	60.90	
		Median	90	6	0.24	0.01	0.04	0.60	0.01	8.88	0.07	0.098	0.04	0.19	0.87	64.00	
Standard deviation		10	2	0.02	0.00	0.01	0.06	0.00	2.01	0.02	0.028	0.00	0.01	0.02	8.65		
Standard error	2	1	0.01	0.00	0.00	0.03	0.00	1.00	0.01	0.014	0.00	0.00	0.01	4.33			
WC-4	Brook Stickleback	Sample Size (n)	19	19	1	1	1	1	1	1	1	1	1	1	1		
		No. MDL (n)	-	-	0	0	0	0	0	0	0	0	1	0	0		
		Minimum	47	1	0.33	0.01	0.05	1.04	0.01	18.90	0.10	0.127	0.04	0.38	1.58	28.30	
		Maximum	65	2	0.33	0.01	0.05	1.04	0.01	18.90	0.10	0.127	0.04	0.38	1.58	28.30	
		Mean	56	1	0.33	0.01	0.05	1.04	0.01	18.90	0.10	0.127	0.04	0.38	1.58	28.30	
		Median	55	1	0.33	0.01	0.05	1.04	0.01	18.90	0.10	0.127	0.04	0.38	1.58	28.30	
		Standard deviation	5	0	-	-	-	-	-	-	-	-	-	-	-		
	Standard error	1	0	-	-	-	-	-	-	-	-	-	-	-			
	Central Mudminnow	Sample Size (n)	6	6	1	1	1	1	1	1	1	1	1	1	1		
		No. MDL (n)	-	-	0	0	0	0	0	0	0	0	1	0	0		
		Minimum	80	5	0.23	0.01	0.02	0.61	0.01	7.04	0.08	0.107	0.04	0.32	1.44	66.90	
		Maximum	98	10	0.23	0.01	0.02	0.61	0.01	7.04	0.08	0.107	0.04	0.32	1.44	66.90	
		Mean	89	7	0.23	0.01	0.02	0.61	0.01	7.04	0.08	0.107	0.04	0.32	1.44	66.90	
		Median	88	7	0.23	0.01	0.02	0.61	0.01	7.04	0.08	0.107	0.04	0.32	1.44	66.90	
Standard deviation		7	2	-	-	-	-	-	-	-	-	-	-	-			
Standard error	3	1	-	-	-	-	-	-	-	-	-	-	-				
WC-5	Central Mudminnow	Sample Size (n)	28	28	5	5	5	5	5	5	5	5	5	5	5		
		No. MDL (n)	-	-	0	0	0	0	0	0	0	0	5	0	0		
		Minimum	69	3	0.18	0.01	0.01	0.47	0.01	5.13	0.03	0.028	0.04	0.13	0.59	57.40	
		Maximum	100	8	0.26	0.01	0.02	0.57	0.02	8.18	0.04	0.052	0.04	0.17	0.78	96.40	
		Mean	87	6	0.22	0.01	0.02	0.53	0.02	6.91	0.03	0.042	0.04	0.16	0.71	77.96	
		Median	88	6	0.22	0.01	0.02	0.54	0.02	6.66	0.03	0.043	0.04	0.16	0.74	81.10	
		Standard deviation	10	2	0.03	0.00	0.00	0.04	0.00	1.25	0.01	0.009	0.00	0.01	0.08	15.78	
	Standard error	2	0	0.01	0.00	0.00	0.02	0.00	0.56	0.00	0.004	0.00	0.01	0.03	7.06		
	Finescale Dace	Sample Size (n)	50	50	5	5	5	5	5	5	5	5	5	5	5		
		No. MDL (n)	-	-	0	0	4	0	0	0	0	0	5	0	0		
		Minimum	55	1	0.18	0.00	0.01	0.81	0.01	4.00	0.02	0.025	0.04	0.14	0.64	40.60	
		Maximum	78	4	0.32	0.01	0.01	0.97	0.01	5.67	0.03	0.043	0.04	0.19	0.88	51.30	
		Mean	66	2	0.28	0.01	0.01	0.87	0.01	4.63	0.02	0.032	0.04	0.16	0.70	46.82	
		Median	66	2	0.30	0.01	0.01	0.84	0.01	4.19	0.02	0.029	0.04	0.16	0.68	47.20	
Standard deviation		5	1	0.06	0.00	0.00	0.07	0.00	0.75	0.00	0.007	0.00	0.02	0.10	4.09		
Standard error	1	0	0.03	0.00	0.00	0.03	0.00	0.34	0.00	0.003	0.00	0.01	0.04	1.83			



Table C1-4: 2022 Summary Statistics for Contaminants of Concern in Small-Bodied Fish

Waterbody	Fish Species	Descriptive Statistics	Total Length (mm)	Fresh Weight (g)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwt	Zinc (Zn)	
WC-6B	Brook Stickleback	Sample Size (n)	19	19	2	2	2	2	2	2	2	2	2	2	2	2	
		No. MDL (n)	-	-	0	0	0	0	0	0	0	0	0	2	0	0	0
		Minimum	45	1	0.12	0.00	0.02	0.52	0.01	10.70	0.04	0.048	0.04	0.13	0.66	20.30	
		Maximum	80	5	0.16	0.01	0.04	0.69	0.01	13.30	0.05	0.072	0.04	0.18	0.77	30.00	
		Mean	58	2	0.14	0.00	0.03	0.60	0.01	12.00	0.05	0.060	0.04	0.15	0.72	25.15	
		Median	55	2	0.14	0.00	0.03	0.60	0.01	12.00	0.05	0.060	0.04	0.15	0.72	25.15	
		Standard deviation	10	1	0.03	0.00	0.02	0.12	0.00	1.84	0.01	0.017	0.00	0.04	0.08	6.86	
	Standard error	2	0	0.02	0.00	0.01	0.08	0.00	1.30	0.01	0.012	0.00	0.03	0.05	4.85		
	Central Mudminnow	Sample Size (n)	16	16	3	3	3	3	3	3	3	3	3	3	3	3	
		No. MDL (n)	-	-	0	0	2	0	0	0	0	0	3	0	0	0	
		Minimum	74	3	0.23	0.01	0.01	0.54	0.01	7.72	0.04	0.046	0.04	0.17	0.76	61.80	
		Maximum	113	14	0.26	0.01	0.01	0.59	0.01	22.20	0.06	0.090	0.04	0.18	0.79	84.70	
		Mean	94	8	0.24	0.01	0.01	0.57	0.01	12.86	0.05	0.064	0.04	0.17	0.77	73.57	
		Median	94	8	0.23	0.01	0.01	0.56	0.01	8.66	0.05	0.057	0.04	0.17	0.77	74.20	
Standard deviation		13	3	0.02	0.00	0.00	0.02	0.00	8.10	0.01	0.023	0.00	0.00	0.01	11.46		
Standard error	3	1	0.01	0.00	0.00	0.01	0.00	4.68	0.01	0.013	0.00	0.00	0.01	6.62			
WC-6C	Brook Stickleback	Sample Size (n)	55	55	4	4	4	4	4	4	4	4	4	4	4		
		No. MDL (n)	-	-	0	0	1	0	0	0	0	0	4	0	0		
		Minimum	45	1	0.11	0.01	0.01	0.81	0.01	8.73	0.11	0.156	0.04	0.23	1.10	28.40	
		Maximum	73	3	0.15	0.01	0.02	0.93	0.01	11.30	0.17	0.209	0.04	0.25	1.13	35.60	
		Mean	57	2	0.13	0.01	0.01	0.88	0.01	9.87	0.14	0.186	0.04	0.24	1.11	32.65	
		Median	58	2	0.13	0.01	0.01	0.90	0.01	9.72	0.15	0.190	0.04	0.24	1.10	33.30	
		Standard deviation	7	1	0.02	0.00	0.00	0.05	0.00	1.09	0.02	0.024	0.00	0.01	0.01	3.12	
	Standard error	1	0	0.01	0.00	0.00	0.03	0.00	0.54	0.01	0.012	0.00	0.00	0.01	1.56		
	Central Mudminnow	Sample Size (n)	25	25	5	5	5	5	5	5	5	5	5	5	5		
		No. MDL (n)	-	-	0	0	4	0	0	0	0	0	2	0	0		
		Minimum	73	5	0.24	0.01	0.01	0.47	0.01	7.22	0.08	0.100	0.04	0.21	0.98	65.90	
		Maximum	107	11	0.33	0.02	0.01	0.76	0.01	13.40	0.15	0.202	0.05	0.25	1.14	83.40	
		Mean	90	8	0.28	0.02	0.01	0.64	0.01	9.89	0.11	0.144	0.04	0.23	1.06	75.30	
		Median	88	8	0.26	0.02	0.01	0.66	0.01	10.00	0.10	0.133	0.04	0.23	1.06	77.80	
Standard deviation		9	2	0.04	0.00	0.00	0.11	0.00	2.68	0.03	0.038	0.00	0.01	0.06	7.67		
Standard error	2	0	0.02	0.00	0.00	0.05	0.00	1.20	0.01	0.017	0.00	0.01	0.03	3.43			
WC-7A-07	Central Mudminnow	Sample Size (n)	25	25	5	5	5	5	5	5	5	5	5	5	5		
		No. MDL (n)	-	-	0	0	0	0	0	0	0	0	5	0	0		
		Minimum	76	4	0.14	0.02	0.04	0.45	0.01	6.28	0.04	0.050	0.04	0.17	0.80	58.30	
		Maximum	95	9	0.18	0.03	0.05	0.54	0.02	9.42	0.05	0.065	0.04	0.19	0.97	75.60	
		Mean	86	6	0.16	0.02	0.04	0.51	0.01	7.69	0.05	0.059	0.04	0.18	0.87	64.38	
		Median	85	6	0.16	0.02	0.04	0.52	0.01	7.57	0.05	0.062	0.04	0.18	0.87	62.90	
		Standard deviation	5	1	0.02	0.00	0.01	0.04	0.00	1.26	0.00	0.006	0.00	0.01	0.07	6.57	
Standard error	1	0	0.01	0.00	0.00	0.02	0.00	0.57	0.00	0.003	0.00	0.00	0.03	2.94			

Notes:
 Concentrations less than the reportable detection limit were given the lowest reportable value for calculation of summary statistics (e.g., a concentration of <0.0010 was considered 0.0010).
 No. MDL indicates the number of sample results reported less than the detection limit.
 Metal concentration values are expressed in mg/kg wet weight.



Table C1-5: 2022 Small-bodied Fish Composite Tissue Data

Waterbody	Species	Sample ID	Total Length Range (mm)	Average Total Length (mm)	Total Weight Range (g)	Average Total Weight (g)	No. Fish in Composite Sample	Moisture (%)	Mercury (Hg)	Methylmercury (MeHg)
Unnamed Waterbody 3	Lake Chub	WB-3-MT1-COMP1-LKCH	120 - 139	127	12.43 - 19.76	16.2	5	75.4	0.072	0.076
		WB-3-MT1-COMP2-LKCH	111 - 121	113	10.79 - 12.87	11.8	5	75.0	0.072	0.094
		WB-3-MT1-COMP3-LKCH	107 - 110	109	8.86 - 14.61	11.3	5	74.9	0.060	0.082
		WB-3-MT1-COMP4-LKCH	104 - 127	120	9.99 - 16.68	13.6	5	75.8	0.075	0.085
Unnamed Watercourse 3	Brook Stickleback	WC-3B-MT1-COMP1-BSB	41 - 60	52	0.54 - 1.65	1.1	32	80.6	0.044	0.063
	Central Mudminnow	WC-3B-MT1-COMP1-CMM	88 - 96	92	5.3 - 6.78	6.2	5	78.7	0.068	0.094
		WC-3B-MT1-COMP2-CMM	85 - 90	87	4.72 - 6.01	5.5	5	77.6	0.059	0.082
		WC-3B-MT1-COMP3-CMM	78 - 90	83	4.13 - 6.27	4.9	5	78.2	0.074	0.102
		WC-3B-MT1-COMP4-CMM	94 - 116	106	7.97 - 12.52	10.0	5	77.5	0.114	0.146
Unnamed Watercourse 4	Brook Stickleback	WC-4-MT1-COMP1-BSB	47 - 65	56	0.63 - 2.03	1.1	19	76.2	0.096	0.127
	Central Mudminnow	WC-4-MT1-COMP1-CMM	80 - 98	89	4.56 - 9.56	7.1	6	77.8	0.078	0.107
Unnamed Watercourse 5	Central Mudminnow	WC-5-MT1-COMP1-CMM	95 - 100	98	6.89 - 7.78	7.4	5	77.9	0.033	0.043
		WC-5-MT1-COMP2-CMM	83 - 93	87	4.6 - 5.67	5.3	5	78.4	0.036	0.048
		WC-5-MT1-COMP3-CMM	92 - 99	95	6.35 - 8.24	7.1	5	76.2	0.041	0.052
		WC-5-MT1-COMP4-CMM	85 - 92	88	5.25 - 6.38	5.8	5	78.8	0.028	0.039
		WC-5-MT1-COMP5-CMM	69 - 82	74	2.98 - 4.17	3.5	8	77.7	0.025	0.028
	Finescale Dace	WC-5-MT1-COMP1-FSD	69 - 75	73	2.61 - 3.56	3.2	7	77.9	0.031	0.043
		WC-5-MT1-COMP2-FSD	58 - 78	66	1.35 - 2.53	2.0	10	77.5	0.026	0.036
		WC-5-MT1-COMP3-FSD	55 - 71	66	1.32 - 2.72	2.2	10	75.9	0.019	0.025
		WC-5-MT1-COMP4-FSD	55 - 72	63	1.22 - 2.79	1.8	12	76.5	0.020	0.028
		WC-5-MT1-COMP5-FSD	60 - 68	64	1.58 - 2.27	2.0	11	76.4	0.020	0.029
Unnamed Watercourse 6B	Brook Stickleback	WC-6B-MT1-COMP1-BSB	45 - 60	53	0.76 - 1.86	1.4	13	80.7	0.039	0.048
		WC-6B-MT1-COMP2-BSB	60 - 80	70	2.02 - 4.68	3.3	6	76.7	0.053	0.072
	Central Mudminnow	WC-6B-MT1-COMP1-CMM	74 - 80	77	3.48 - 6.22	4.6	5	77.5	0.038	0.046
		WC-6B-MT1-COMP2-CMM	93 - 95	94	7.37 - 8.68	8.0	5	77.8	0.062	0.090
		WC-6B-MT1-COMP3-CMM	99 - 113	107	10.44 - 14.44	12.1	6	77.5	0.051	0.057
Unnamed Watercourse 6C	Brook Stickleback	WC-6C-MT1-COMP1-BSB	45 - 55	50	0.73 - 1.36	1.0	26	79.7	0.110	0.156
		WC-6C-MT1-COMP2-BSB	58 - 66	61	0.85 - 2.35	1.8	11	78.6	0.151	0.209
		WC-6C-MT1-COMP3-BSB	58 - 67	62	1.53 - 2.59	1.9	10	78.1	0.168	0.178
		WC-6C-MT1-COMP4-BSB	62 - 73	66	1.73 - 2.82	2.4	8	77.7	0.141	0.202
	Central Mudminnow	WC-6C-MT1-COMP1-CMM	73 - 82	78	4.03 - 5.41	4.7	5	79.4	0.099	0.133
		WC-6C-MT1-COMP2-CMM	78 - 86	83	4.34 - 5.76	5.2	5	78.0	0.082	0.100
		WC-6C-MT1-COMP3-CMM	83 - 96	90	5.02 - 7.35	6.3	5	76.9	0.126	0.156
		WC-6C-MT1-COMP4-CMM	95 - 107	100	8.44 - 10.76	9.3	5	78.6	0.145	0.202
Unnamed Watercourse 7A-07	Central Mudminnow	WC-7A-07-MT1-COMP1-CMM	88 - 95	92	7.57 - 8.58	8.1	5	80.6	0.046	0.065
		WC-7A-07-MT1-COMP2-CMM	81 - 87	83	5.27 - 7	5.9	5	80.2	0.050	0.062
		WC-7A-07-MT1-COMP3-CMM	83 - 90	87	5.32 - 7.53	6.5	5	78.5	0.047	0.062
		WC-7A-07-MT1-COMP4-CMM	76 - 82	80	4.18 - 5.44	5.0	5	78.7	0.043	0.059
		WC-7A-07-MT1-COMP5-CMM	83 - 89	86	5.84 - 6.35	6.1	5	78.8	0.040	0.050

Notes:
 Mercury and methylmercury concentration values are expressed in mg/kg wet weight.
 Number of fish included in composite samples ranged depending on the size of the target species present at the time of sampling



Table C1-6: 2023 Summary Statistics for Contaminants of Concern in Small-Bodied Fish

Waterbody	Fish Species	Descriptive Statistics	Total Length (mm)	Fresh Weight (g)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwf	Zinc (Zn)	
Dixie Creek	Yellow Perch	Sample Size (n)	9	9	2.00	2.00	2.00	2.00	2.00	2.00	2.000	2.000	2.00	2.00	2.00	2.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	2.00	0.00	0.00	0.00
		Minimum	54	1	0.07	0.00	0.02	0.40	0.01	3.76	0.026	0.021	0.00	0.14	0.81	16.10	
		Maximum	109	14	0.08	0.01	0.04	0.46	0.01	10.00	0.047	0.031	0.00	0.20	1.13	22.10	
		Mean	80	6	0.07	0.00	0.03	0.43	0.01	6.88	0.037	0.026	-	0.17	0.97	19.10	
		Median	77	1	0.07	0.00	0.03	0.43	0.01	6.88	0.037	0.026	-	0.17	0.97	19.10	
		Standard deviation	22	6	0.01	0.00	0.02	0.04	0.00	4.41	0.015	0.007	-	0.04	0.22	4.24	
		Standard error	7	2	0.01	0.00	0.01	0.03	0.00	3.12	0.011	0.005	-	0.03	0.16	3.00	
Chukuni River	Yellow Perch	Sample Size (n)	17	17	2.00	2.00	2.00	2.00	2.00	2.00	2.000	2.000	2.00	2.00	2.00	2.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	1.00	0.00	0.00	0.00
		Minimum	51	1	0.25	0.01	0.05	0.49	0.01	4.58	0.041	0.020	0.05	0.21	0.56	20.30	
		Maximum	80	5	0.36	0.01	0.07	0.57	0.02	5.49	0.049	0.020	0.06	0.28	0.77	28.20	
		Mean	63	3	0.30	0.01	0.06	0.53	0.02	5.04	0.045	0.020	0.06	0.25	0.66	24.25	
		Median	60	2	0.30	0.01	0.06	0.53	0.02	5.04	0.045	0.020	0.06	0.25	0.66	24.25	
		Standard deviation	9	1	0.08	0.00	0.02	0.06	0.00	0.64	0.006	0.000	0.01	0.05	0.15	5.59	
		Standard error	2	0	0.05	0.00	0.01	0.04	0.00	0.46	0.004	0.000	0.01	0.03	0.10	3.95	
GL	Iowa Darter	Sample Size (n)	-	-	2.00	2.00	2.00	2.00	2.00	2.00	2.000	2.000	2.00	2.00	2.00	2.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	2.00	0.00	0.00	0.00
		Minimum	-	-	0.20	0.00	0.03	0.55	0.05	4.16	0.029	0.014	0.00	0.26	1.27	32.70	
		Maximum	-	-	0.21	0.00	0.03	0.59	0.05	4.20	0.032	0.015	0.00	0.29	1.40	40.00	
		Mean	-	-	0.21	0.00	0.03	0.57	0.05	4.18	0.030	0.014	-	0.27	1.34	36.35	
		Median	-	-	0.21	0.00	0.03	0.57	0.05	4.18	0.030	0.014	-	0.27	1.34	36.35	
		Standard deviation	-	-	0.01	0.00	0.00	0.03	0.00	0.03	0.002	0.001	-	0.02	0.09	5.16	
		Standard error	-	-	0.01	0.00	0.00	0.02	0.00	0.02	0.001	0.001	-	0.01	0.06	3.65	
	Spottail Shiner	Sample Size (n)	-	-	4.00	4.00	3.00	4.00	4.00	4.00	4.00	4.000	4.000	4.00	4.00	4.00	4.00
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	4.00	0.00	0.00	0.00
		Minimum	-	-	0.10	0.00	0.01	0.35	0.01	2.75	0.025	0.013	0.00	0.25	1.28	39.70	
		Maximum	-	-	0.12	0.00	0.02	0.39	0.03	3.90	0.027	0.021	0.00	0.27	1.44	44.40	
		Mean	-	-	0.11	0.00	0.01	0.37	0.01	3.13	0.026	0.017	-	0.26	1.35	42.08	
		Median	-	-	0.11	0.00	0.01	0.36	0.01	2.94	0.026	0.017	-	0.26	1.34	42.10	
		Standard deviation	-	-	0.01	0.00	0.00	0.02	0.01	0.53	0.001	0.004	-	0.01	0.07	1.93	
		Standard error	-	-	0.01	0.00	0.00	0.01	0.01	0.26	0.000	0.002	-	0.00	0.04	0.97	
WB-3	Finescale Dace	Sample Size (n)	50	50	5.00	5.00	3.00	5.00	5.00	5.00	5.000	5.000	5.00	5.00	5.00	5.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	5.00	0.00	0.00	0.00	
		Minimum	57	2	0.08	0.01	0.01	1.16	0.01	4.33	0.054	0.034	0.00	0.35	1.35	45.60	
		Maximum	85	5	0.15	0.01	0.02	1.98	0.05	6.06	0.059	0.047	0.00	0.49	1.79	53.40	
		Mean	66	3	0.12	0.01	0.02	1.60	0.02	5.23	0.057	0.042	-	0.44	1.59	49.32	
		Median	66	2	0.13	0.01	0.02	1.68	0.01	5.06	0.058	0.042	-	0.44	1.62	49.70	
		Standard deviation	6	1	0.03	0.00	0.01	0.37	0.02	0.72	0.002	0.005	-	0.05	0.17	3.20	
		Standard error	1	0	0.01	0.00	0.00	0.16	0.01	0.32	0.001	0.002	-	0.02	0.08	1.43	
	Lake Chub	Sample Size (n)	24	24	5.00	5.00	1.00	5.00	4.00	5.00	5.000	5.000	5.00	5.00	5.00	5.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	5.00	0.00	0.00	0.00	
		Minimum	90	7	0.06	0.00	0.01	0.80	0.01	5.31	0.060	0.041	0.00	0.43	1.47	39.50	
		Maximum	137	21	0.18	0.01	0.01	1.36	0.01	9.02	0.080	0.086	0.00	0.46	1.80	75.50	
		Mean	109	11	0.08	0.00	0.01	1.14	0.01	6.60	0.069	0.060	-	0.44	1.67	51.02	
		Median	109	11	0.06	0.00	0.01	1.29	0.01	6.40	0.071	0.056	-	0.44	1.77	44.70	
		Standard deviation	14	4	0.05	0.00	0.00	0.25	0.00	1.45	0.009	0.018	-	0.01	0.16	14.32	
		Standard error	3	1	0.02	0.00	0.00	0.11	0.00	0.65	0.004	0.008	-	0.01	0.07	6.40	

Table C1-6: 2023 Summary Statistics for Contaminants of Concern in Small-Bodied Fish

Waterbody	Fish Species	Descriptive Statistics	Total Length (mm)	Fresh Weight (g)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwf	Zinc (Zn)	
WB-6	Yellow Perch	Sample Size (n)	13	13	1.00	1.00	1.00	1.00	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	1.00	0.00	0.00	0.00
		Minimum	38	10	0.11	0.01	0.07	0.56	0.03	7.27	0.031	0.023	0.04	0.25	1.00	23.60	
		Maximum	100	10	0.11	0.01	0.07	0.56	0.03	7.27	0.031	0.023	0.04	0.25	1.00	23.60	
		Mean	54	10	0.11	0.01	0.07	0.56	0.03	7.27	0.031	0.023	0.04	0.25	1.00	23.60	
		Median	50	10	0.11	0.01	0.07	0.56	0.03	7.27	0.031	0.023	0.04	0.25	1.00	23.60	
		Standard deviation	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WC-2	Brook Stickleback	Sample Size (n)	26	26	2.00	2.00	2.00	2.00	2.00	2.00	2.000	2.000	2.00	2.00	2.00	2.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	2.00	0.00	0.00	0.00	
		Minimum	50	1	0.11	0.00	0.04	0.80	0.01	12.00	0.133	0.098	0.04	0.21	0.80	30.90	
		Maximum	67	2	0.12	0.00	0.06	0.81	0.01	14.20	0.136	0.137	0.04	0.22	0.83	31.50	
		Mean	62	2	0.11	0.00	0.05	0.80	0.01	13.10	0.135	0.118	0.04	0.21	0.81	31.20	
		Median	63	2	0.11	0.00	0.05	0.80	0.01	13.10	0.135	0.118	0.04	0.21	0.81	31.20	
		Standard deviation	4	0	0.01	0.00	0.01	0.00	0.00	1.56	0.002	0.027	-	0.01	0.02	0.42	
WC-3	Central Mudminnow	Sample Size (n)	10	10	5.00	5.00	5.00	5.00	5.00	5.00	5.000	5.000	5.00	5.00	5.00	5.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	5.00	0.00	0.00	0.00	
		Minimum	64	3	0.15	0.01	0.02	0.44	0.01	13.20	0.070	0.025	0.00	0.15	0.60	86.70	
		Maximum	88	6	0.18	0.01	0.03	0.56	0.01	17.10	0.121	0.097	0.00	0.18	0.76	111.00	
		Mean	77	5	0.17	0.01	0.03	0.50	0.01	14.16	0.100	0.076	-	0.17	0.71	99.08	
		Median	77	5	0.18	0.01	0.03	0.48	0.01	13.60	0.101	0.092	-	0.18	0.74	101.00	
		Standard deviation	7	1	0.01	0.00	0.01	0.05	0.00	1.65	0.020	0.030	-	0.01	0.07	9.26	
	Standard error	2	0	0.01	0.00	0.00	0.02	0.00	0.74	0.009	0.014	-	0.01	0.03	4.14		
	Finescale Dace	Sample Size (n)	34	34	5.00	5.00	5.00	5.00	5.00	5.00	5.000	5.000	5.00	5.00	5.00	5.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	1.00	0.00	0.00	0.00	
		Minimum	32	0	0.19	0.00	0.05	0.74	0.01	14.40	0.025	0.020	0.04	0.13	0.50	54.00	
		Maximum	76	8	0.26	0.01	0.28	1.20	0.04	37.40	0.059	0.056	0.16	0.19	0.73	64.00	
		Mean	52	2	0.23	0.01	0.14	0.92	0.02	19.90	0.036	0.033	0.08	0.16	0.65	59.44	
		Median	56	1	0.23	0.00	0.11	0.80	0.01	15.20	0.026	0.027	0.06	0.15	0.68	58.20	
Standard deviation		13	1	0.03	0.00	0.09	0.22	0.01	9.89	0.015	0.014	0.05	0.03	0.09	4.25		
WC-4	Brook Stickleback	Sample Size (n)	58	58	2.00	2.00	2.00	2.00	2.00	2.00	2.000	2.000	2.00	2.00	2.00	2.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	2.00	0.00	0.00	0.00	
		Minimum	44	0	0.20	0.01	0.04	1.05	0.02	13.30	0.085	0.101	0.00	0.35	1.38	34.20	
		Maximum	64	2	0.25	0.01	0.04	1.10	0.02	23.20	0.129	0.119	0.00	0.35	1.39	38.60	
		Mean	52	1	0.23	0.01	0.04	1.08	0.02	18.25	0.107	0.110	-	0.35	1.39	36.40	
		Median	52	1	0.23	0.01	0.04	1.08	0.02	18.25	0.107	0.110	-	0.35	1.39	36.40	
		Standard deviation	4	0	0.03	0.00	0.00	0.04	0.00	7.00	0.031	0.013	-	0.00	0.01	3.11	
WC-5	Central Mudminnow	Sample Size (n)	30	30	5.00	5.00	5.00	5.00	5.00	5.00	5.000	5.000	5.00	5.00	5.00	5.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	5.00	0.00	0.00	0.00	
		Minimum	58	2	0.19	0.01	0.01	0.52	0.02	6.38	0.025	0.025	0.00	0.15	0.60	66.60	
		Maximum	98	10	0.22	0.01	0.03	0.58	0.03	9.79	0.043	0.045	0.00	0.19	0.78	94.70	
		Mean	74	5	0.20	0.01	0.02	0.53	0.02	8.06	0.034	0.037	-	0.17	0.71	78.20	
		Median	74	4	0.20	0.01	0.02	0.52	0.02	7.87	0.037	0.043	-	0.17	0.72	78.30	
		Standard deviation	11	2	0.01	0.00	0.01	0.03	0.00	1.23	0.008	0.010	-	0.02	0.07	11.80	
WC-6A-US	Central Mudminnow	Sample Size (n)	5	5	1.00	1.00	1.00	1.00	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	1.00	0.00	0.00	0.00	
		Minimum	75	4	0.28	0.01	0.02	0.62	0.01	19.00	0.120	0.137	<0.040	0.22	0.86	62.20	
		Maximum	93	8	0.28	0.01	0.02	0.62	0.01	19.00	0.120	0.137	<0.040	0.22	0.86	62.20	
		Mean	83	6	0.28	0.01	0.02	0.62	0.01	19.00	0.120	0.137	<0.040	0.22	0.86	62.20	
		Median	81	5	0.28	0.01	0.02	0.62	0.01	19.00	0.120	0.137	<0.040	0.22	0.86	62.20	
		Standard deviation	8	2	-	-	-	-	-	-	-	-	-	-	-	-	

Table C1-6: 2023 Summary Statistics for Contaminants of Concern in Small-Bodied Fish

Waterbody	Fish Species	Descriptive Statistics	Total Length (mm)	Fresh Weight (g)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwf	Zinc (Zn)	
WC-6B	Brook Stickleback	Sample Size (n)	33	33	2.00	2.00	2.00	2.00	2.00	2.00	2.000	2.000	2.00	2.00	2.00	2.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	2.00	0.00	0.00	0.00
		Minimum	46	1	0.25	0.01	0.03	0.88	0.02	11.60	0.070	0.065	0.00	0.18	0.79	35.80	
		Maximum	62	2	0.26	0.01	0.06	0.93	0.02	17.20	0.081	0.078	0.00	0.20	0.85	36.90	
		Mean	55	1	0.26	0.01	0.04	0.91	0.02	14.40	0.076	0.072	-	0.19	0.82	36.35	
		Median	56	1	0.26	0.01	0.04	0.91	0.02	14.40	0.076	0.072	-	0.19	0.82	36.35	
		Standard deviation	5	0	0.01	0.00	0.02	0.03	0.00	3.96	0.008	0.009	-	0.01	0.04	0.78	
	Standard error	1	0	0.01	0.00	0.02	0.02	0.00	2.80	0.005	0.006	-	0.01	0.03	0.55		
	Central Mudminnow	Sample Size (n)	39	39	5.00	5.00	3.00	5.00	5.00	5.00	5.000	5.000	5.00	5.00	5.00	5.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	5.00	5.00	0.00	0.00	
		Minimum	47	1	0.28	0.01	0.01	0.55	0.01	11.30	0.056	0.058	0.04	0.18	0.72	76.20	
		Maximum	127	18	0.44	0.01	0.04	0.68	0.02	15.40	0.084	0.104	0.04	0.21	0.84	118.00	
		Mean	78	6	0.33	0.01	0.02	0.59	0.01	13.46	0.073	0.078	0.04	0.19	0.78	89.90	
		Median	75	4	0.29	0.01	0.02	0.57	0.01	13.70	0.075	0.079	0.04	0.19	0.76	87.60	
Standard deviation		22	5	0.07	0.00	0.01	0.06	0.00	1.60	0.010	0.017	-	0.01	0.05	16.59		
Standard error	4	1	0.03	0.00	0.01	0.03	0.00	0.72	0.005	0.008	-	0.01	0.02	7.42			
WC-6B-02	Brook Stickleback	Sample Size (n)	28	28	1.00	1.00	1.00	1.00	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	1.00	0.00	0.00	0.00	
		Minimum	46	1	0.30	0.00	0.03	0.92	0.01	38.70	0.071	0.079	<0.040	0.21	0.86	39.80	
		Maximum	57	2	0.30	0.00	0.03	0.92	0.01	38.70	0.071	0.079	<0.040	0.21	0.86	39.80	
		Mean	50	1	0.30	0.00	0.03	0.92	0.01	38.70	0.071	0.079	<0.040	0.21	0.86	39.80	
		Median	50	1	0.30	0.00	0.03	0.92	0.01	38.70	0.071	0.079	<0.040	0.21	0.86	39.80	
		Standard deviation	3	0	-	-	-	-	-	-	-	-	-	-	-	-	
	Standard error	1	0	-	-	-	-	-	-	-	-	-	-	-	-		
	Central Mudminnow	Sample Size (n)	41	41	5.00	5.00	5.00	5.00	5.00	5.00	5.000	5.000	5.00	5.00	5.00	5.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	5.00	0.00	0.00	0.00	
		Minimum	54	2	0.21	0.01	0.04	0.58	0.01	17.00	0.110	0.102	0.05	0.19	0.73	77.00	
		Maximum	106	12	0.32	0.01	0.08	0.72	0.02	37.40	0.133	0.144	0.05	0.20	0.82	124.00	
		Mean	72	4	0.27	0.01	0.05	0.62	0.01	25.14	0.124	0.123	0.05	0.19	0.77	99.08	
		Median	65	3	0.28	0.01	0.05	0.61	0.01	22.20	0.125	0.121	0.05	0.20	0.77	96.60	
Standard deviation		16	3	0.04	0.00	0.02	0.06	0.00	8.17	0.009	0.018	-	0.01	0.03	21.04		
Standard error	2	0	0.02	0.00	0.01	0.03	0.00	3.66	0.004	0.008	-	0.00	0.01	9.41			
WC-6C	Brook Stickleback	Sample Size (n)	58	58	3.00	3.00	3.00	3.00	3.00	3.00	3.000	3.000	3.00	3.00	3.00	3.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.00	0.00	0.00	0.00	
		Minimum	43	1	0.22	0.01	0.06	1.11	0.03	18.60	0.073	0.050	0.05	0.22	0.95	39.80	
		Maximum	67	3	0.25	0.01	0.12	1.15	0.04	24.70	0.167	0.125	0.08	0.24	1.00	51.30	
		Mean	53	1	0.24	0.01	0.09	1.13	0.03	21.47	0.104	0.080	0.06	0.23	0.98	45.60	
		Median	52	1	0.24	0.01	0.09	1.12	0.03	21.10	0.073	0.067	0.07	0.23	0.99	45.70	
		Standard deviation	5	0	0.02	0.00	0.03	0.02	0.01	3.07	0.054	0.040	0.01	0.01	0.03	5.75	
	Standard error	1	0	0.01	0.00	0.01	0.01	0.00	0.92	0.016	0.012	0.00	0.00	0.02	1.73		
	Central Mudminnow	Sample Size (n)	24	24	4.00	4.00	4.00	4.00	4.00	4.00	4.000	4.000	1.00	4.00	4.00	4.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	3.00	0.00	0.00	0.00	
		Minimum	52	1	0.20	0.01	0.03	0.68	0.01	16.30	0.094	0.091	0.04	0.21	0.89	54.00	
		Maximum	98	10	0.42	0.02	0.05	0.75	0.02	29.30	0.106	0.107	0.05	0.24	0.96	85.80	
		Mean	77	5	0.28	0.02	0.04	0.72	0.02	21.58	0.098	0.097	0.05	0.22	0.92	70.18	
		Median	85	6	0.24	0.02	0.04	0.73	0.01	20.35	0.096	0.096	0.05	0.22	0.92	70.45	
Standard deviation		13	2	0.10	0.00	0.01	0.03	0.00	6.03	0.006	0.007	0.00	0.01	0.03	13.55		
Standard error	3	1	0.05	0.00	0.00	0.02	0.00	3.02	0.003	0.003	0.00	0.01	0.02	6.78			
WC-7A-08	Central Mudminnow	Sample Size (n)	23	23	3.00	3.00	3.00	3.00	3.00	3.00	3.000	3.000	3.00	3.00	3.00	3.00	
		No. MDL (n)	-	-	0.00	0.00	2.00	0.00	0.00	0.00	0.000	0.000	3.00	0.00	0.00	0.00	
		Minimum	49	1	0.36	0.01	0.01	0.48	0.02	7.32	0.029	0.019	0.00	0.18	0.75	72.30	
		Maximum	98	11	0.61	0.02	0.02	0.59	0.02	14.00	0.035	0.043	0.00	0.18	0.75	86.60	
		Mean	67	3	0.49	0.02	0.01	0.55	0.02	11.67	0.033	0.028	-	0.18	0.75	79.23	
		Median	66	2	0.51	0.02	0.01	0.58	0.02	13.70	0.034	0.021	-	0.18	0.75	78.80	
		Standard deviation	12	2	0.13	0.00	0.00	0.06	0.00	3.77	0.003	0.013	-	0.00	0.00	7.16	
Standard error	2	0	0.07	0.00	0.00	0.04	0.00	2.18	0.002	0.008	-	0.00	0.00	4.13			

Table C1-6: 2023 Summary Statistics for Contaminants of Concern in Small-Bodied Fish

Waterbody	Fish Species	Descriptive Statistics	Total Length (mm)	Fresh Weight (g)	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Methylmercury (MeHg)	Nickel (Ni)	Selenium (Se)	Selenium (Se) dwt	Zinc (Zn)	
WC-8B	Brook Stickleback	Sample Size (n)	89	89	5.00	4.00	2.00	5.00	4.00	5.00	5.000	5.000	5.00	5.00	5.00	5.00	
		No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	5.00	0.00	0.00	0.00
		Minimum	46	1	0.10	0.00	0.01	0.76	0.01	14.00	0.073	0.076	0.00	0.18	0.68	27.40	
		Maximum	68	3	0.11	0.00	0.02	0.89	0.01	16.50	0.121	0.126	0.00	0.20	0.77	38.80	
		Mean	58	2	0.10	0.00	0.01	0.85	0.01	15.52	0.101	0.103	-	0.19	0.73	33.46	
		Median	59	2	0.10	0.00	0.01	0.86	0.01	15.80	0.104	0.106	-	0.19	0.71	34.00	
		Standard deviation	6	1	0.01	0.00	0.00	0.05	0.00	0.93	0.021	0.020	-	0.01	0.04	4.30	
		Standard error	1	0	0.00	0.00	0.00	0.02	0.00	0.41	0.009	0.009	-	0.00	0.02	1.92	
		Sample Size (n)	27	27	5.00	5.00	4.00	5.00	4.00	5.00	5.000	5.000	5.00	5.00	5.00	5.00	
	No. MDL (n)	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	5.00	0.00	0.00	0.00	
	Minimum	51	1	0.08	0.00	0.01	0.92	0.01	8.18	0.068	0.077	0.04	0.21	0.78	38.20		
	Maximum	88	7	0.16	0.01	0.03	1.74	0.01	26.90	0.230	0.247	0.04	0.24	0.89	58.50		
	Mean	74	4	0.12	0.00	0.02	1.25	0.01	17.70	0.160	0.174	0.04	0.23	0.83	51.54		
	Median	77	4	0.13	0.00	0.02	1.09	0.01	15.40	0.160	0.167	0.04	0.22	0.83	52.80		
	Standard deviation	12	2	0.03	0.00	0.00	0.34	0.00	8.00	0.060	0.067	-	0.01	0.04	8.01		
	Standard error	2	0	0.01	0.00	0.00	0.15	0.00	3.58	0.027	0.030	-	0.01	0.02	3.58		
		Northern Redbelly Dace															

Notes:
 Concentrations less than the reportable detection limit were given the lowest reportable value for calculation of summary statistics (e.g., a concentration of <0.0010 was considered 0.0010).
 No. MDL indicates the number of sample results reported less than the detection limit.
 Metal concentration values are expressed in mg/kg wet weight.



Table C1-7: 2023 Small-bodied Fish Composite Tissue Data

Waterbody	Species	Sample ID	Total Length Range (mm)	Average Total Length (mm)	Total Weight Range (g)	Average Total Weight (g)	No. Fish in Composite Sample	Moisture (%)	Mercury (Hg)	Methylmercury (MeHg)
Dixie Creek	Yellow Perch	DC-01-GN2-COMP-1	100 - 109	103	11 - 14	12	4	74.5	0.0474	0.031
		DC-01-MT-COMP-1	54 - 77	62	1 - 1	1	5	74.3	0.0264	0.021
Chukuni River	Yellow Perch	CR-FDP-YLP-COMP-1	51 - 66	74	3.38 - 5.33	4	4	73.6	0.0406	0.020
		CR-FDP-YLP-COMP-2	68 - 80	58	1.35 - 3	2	12	74.8	0.049	0.020
Genessee Lake	Iowa Darter	GL-ID-COMP-1	-	-	-	1	29	81.7	0.0293	0.015
		GL-ID-COMP-2	-	-	-	1	27	77.6	0.0316	0.014
	Spottail Shiner	GL-SPTS-COMP-1	30 - 40	35	-	0	102	80.8	0.0259	0.019
		GL-SPTS-COMP-2	30 - 40	35	-	0	96	80.8	0.0253	0.021
		GL-SPTS-COMP-3	30 - 40	35	-	0	94	80.8	0.026	0.013
		GL-SPTS-COMP-4	30 - 40	35	-	0	86	81.5	0.0274	0.015
Unnamed Waterbody 3	Finescale Dace	WB-3-FNSD-COMP-1	62 - 62	62	2.2 - 2.2	2	1	74	0.059	0.042
		WB-3-FNSD-COMP-2	59 - 59	59	1.74 - 1.74	2	1	72.8	0.0538	0.034
		WB-3-FNSD-COMP-3	59 - 59	59	1.64 - 1.64	2	1	72.5	0.0559	0.047
		WB-3-FNSD-COMP-4	61 - 61	61	1.99 - 1.99	2	1	71.9	0.059	0.046
		WB-3-FNSD-COMP-5	61 - 61	61	1.84 - 1.84	2	1	72.5	0.0578	0.042
	Lake Chub	WB-3-LKCH-COMP-1	91 - 106	99	6.62 - 10.03	8	5	70.8	0.0618	0.056
		WB-3-LKCH-COMP-2	93 - 112	105	7.58 - 12.27	10	5	74.3	0.0802	0.086
		WB-3-LKCH-COMP-3	106 - 123	115	11.27 - 15.29	13	5	75.4	0.0712	0.069
		WB-3-LKCH-COMP-4	112 - 137	126	12.44 - 21.49	17	5	75.5	0.0744	0.049
		WB-3-LKCH-COMP-5	90 - 102	96	7.22 - 8.82	8	4	71.8	0.0595	0.041
Unnamed Waterbody 6	Yellow Perch	WB-6-SN-COMP-1	38 - 100	54	10 - 10	10	13	74.9	0.031	0.023
Unnamed Watercourse 2	Brook Stickleback	WC-2-BSB-COMP-1	61 - 66	64	1.28 - 2.3	2	12	73.8	0.136	0.098
		WC-2-BSB-COMP-2	50 - 67	61	1 - 2.28	2	14	73.9	0.133	0.137
Unnamed Watercourse 3	Central Mudminnow	WC-3-CMM-COMP-1	72 - 93	81	3.6 - 7.8	5	6	76.1	0.0946	0.097
		WC-3-CMM-COMP-2	92 - 120	101	8.1 - 10.6	9	5	76.4	0.114	0.073
		WC-3-CMM-COMP-3	73 - 86	78	3.8 - 7.3	5	5	75.9	0.101	0.092
		WC-3-CMM-COMP-4	55 - 74	67	1.7 - 4.3	3	10	76.2	0.0702	0.025
		WC-3-CMM-COMP-5	74 - 88	79	4.5 - 6.3	5	8	74.8	0.121	0.095
	Finescale Dace	WC-3-FSDC-COMP-1	-	36	-	0	0	78	0.0264	0.020
		WC-3-FSDC-COMP-2	56 - 76	64	1.5 - 7.8	3	8	74.6	0.0585	0.056
		WC-3-FSDC-COMP-3	52 - 64	58	0.9 - 2.4	2	14	73.7	0.0449	0.038
		WC-3-FSDC-COMP-4	32 - 39	36	0.26 - 0.55	0	12	79.6	0.0258	0.024
		WC-3-FSDC-COMP-5	-	36	-	0	0	72.7	0.0248	0.027
Unnamed Watercourse 4	Brook Stickleback	WC-4-BSB-COMP-1	44 - 57	50	0.43 - 1.46	1	39	74.7	0.0852	0.101
		WC-4-BSB-COMP-2	52 - 64	56	0.89 - 2	1	19	74.6	0.129	0.119
Unnamed Watercourse 5	Central Mudminnow	WC-5-CNMN-COMP-1	58 - 74	62	1.9 - 4.	3	5	75.8	0.0261	0.026
		WC-5-CNMN-COMP-2	71 - 82	78	3.2 - 6.6	5	5	75.4	0.0427	0.045
		WC-5-CNMN-COMP-3	85 - 98	90	6.8 - 10.2	8	5	75.9	0.0401	0.045
		WC-5-CNMN-COMP-4	62 - 73	67	2.5 - 4.2	3	7	75.3	0.0253	0.025
		WC-5-CNMN-COMP-5	78 - 84	82	5.7 - 6.7	6	5	76	0.0368	0.043
Unnamed Watercourse 6A-US	Central Mudminnow	WC-6A-2-CMM-COMP-1	75 - 93	83	4 - 7.72	6	5	74.2	0.12	0.137
Unnamed Watercourse 6B	Brook Stickleback	WC-6B-BSB-COMP-1	46 - 62	58	0.82 - 2.03	2	15	76.8	0.0811	0.078
		WC-6B-BSB-COMP-2	47 - 62	53	0.84 - 1.63	1	18	77.2	0.0704	0.065
	Central Mudminnow	WC-6B-CMM-COMP-1	47 - 86	63	1.04 - 5.98	2	18	75.5	0.0562	0.058
		WC-6B-CMM-COMP-2	65 - 82	72	2.41 - 5.57	4	6	75.3	0.0733	0.079
		WC-6B-CMM-COMP-3	62 - 95	83	2.16 - 8.46	5	5	75.2	0.0746	0.079
		WC-6B-CMM-COMP-4	83 - 119	99	6.12 - 16.65	10	5	76.3	0.0745	0.071
WC-6B-CMM-COMP-5	109 - 127	117	12.39 - 18.32	15	5	75	0.0841	0.104		



Table C1-7: 2023 Small-bodied Fish Composite Tissue Data

Waterbody	Species	Sample ID	Total Length Range (mm)	Average Total Length (mm)	Total Weight Range (g)	Average Total Weight (g)	No. Fish in Composite Sample	Moisture (%)	Mercury (Hg)	Methylmercury (MeHg)
Unnamed Waterbody 6B-02	Brook Stickleback	WC-6B-02-BSB-COMP-1	46 - 57	50	0.82 - 1.73	1	28	75.6	0.0712	0.079
	Central Mudminnow	WC-6B-02-CMM-COMP-1	96 - 106	99	9.82 - 10.85	11	4	73.8	0.133	0.137
		WC-6B-02-CMM-COMP-2	54 - 64	59	1.59 - 2.58	2	13	74.5	0.125	0.102
		WC-6B-02-CMM-COMP-3	61 - 86	72	1.97 - 6.19	4	10	74.6	0.121	0.121
		WC-6B-02-CMM-COMP-4	56 - 106	68	1.62 - 12.12	4	8	74.6	0.11	0.144
WC-6B-02-CMM-COMP-5	69 - 97	88	4.68 - 11.04	7	6	76.1	0.129	0.109		
Unnamed Watercourse 6C	Brook Stickleback	WC-6C-BSB-COMP-1	54 - 67	60	1.3 - 2.51	2	13	77.1	0.167	0.125
		WC-6C-BSB-COMP-2	46 - 57	52	0.86 - 1.62	1	20	76	0.0729	0.067
		WC-6C-BSB-COMP-3	43 - 55	50	0.69 - 1.49	1	25	76.4	0.0734	0.050
	Central Mudminnow	WC-6C-CMM-COMP-1	94 - 98	96	8 - 9.68	9	5	76.2	0.0936	0.107
		WC-6C-CMM-COMP-2	83 - 93	86	5.51 - 8.6	7	5	76	0.106	0.096
		WC-6C-CMM-COMP-3	75 - 82	78	4.14 - 5.99	5	5	76.5	0.0937	0.096
		WC-6C-CMM-COMP-4	52 - 67	61	1.38 - 3.22	2	9	75.1	0.099	0.091
Unnamed Watercourse 7A-08	Central Mudminnow	WC-7A-08-CMM-COMP-1	73 - 98	84	0.97 - 11.01	6	5	75.7	0.0341	0.021
		WC-7A-08-CMM-COMP-2	66 - 73	70	2.6 - 4.38	3	7	76.1	0.0351	0.043
		WC-7A-08-CMM-COMP-3	49 - 63	58	1.2 - 2.44	2	11	76	0.0288	0.019
Unnamed Watercourse 8B	Brook Stickleback	WC-8B-BRST-COMP-1	50 - 68	65	0.9 - 2.6	2	17	73.2	0.121	0.116
		WC-8B-BRST-COMP-2	46 - 62	51	0.6 - 2.4	1	24	75.8	0.0726	0.076
		WC-8B-BRST-COMP-3	54 - 64	57	1.2 - 2.3	2	19	73.8	0.104	0.106
		WC-8B-BRST-COMP-4	50 - 64	60	1.5 - 2.2	2	17	74.7	0.0879	0.090
		WC-8B-BRST-COMP-5	61 - 64	62	1.8 - 2.7	2	12	72.7	0.121	0.126
	Northern Redbelly Dace	WC-8B-NRDC-COMP-1	87 - 88	87	5.8 - 7	6	5	73	0.23	0.247
		WC-8B-NRDC-COMP-2	65 - 77	72	2.5 - 4.6	4	6	72.3	0.152	0.153
		WC-8B-NRDC-COMP-3	77 - 81	78	4.2 - 5.1	5	5	72.4	0.191	0.226
		WC-8B-NRDC-COMP-4	80 - 86	82	4.5 - 5.9	5	5	73.8	0.16	0.167
		WC-8B-NRDC-COMP-5	51 - 57	55	1.3 - 1.9	2	6	73.2	0.0676	0.077

Notes:

Mercury and methylmercury concentration values are expressed in mg/kg wet weight.
 Number of fish included in composite samples ranged depending on the size of the target species present at the time of sampling

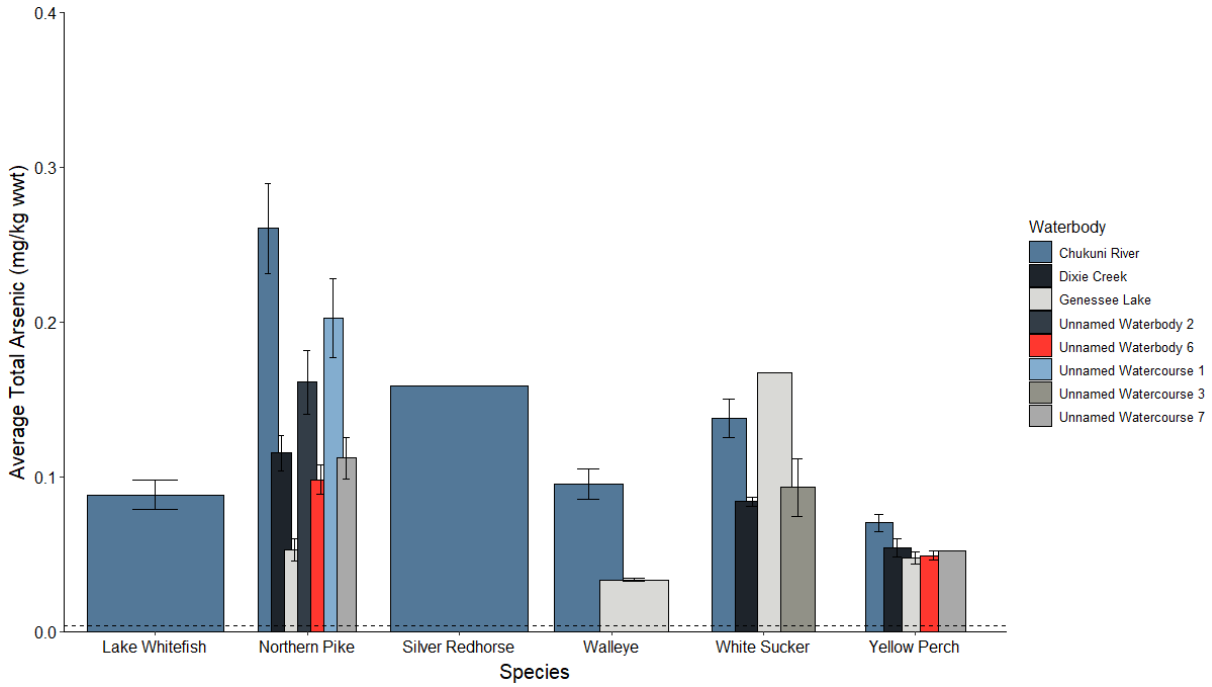


Figure C1-1: Average Total Arsenic Concentration (\pm standard error; mg/kg ww) in Large-bodied Fish Tissue

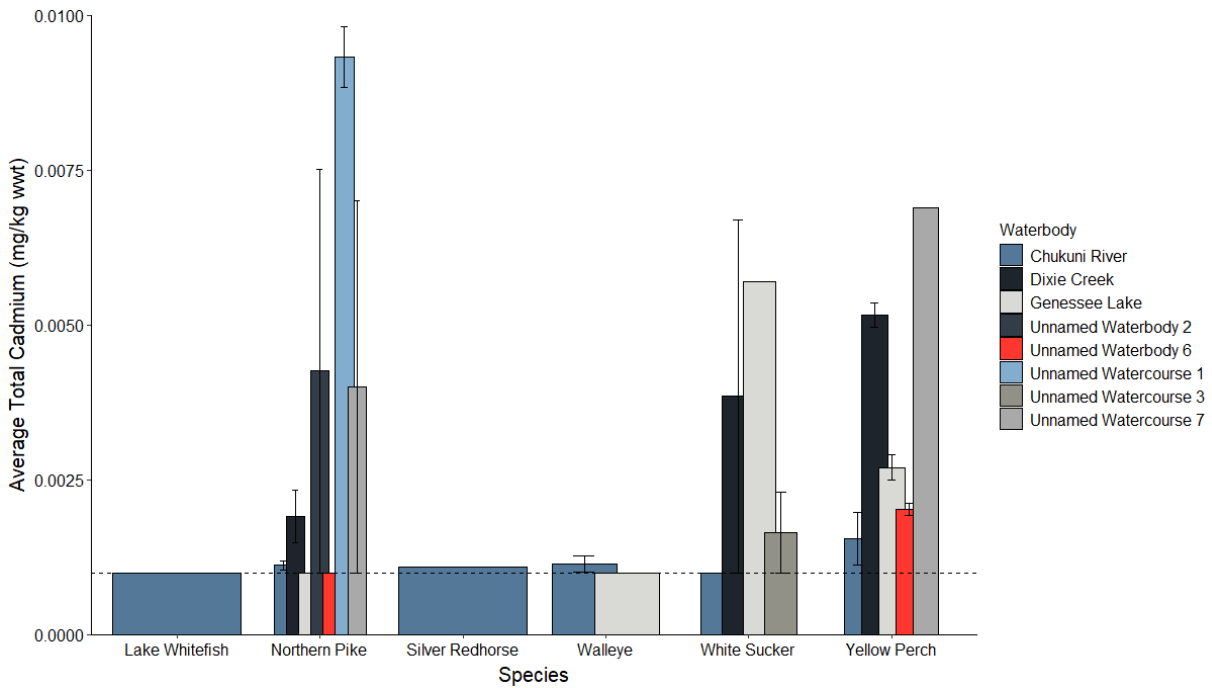


Figure C1-2: Average Total Cadmium Concentration (\pm standard error; mg/kg ww) in Large-bodied Fish Tissue

Note: Dashed line represents the lowest detection limit during analysis (0.004mg/kg ww for arsenic and 0.001 mg/kg ww for cadmium).

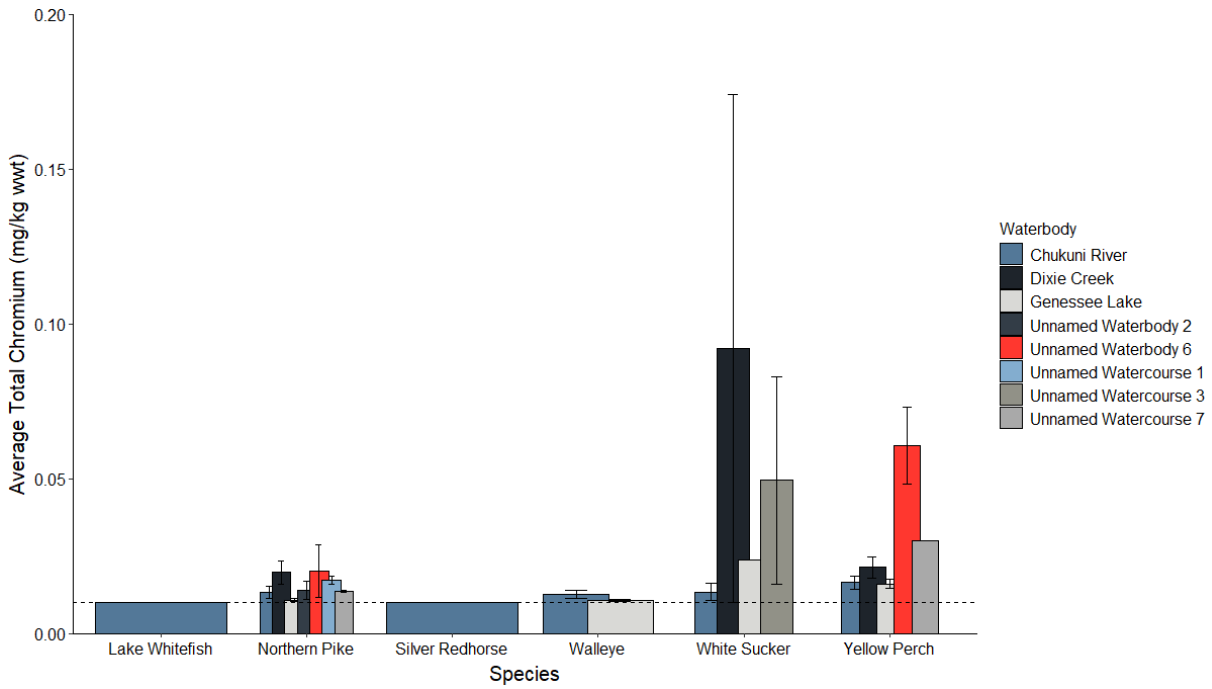


Figure C1-3: Average Total Chromium Concentration (\pm standard error; mg/kg wwt) in Large-bodied Fish Tissue

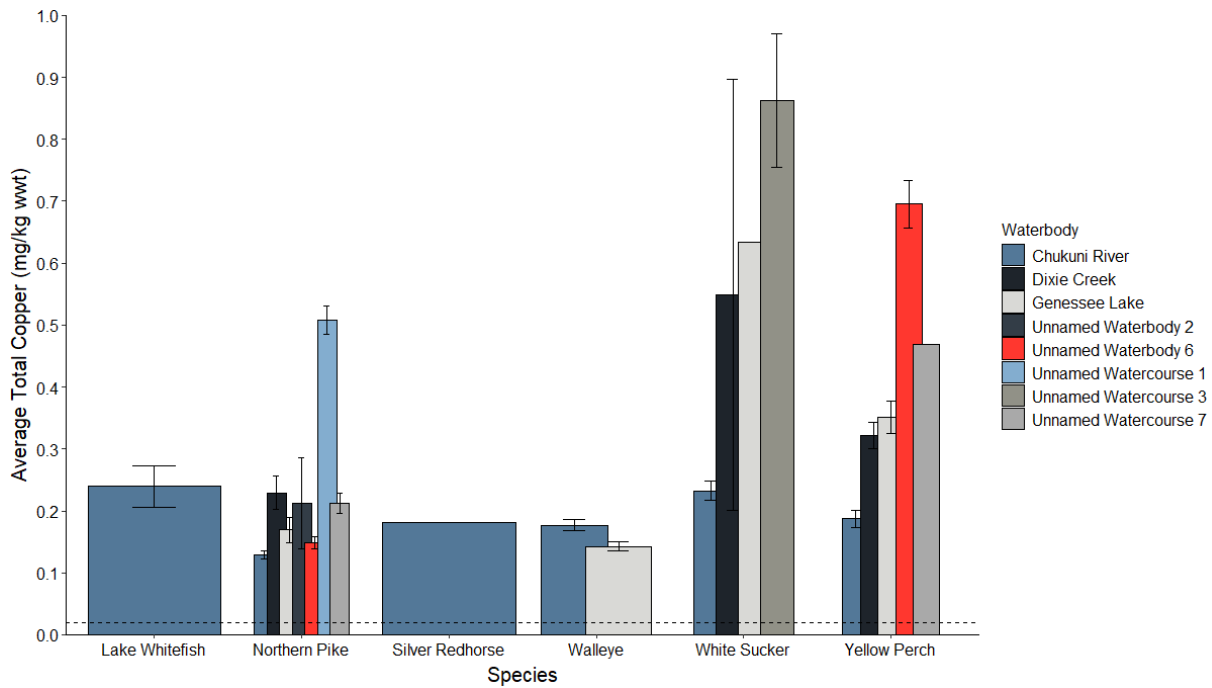


Figure C1-4: Average Total Copper Concentration (\pm standard error; mg/kg wwt) in Large-bodied Fish Tissue

Note: Black dashed line represents the lowest detection limit during analysis (0.01 mg/kg wwt for chromium and 0.02 mg/kg wwt for copper).

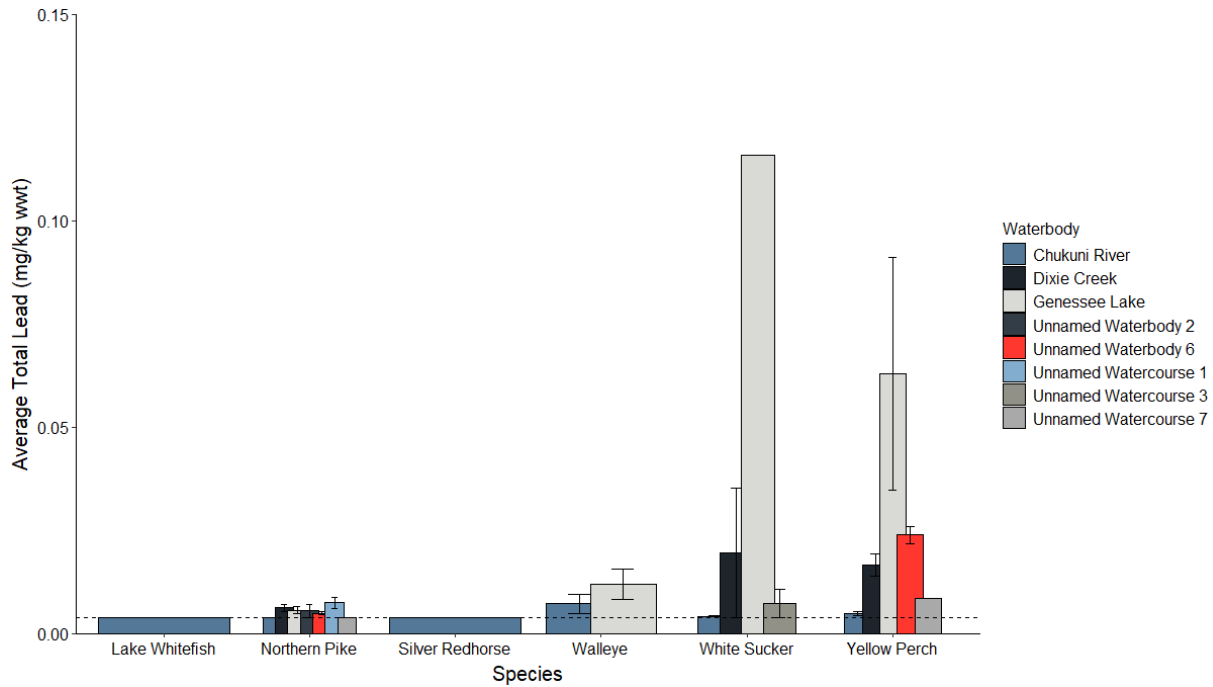


Figure C1-5: Average Total Lead Concentration (\pm standard error; mg/kg ww) in Large-bodied Fish Tissue

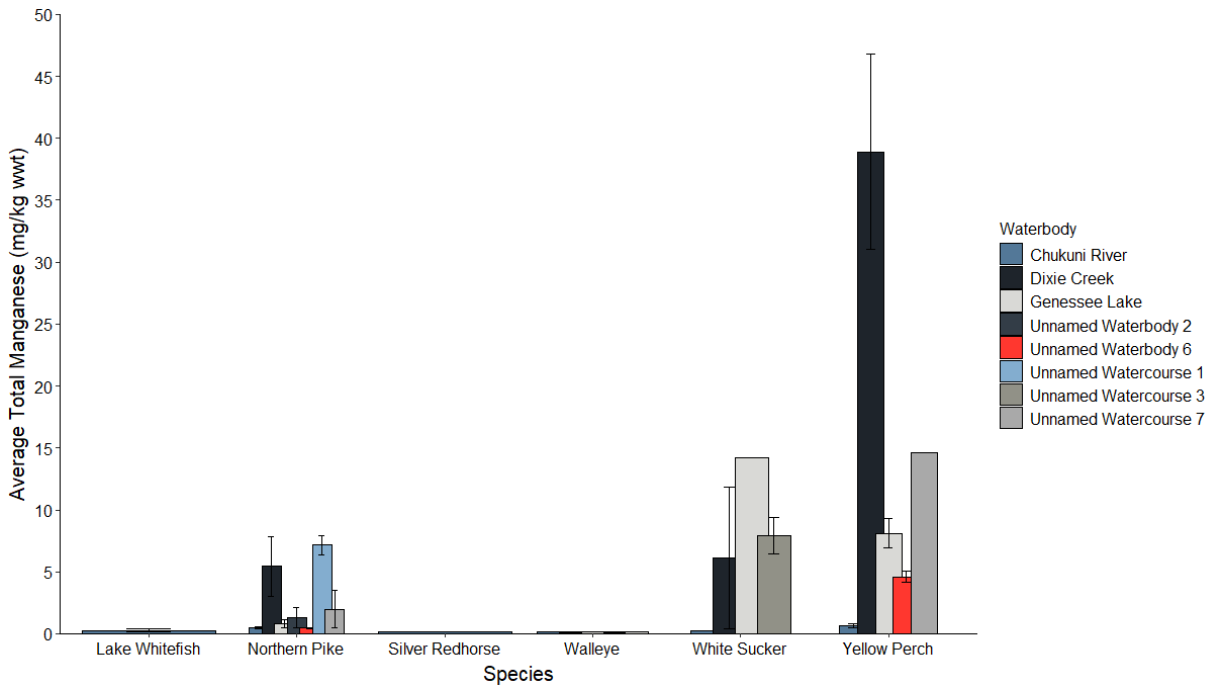


Figure C1-6: Average Total Manganese Concentration (\pm standard error; mg/kg ww) in Large-bodied Fish Tissue

Note: Dashed line represents the lowest detection limit during analysis (0.004 mg/kg ww for lead and 0.01 mg/kg ww for manganese).

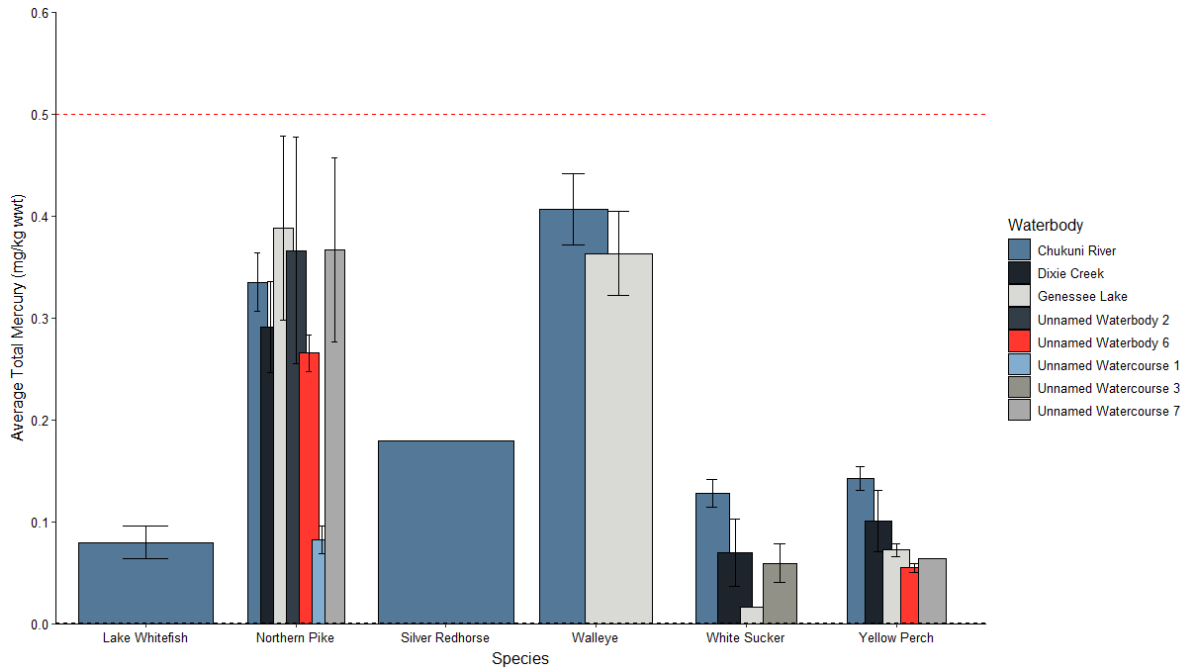


Figure C1-7: Average Total Mercury Concentration (\pm standard error; mg/kg wwt) in Large-bodied Fish Tissue

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg wwt). Red dashed line represents the Ontario consumption guideline for women of child-bearing age and children (0.5 mg/kg wwt).

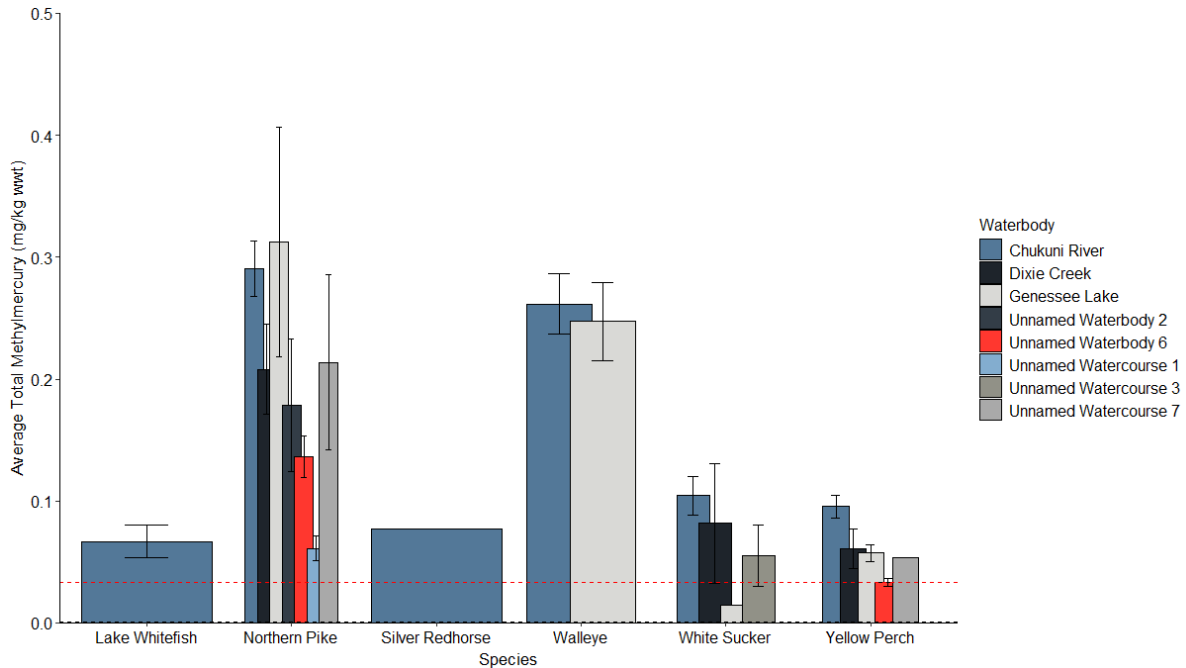


Figure C1-8: Average Total Methylmercury Concentration (\pm standard error; mg/kg wwt) in Large-bodied Fish Tissue

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg wwt). Red dashed line represents the CCME guideline for the protection of wildlife consumers of aquatic biota (0.033 mg/kg wwt).

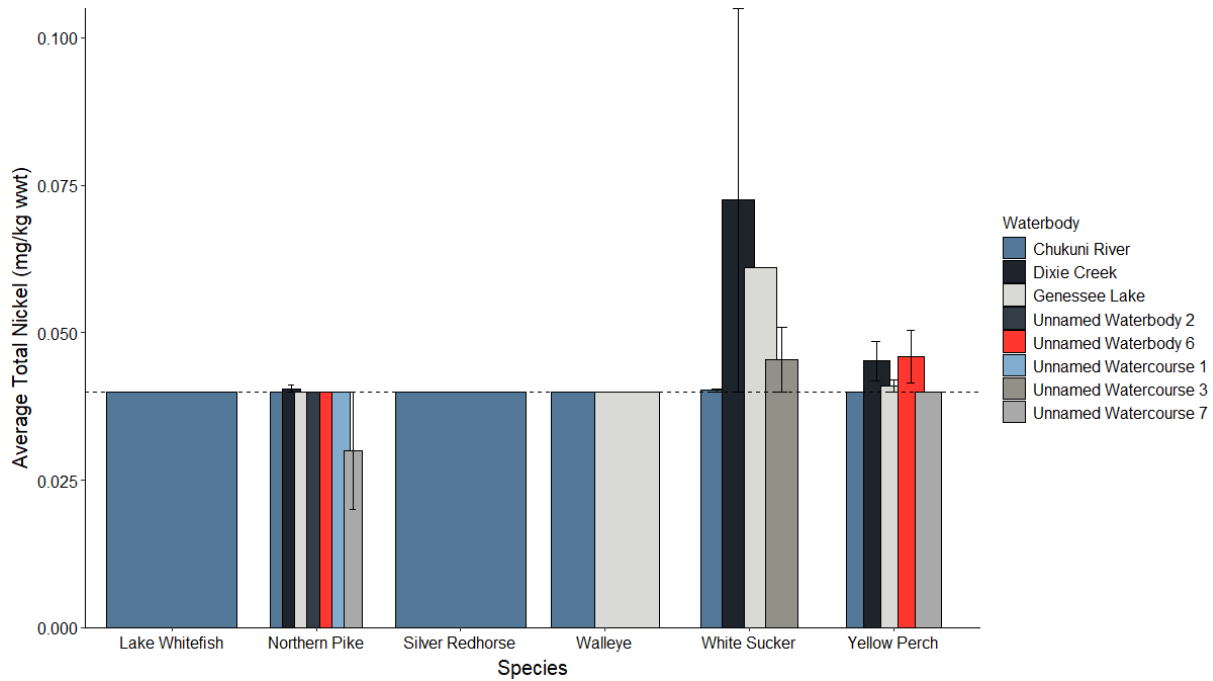


Figure C1-9: Average Total Nickel Concentration (\pm standard error; mg/kg ww) in Large-bodied Fish Tissue

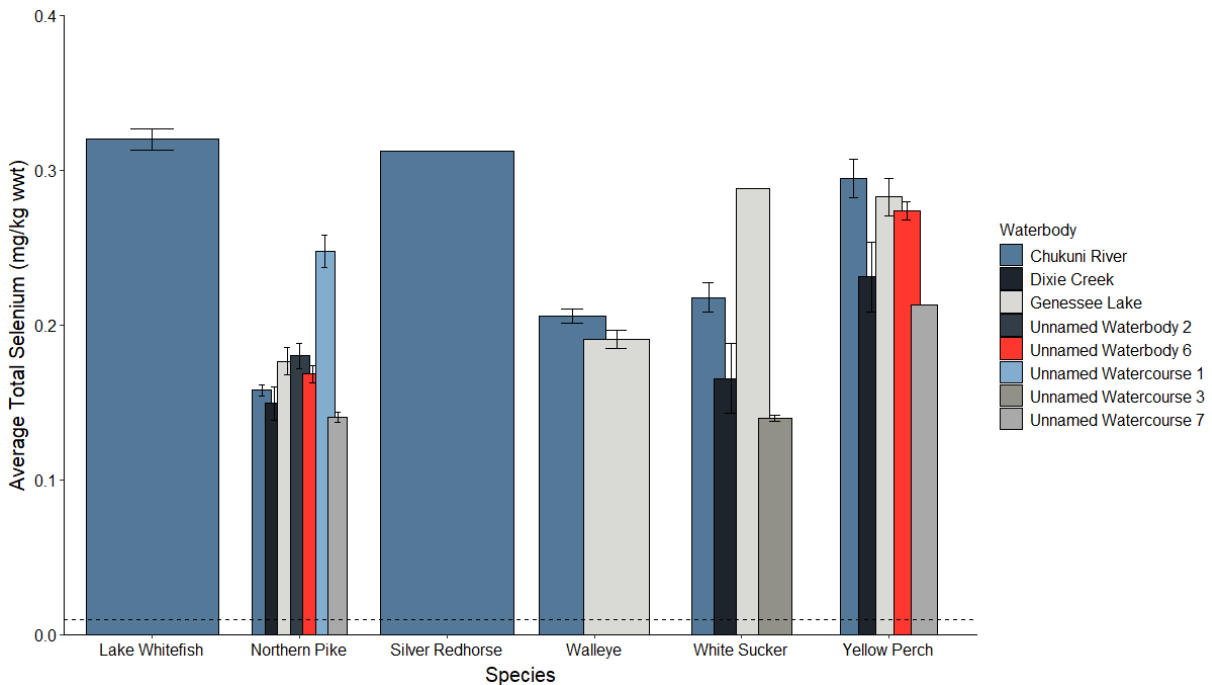


Figure C1-10: Average Total (\pm standard error) Selenium Concentration (mg/kg ww) in Large-bodied Fish Tissue

Notes: Black dashed line represents the lowest detection limit during analysis (0.04 mg/kg ww for nickel and 0.01 mg/kg ww for selenium). All sample results in 2022 were at or below the lowest detection limit for nickel in 2022, with the exception of one sample at Dixie Creek (DC-03).

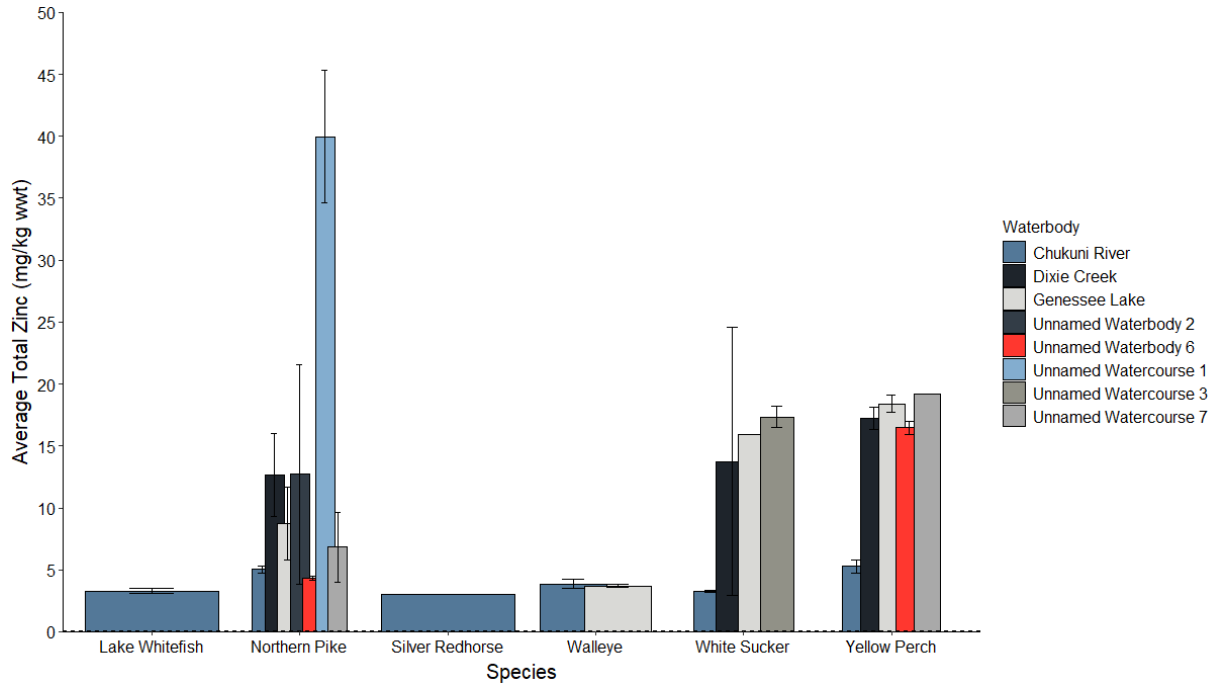


Figure C1-11: Average Total Zinc Concentration (\pm standard error; mg/kg ww) in Large-bodied Fish Tissue

Note: Black dashed line represents the lowest detection limit during analysis (0.1 mg/kg ww).

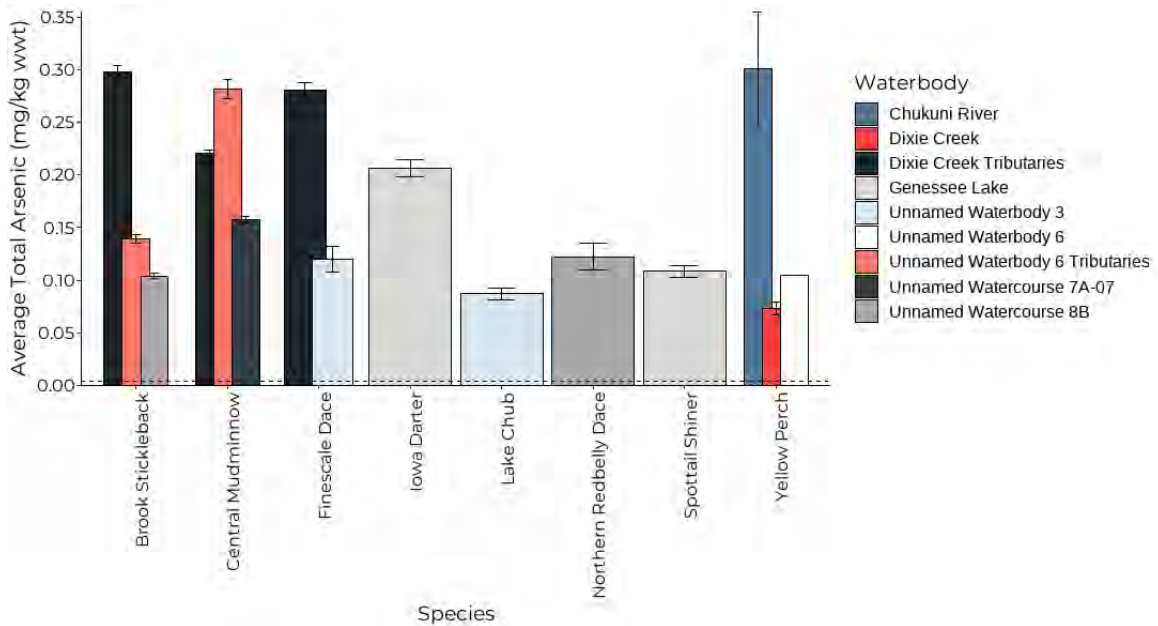


Figure C1-12: Average Total Arsenic Concentration (\pm standard error; mg/kg ww) in Small-bodied Fish Tissue

Note: Dashed line represents the lowest detection limit during analysis (0.004 mg/kg ww).

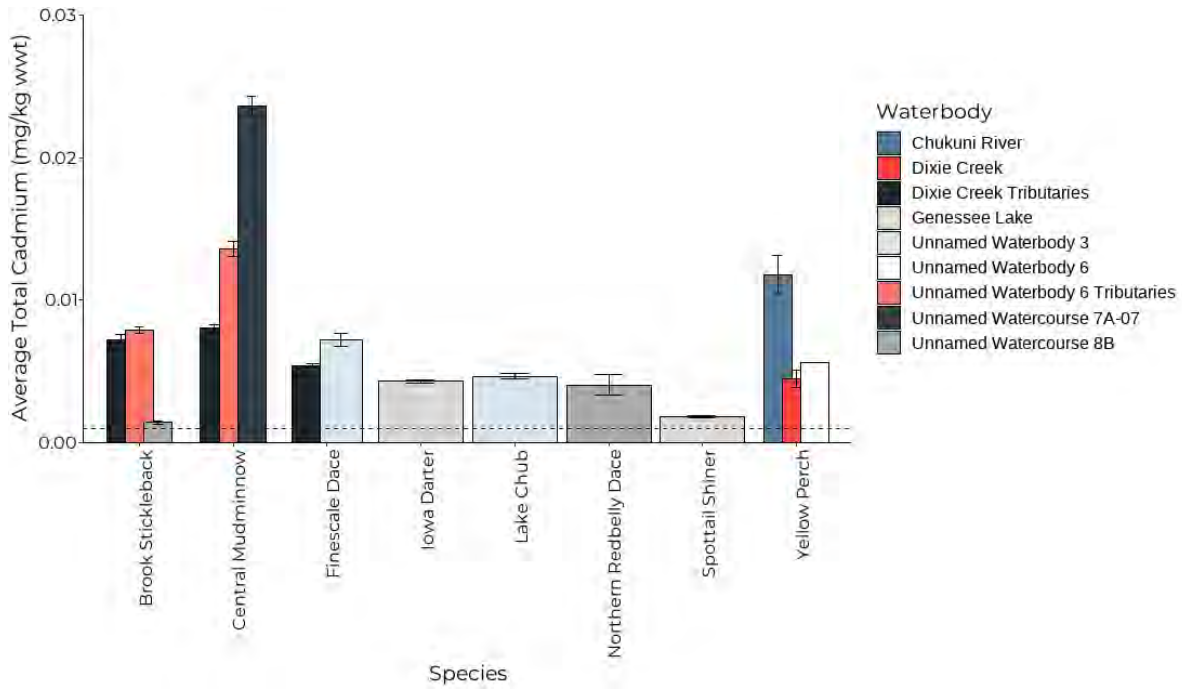


Figure C1-13: Average Total Cadmium Concentration (± standard error; mg/kg ww) in Small-bodied Fish Tissue

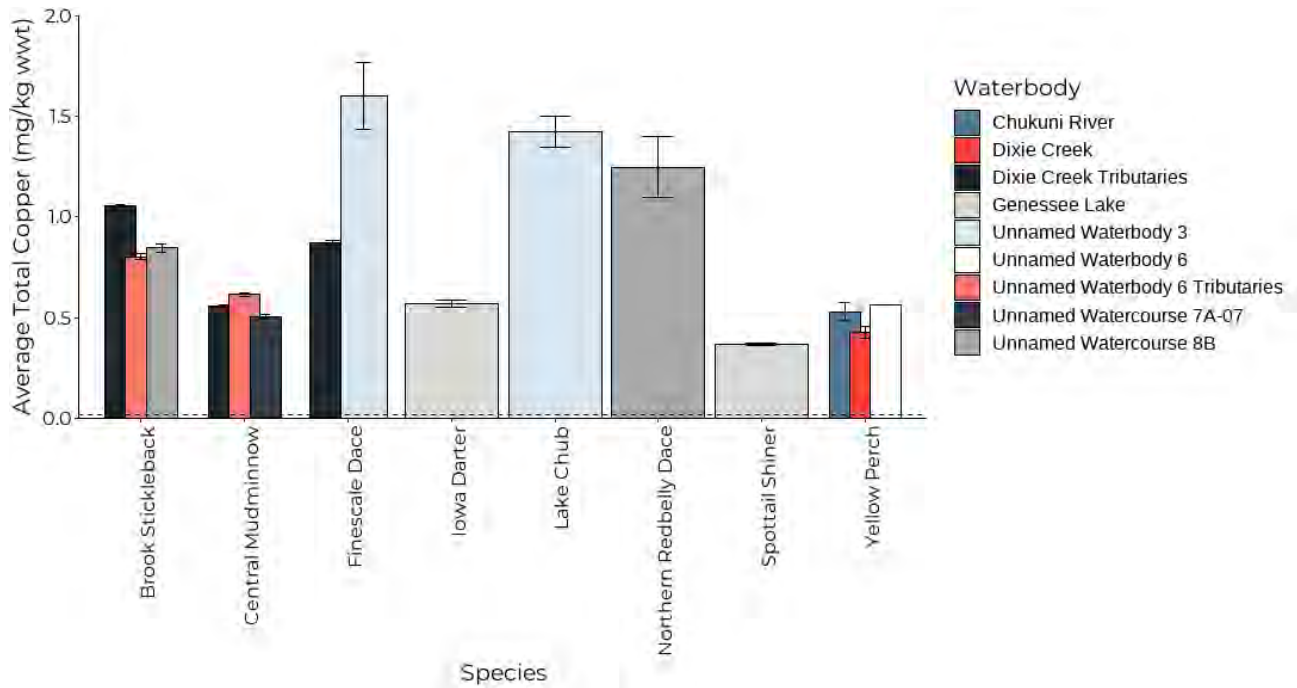


Figure C1-14: Average Total Copper Concentration (± standard error; mg/kg ww) in Small-bodied Fish Tissue

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww for cadmium and 0.02 mg/kg ww for copper).

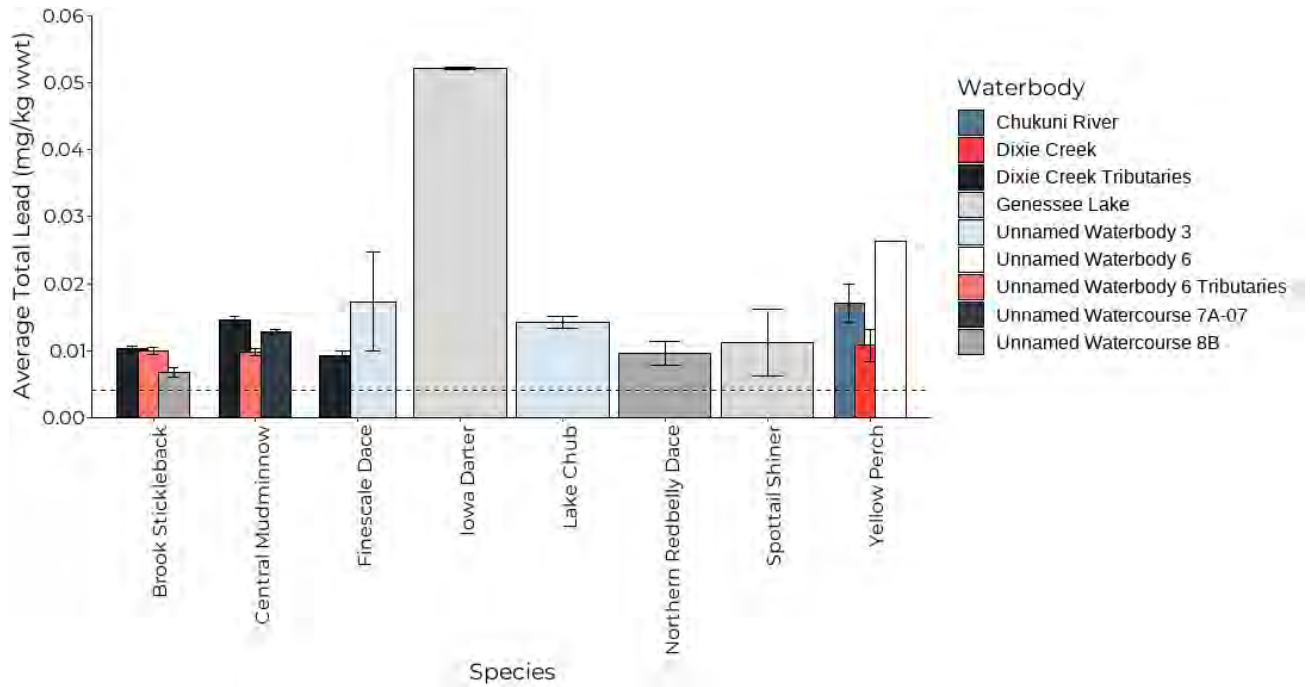


Figure C1-15: Average Total Lead Concentration (\pm standard error; mg/kg ww) in Small-bodied Fish Tissue

Note: Dashed line represents the lowest detection limit during analysis (0.004 mg/kg ww).

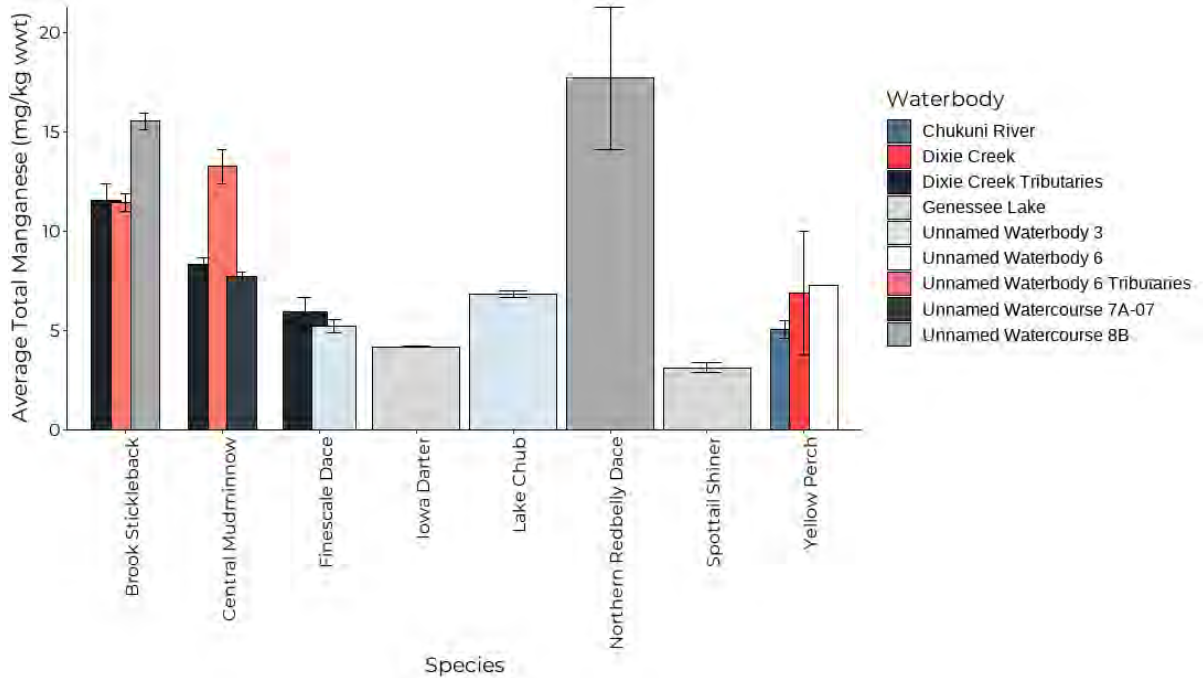


Figure C1-16: Average Total Manganese Concentration (\pm standard error; mg/kg ww) in Small-bodied Fish Tissue

Notes: Black dashed line represents the lowest detection limit during analysis (0.01 mg/kg ww) is not visible on graph.

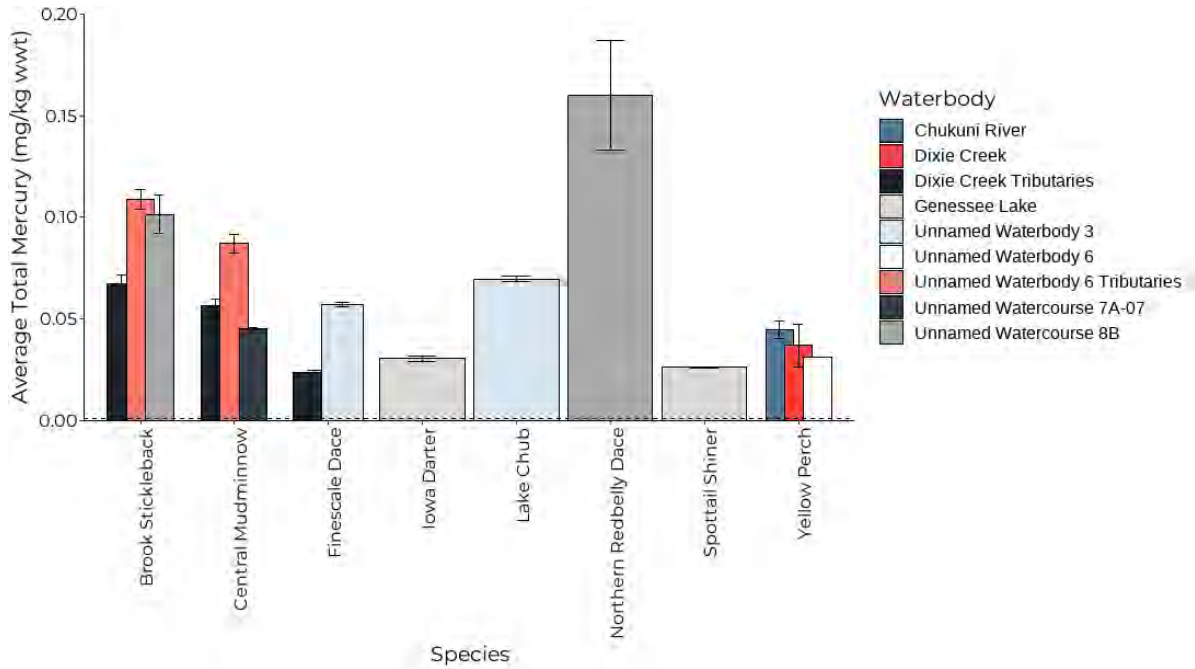


Figure C1-17: Average Total Mercury Concentration (± standard error; mg/kg ww) in Small-bodied Fish Tissue

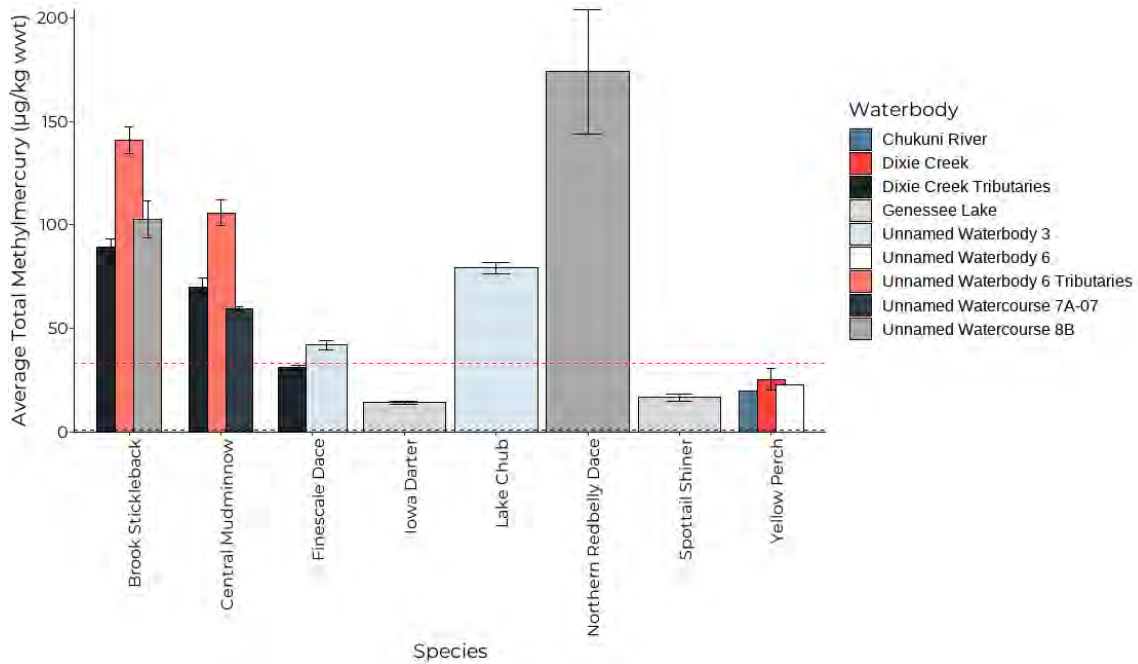


Figure C1-18: Average Total Methylmercury Concentration (± standard error; µg/kg ww) in Small-bodied Fish Tissue

Notes: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww for mercury and 1 µg/kg ww for methylmercury). Red dashed line represents the CCME guideline for the protection of wildlife consumers of aquatic biota (33 µg/kg ww).

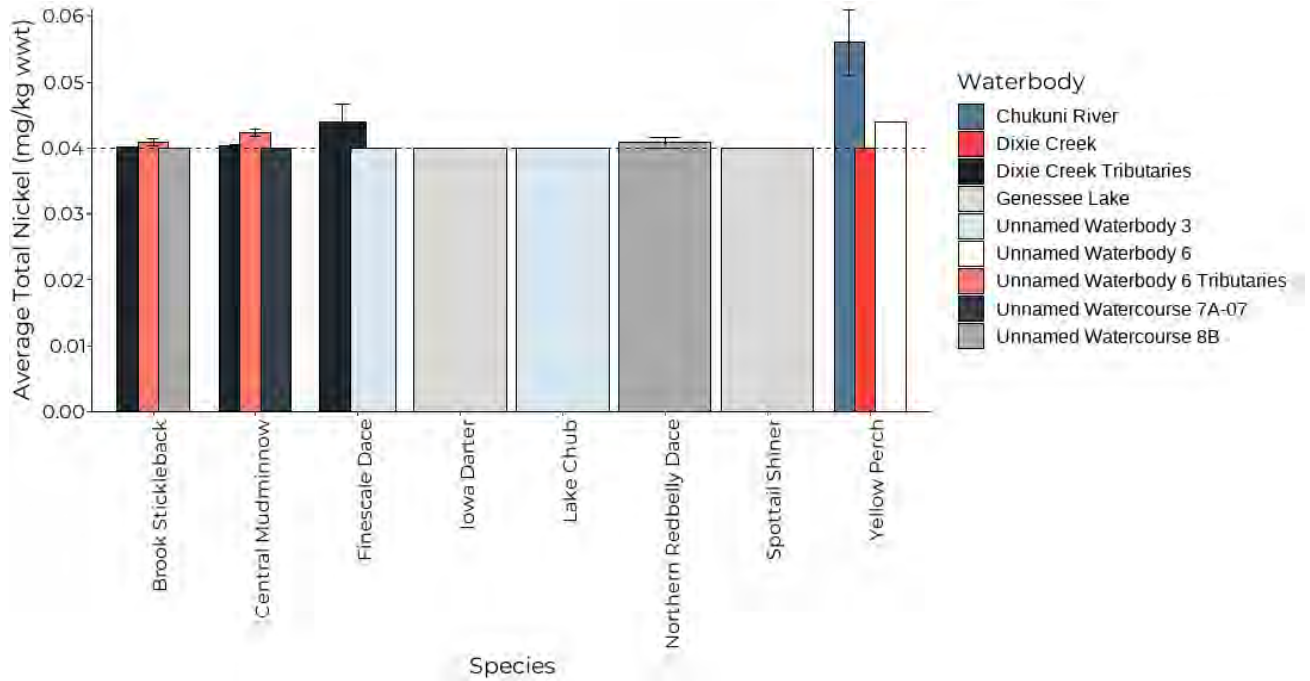


Figure C1-19: Average Total Nickel Concentration (\pm standard error; mg/kg ww) in Small-bodied Fish Tissue

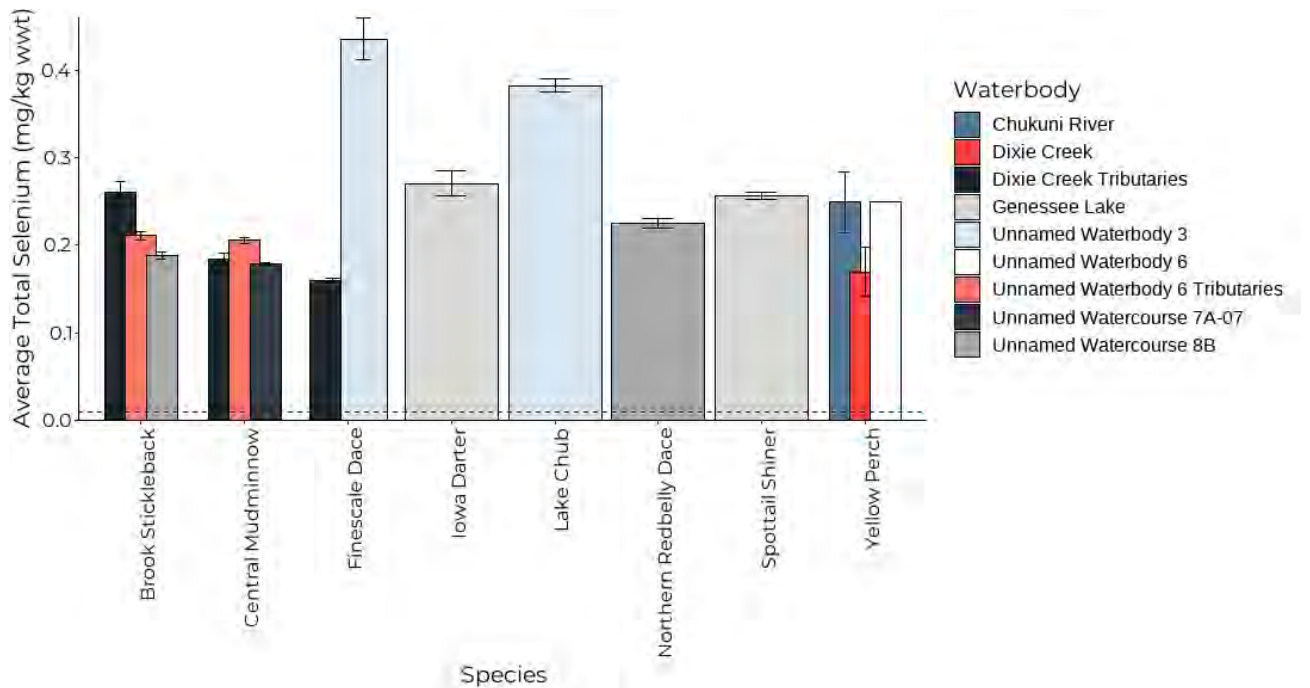


Figure C1-20: Average Total Selenium Concentration (\pm standard error; mg/kg ww) in Small-bodied Fish Tissue

Notes: Black dashed line represents the lowest detection limit during analysis (0.04 mg/kg ww for nickel and 0.01 mg/kg ww for selenium).

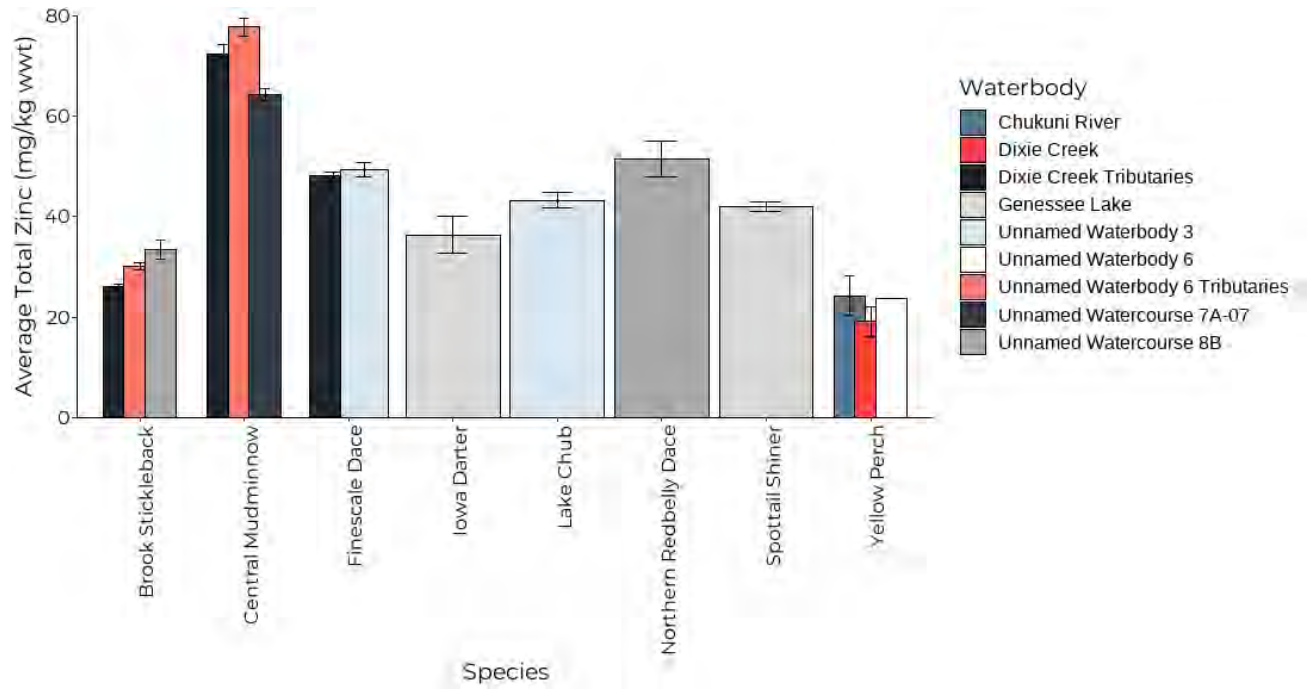


Figure C1-21: Average Total Zinc Concentration (\pm standard error; mg/kg ww) in Small-bodied Fish Tissue

Note: Lowest detection limit (0.04 mg/kg ww) not visible on figure.

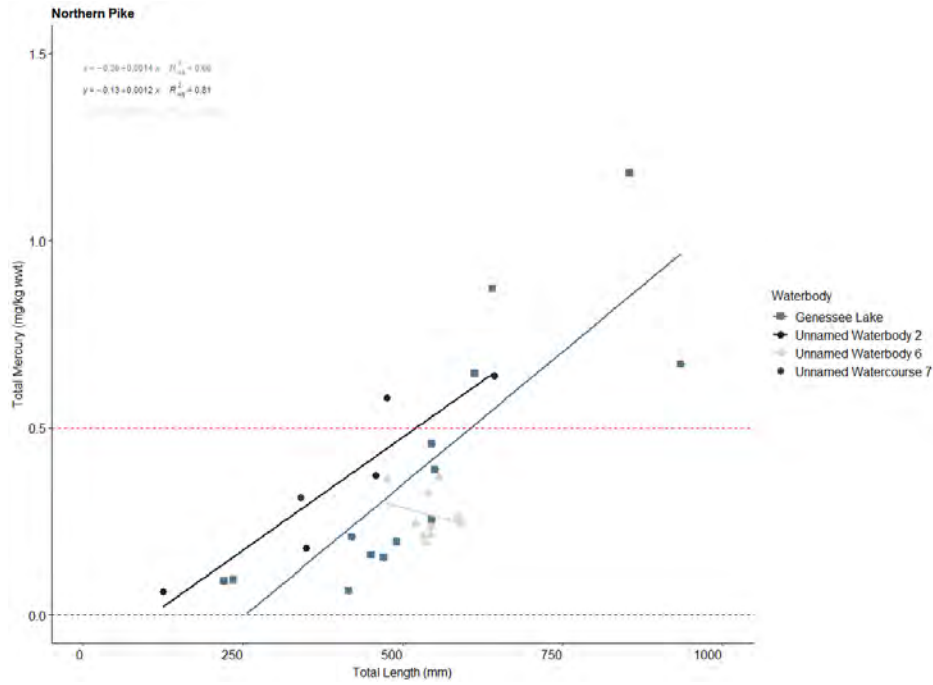


Figure C2-1: Regression of Total Mercury at Total Length for Northern Pike by Waterbody

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the Ontario consumption guideline for women of child-bearing age and children (0.5 mg/kg ww).

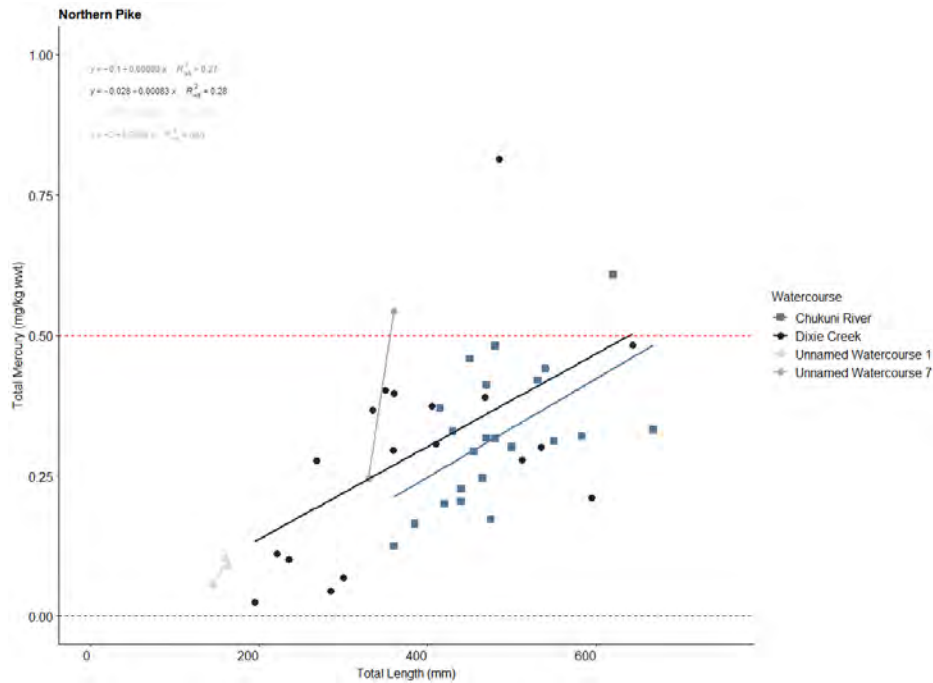


Figure C2-2: Regression of Total Mercury at Total Length for Northern Pike by Watercourse

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the Ontario consumption guideline for women of child-bearing age and children (0.5 mg/kg ww).

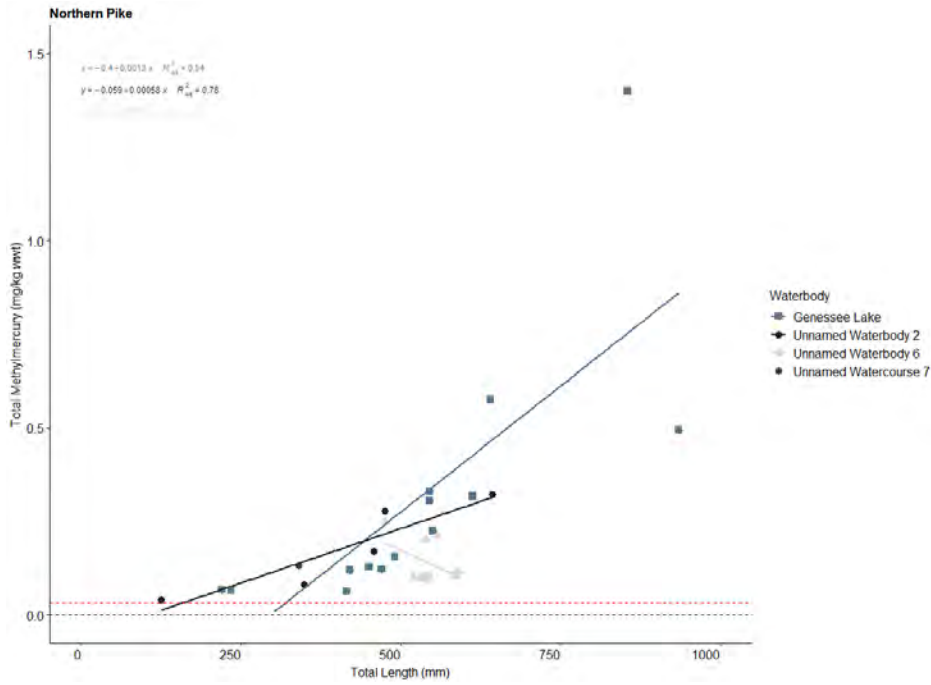


Figure C2-3: Regression of Methylmercury at Total Length for Northern Pike by Waterbody

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the CCME guideline for the protection of wildlife consumers of aquatic biota (0.033 mg/kg ww).

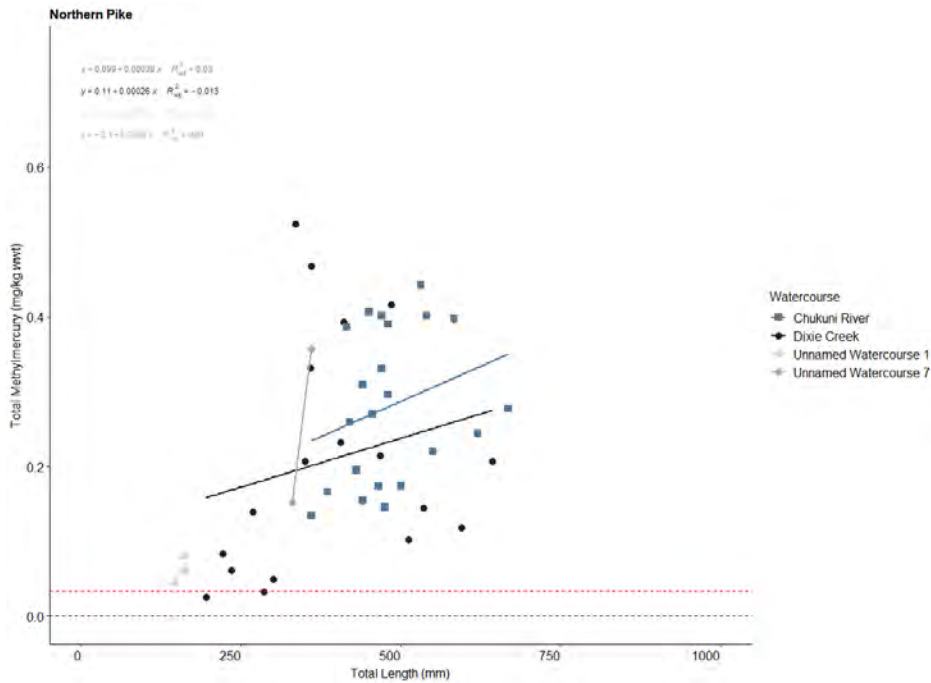


Figure C2-4: Regression of Methylmercury at Total Length for Northern Pike by Watercourse

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the CCME guideline for the protection of wildlife consumers of aquatic biota (0.033 mg/kg ww).

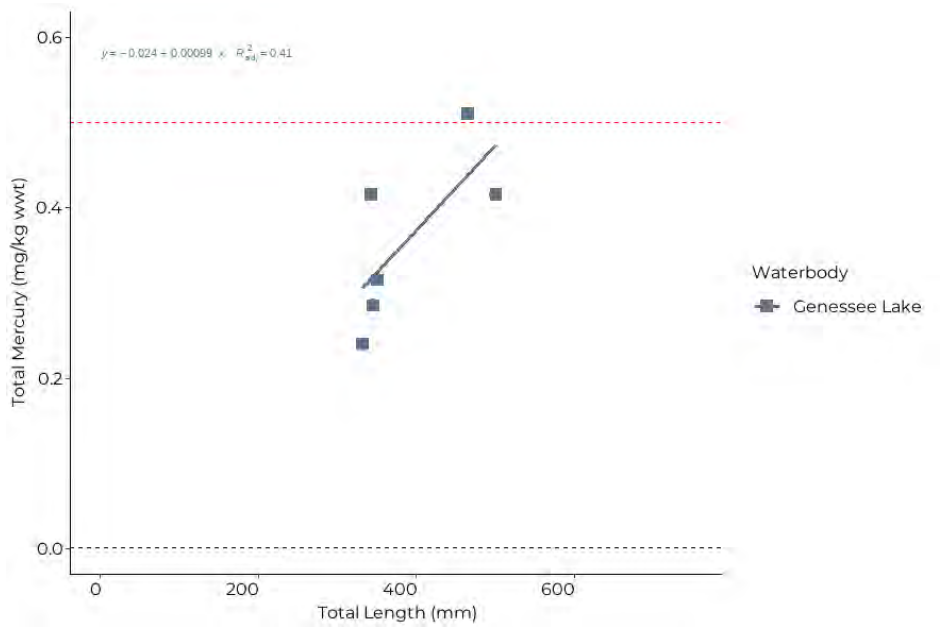


Figure C2-5: Regression of Total Mercury at Total Length for Walleye by Waterbody

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the Ontario consumption guideline for women of child-bearing age and children (0.5 mg/kg ww).

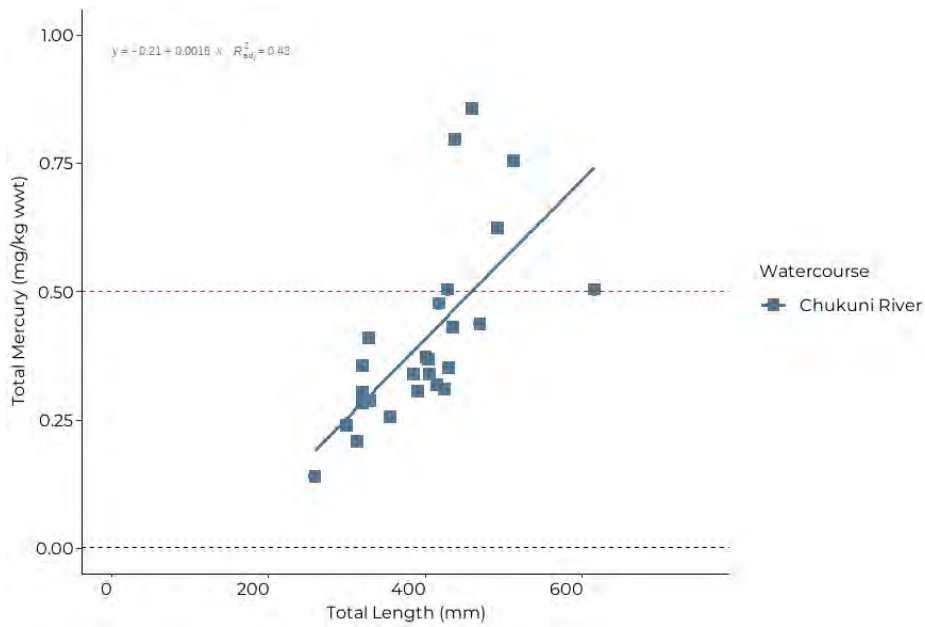


Figure C2-6: Regression of Total Mercury at Total Length for Walleye by Watercourse

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the Ontario consumption guideline for women of child-bearing age and children (0.5 mg/kg ww).

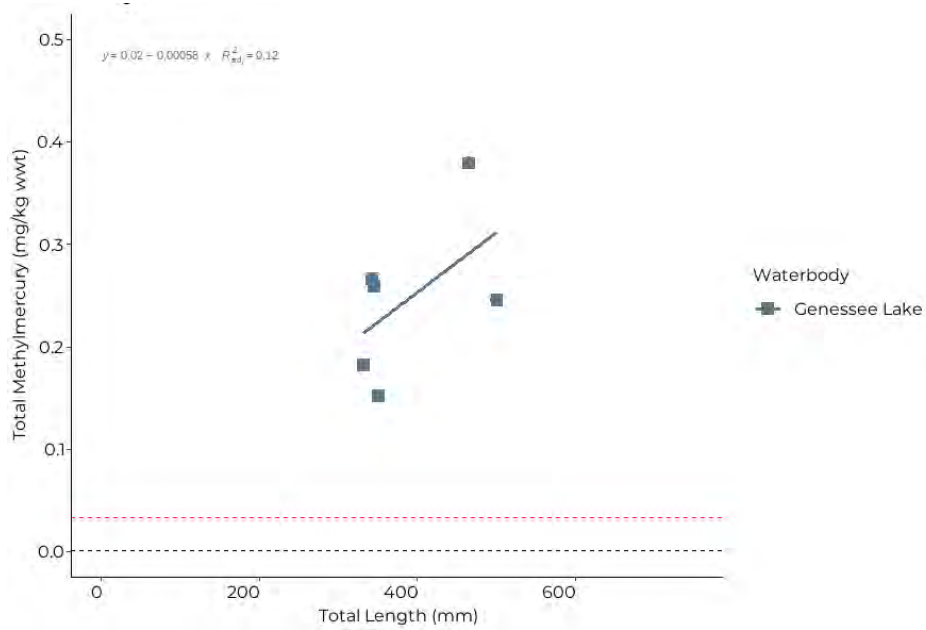


Figure C2-7: Regression of Methylmercury at Total Length for Walleye by Waterbody

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the CCME guideline for the protection of wildlife consumers of aquatic biota (0.033 mg/kg ww).

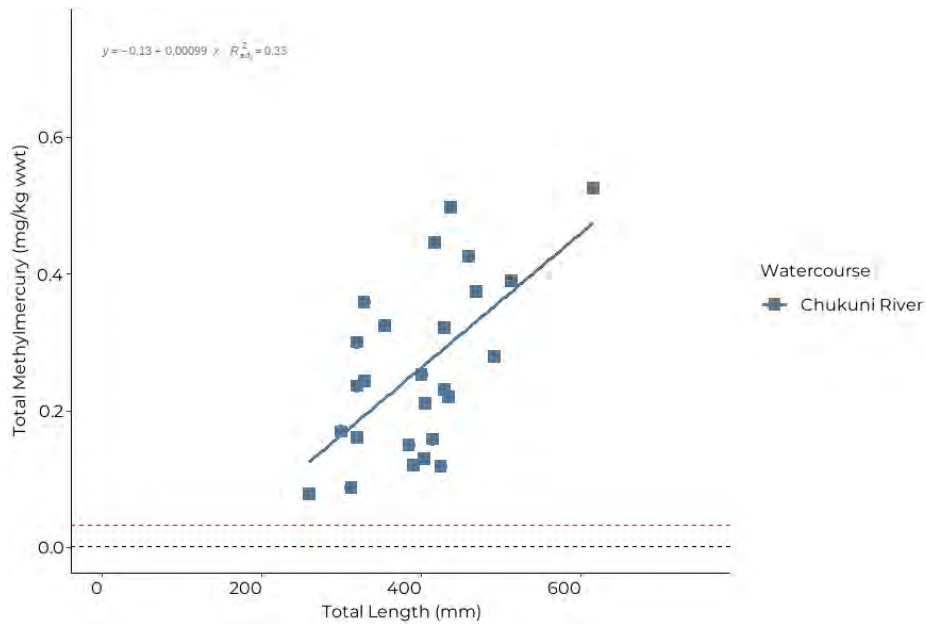


Figure C2-8: Regression of Methylmercury at Total Length for Walleye by Watercourse

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the CCME guideline for the protection of wildlife consumers of aquatic biota (0.033 mg/kg ww).

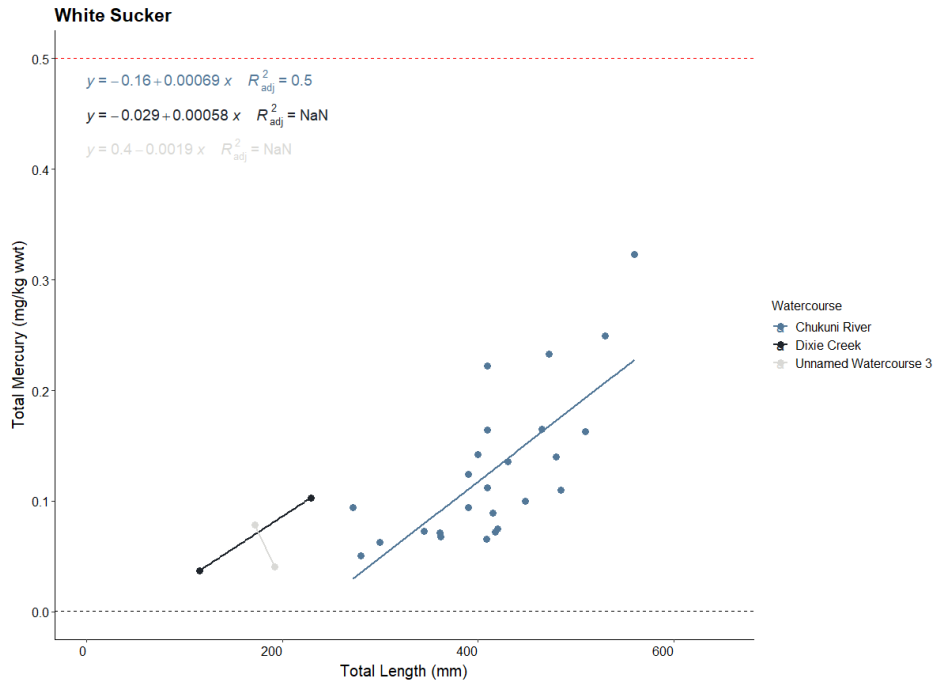


Figure C2-9: Regression of Total Mercury at Total Length for White Sucker by Watercourse

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the Ontario consumption guideline for women of child-bearing age and children (0.5 mg/kg ww).

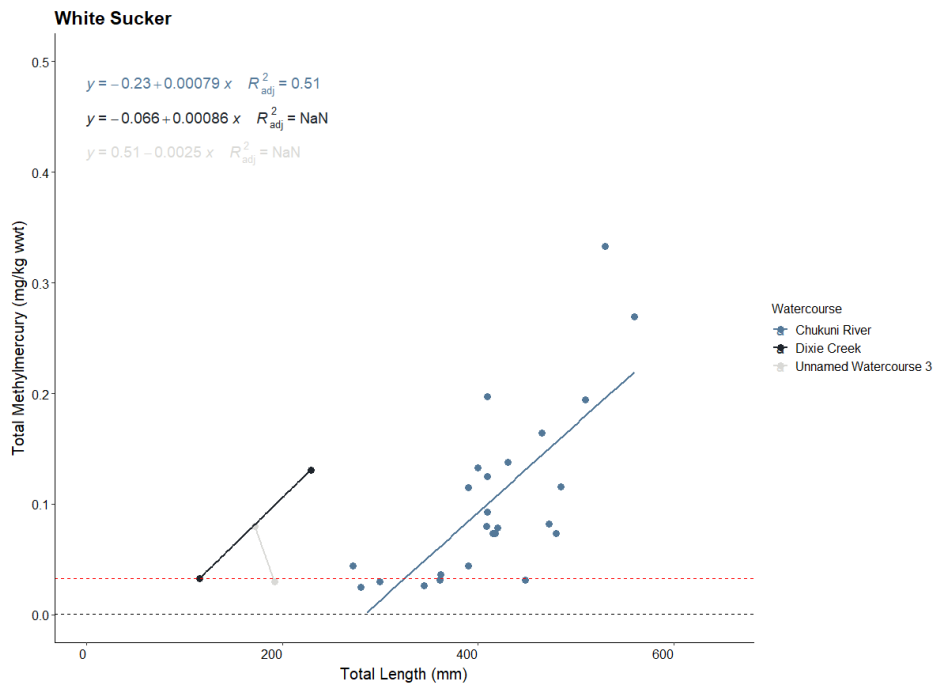


Figure C2-10: Regression of Methylmercury at Total Length for White Sucker by Watercourse

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the CCME guideline for the protection of wildlife consumers of aquatic biota (0.033 mg/kg ww).

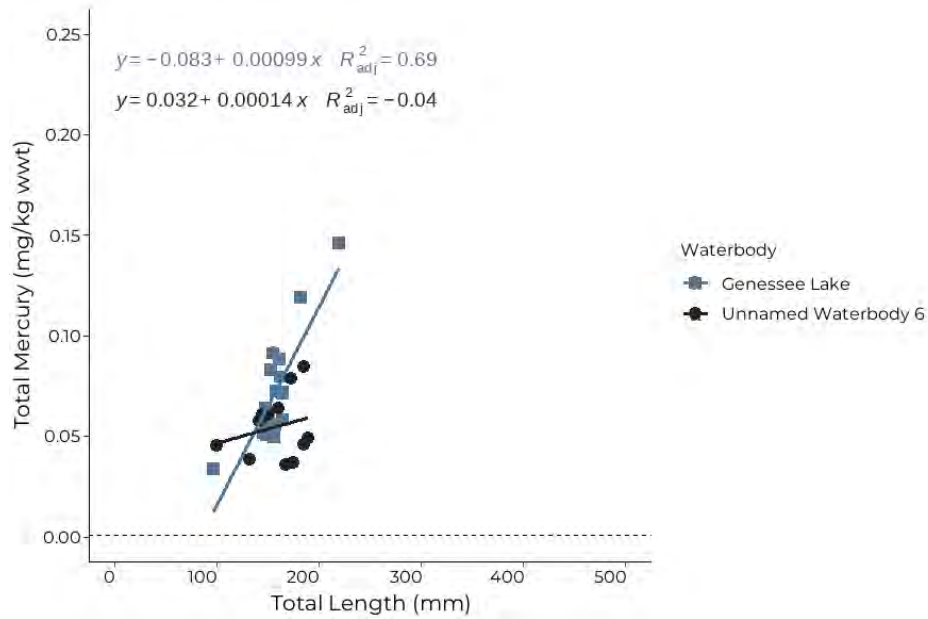


Figure C2-11: Regression of Total Mercury at Total Length for Yellow Perch by Waterbody

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg wwtt).

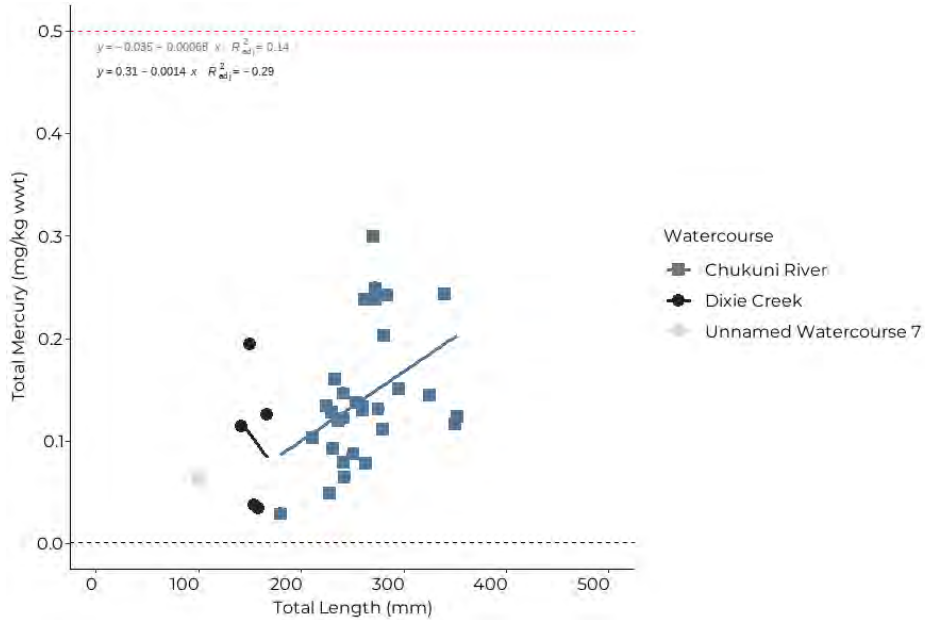


Figure C2-12: Regression of Total Mercury at Total Length for Yellow Perch by Watercourse

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg wwtt). Red dashed line represents the Ontario consumption guideline for women of child-bearing age and children (0.5 mg/kg wwtt).

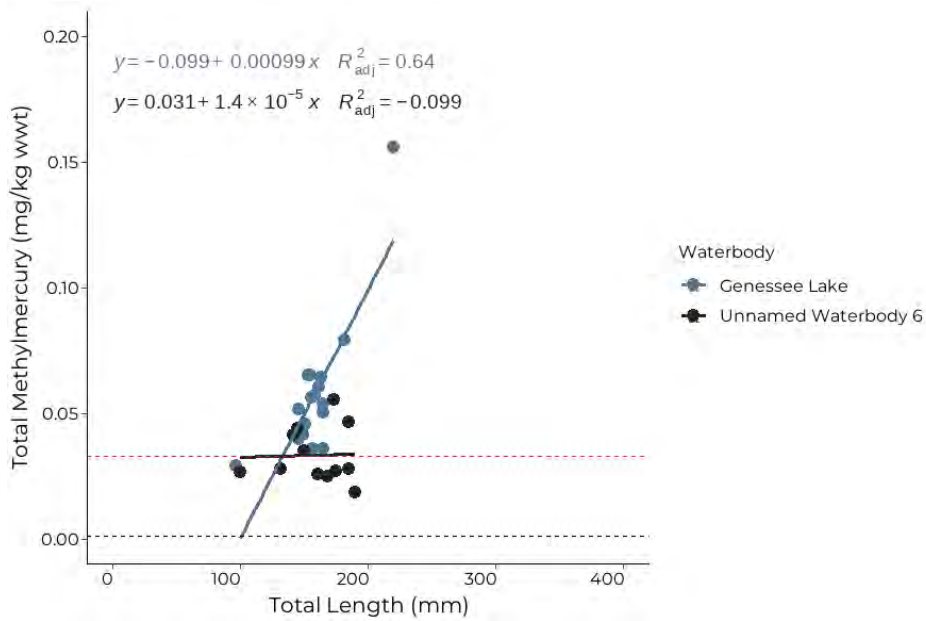


Figure C2-13: Regression of Methylmercury at Total Length for Yellow Perch by Waterbody

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the CCME guideline for the protection of wildlife consumers of aquatic biota (0.033 mg/kg ww).

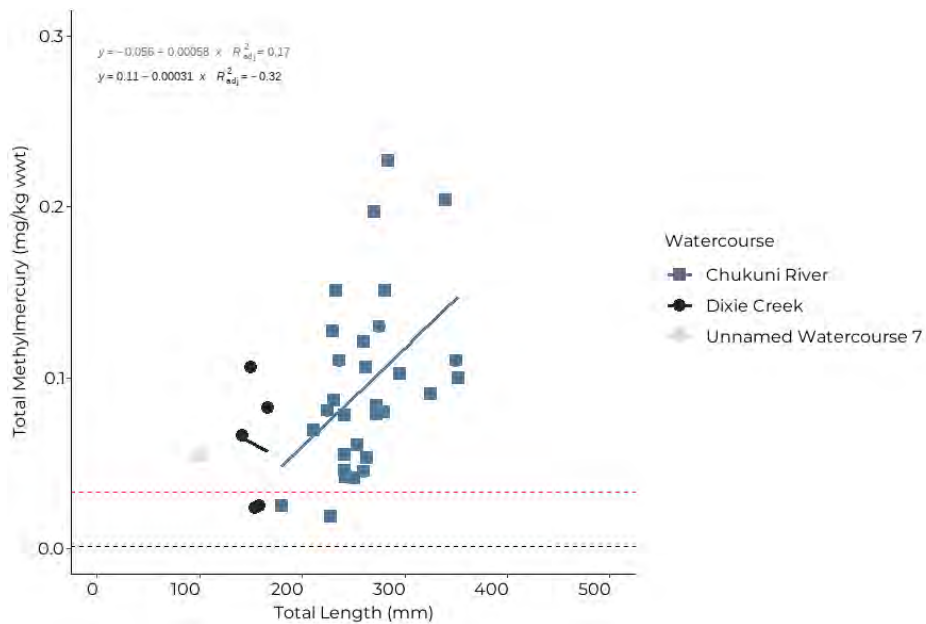


Figure C2-14: Regression of Methylmercury at Total Length for Yellow Perch by Watercourse

Note: Black dashed line represents the lowest detection limit during analysis (0.001 mg/kg ww). Red dashed line represents the CCME guideline for the protection of wildlife consumers of aquatic biota (0.033 mg/kg ww).

Appendix D
Sediment Quality and Benthic
Invertebrate Community Data

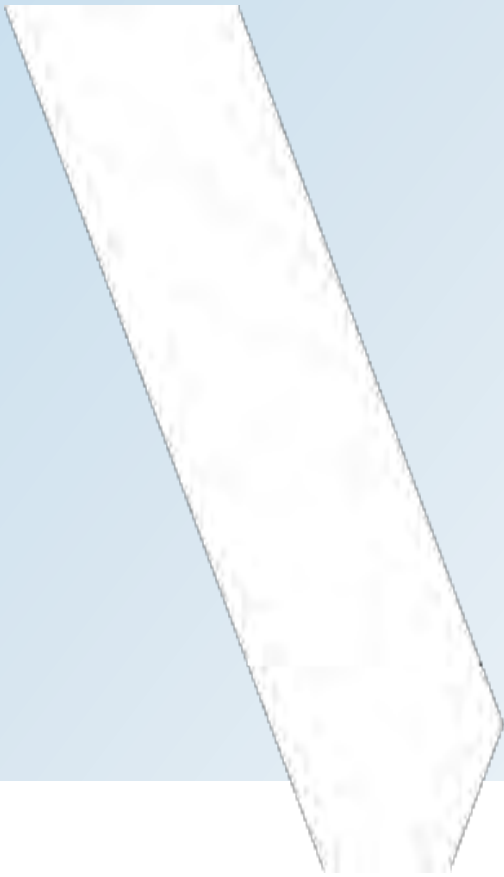




Table D1-2: 2022 Sediment Quality Results

Waterbody							Dixie Creek											
Sample ID							DC01-S01	DC01-S02	DC01-S03	DC02-S01	DC02-S02	DC02-S03	DC03-S01	DC03-S02	DC03-S03	DC04-S01	DC04-S02	DC04-S03
Date Sampled							27-Oct-22	27-Oct-22	27-Oct-22	22-Oct-22	22-Oct-22	22-Oct-22	23-Oct-22	23-Oct-22	23-Oct-22	25-Oct-22	25-Oct-22	25-Oct-22
Time Sampled							13:00	12:30	12:00	14:30	13:45	13:00	13:30	12:45	12:00	11:15	10:30	10:00
Parameter	Lowest Detection Limit	Units	CSQG ISQG	CSQG PEL	PSQG LEL	PSQG SEL	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests																		
Moisture Content		%					37.7	49	45.3	21.6	58.4	42	32.6	47.7	39.5	51	47.1	46.5
Loss on ignition @ 550°C	1	%					3.77	6.56	6.3	0.82	9.08	5.43	3.45	8.6	4.25	7.89	5.32	7.26
pH (1:2 soil:water)	0.05	pH units					6.37	5.87	6.54	6.32	6.19	6.3	6.49	5.9	6.83	5.83	6.81	5.71
Particle Size																		
Gravel (16mm - 2.0mm)	1.0	%					1.1	0.8	1.1	1.1	0.9	0.2	0.9	2.1	2.8	0.1	0.2	0.2
Coarse Sand (2.0mm - 0.2mm)	1.0	%					6.7	6.5	9.6	76.2	10.4	28.3	13.7	8.4	2.3	2.2	1.8	3.2
Fine Sand (0.2mm - 0.062mm)	1.0	%					35.9	30.1	45	9.3	8.3	23.9	37.9	24.9	10.8	8.8	9	14.8
Silt (0.062mm - 0.0039mm)	1.0	%					52.2	57.3	40.3	11.7	67.6	38.6	40.9	54.4	57	77.8	71	72.5
Clay (<0.0039mm)	1.0	%					4.1	5.3	3.9	1.7	12.8	9.1	6.4	10.1	27.1	11.1	18.1	9.3
Nutrients & Organics																		
Total Kjeldahl Nitrogen		%					0.06	0.09	0.07	0.02	0.14	0.06	0.04	0.06	0.03	0.06	0.06	0.09
Total Organic Carbon		%			1	10	3.4	4	3.7	1.1	6.4	3.1	2.7	4.6	1.8	5.2	4.5	4.8
Metals																		
Aluminum (Al)	1	mg/kg					2900	4800	3300	4300	13000	7100	5600	7500	9800	8300	9800	6400
Antimony (Sb)	0.80	mg/kg					< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Arsenic (As)	0.50	mg/kg	5.9	17	6	33	2	1.9	1.7	1.5	5.3	2	1.7	3	4.4	2.3	2.3	1.8
Barium (Ba)	0.10	mg/kg					22	38	25	29	92	50	39	51	88	66	82	49
Beryllium (Be)	0.02	mg/kg					0.1	0.18	0.12	0.14	0.41	0.23	0.18	0.23	0.35	0.29	0.38	0.23
Bismuth (Bi)	0.09	mg/kg					< 0.09	0.1	< 0.09	< 0.09	0.22	0.12	0.1	0.13	0.18	0.16	0.21	0.13
Boron (B)	1.0	mg/kg					1	2	2	2	4	3	2	3	4	4	5	3
Cadmium (Cd)	0.050	mg/kg	0.6	3.5	0.6	10	0.05	0.11	0.1	< 0.05	0.29	0.08	0.07	0.16	0.16	0.19	0.18	0.14
Calcium (Ca)	3	mg/kg					3400	3300	2900	2500	6600	3900	3500	4000	6100	5100	8400	4400
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	9.8	15	9.9	12	34	19	15	20	27	24	30	19
Cobalt (Co)	0.01	mg/kg					2.6	3.9	3	4.7	10	6.1	4.7	5.8	8.2	6.3	8	4.7
Copper (Cu)	0.10	mg/kg	35.7	197	16	110	5	7.1	4.2	6	18	10	7.3	11	17	10	15	8
Iron (Fe)	1	mg/kg			21200	43766	6450	9060	6290	7720	20500	12200	9420	12200	17800	13200	17300	10400
Lead (Pb)	0.10	mg/kg	35	91.3	31	250	2.6	3.9	2.8	3.5	10	5.1	4.1	5.6	7.3	5.6	6.7	4.7
Lithium (Li)	2.0	mg/kg					6	10	7	8	20	12	9	11	16	15	19	12
Magnesium (Mg)	1	mg/kg					1600	2400	1600	2000	5500	3200	2500	3200	5200	4100	6900	3200
Manganese (Mn)	0.5	mg/kg			460	1100	120	150	110	160	360	260	190	240	490	270	340	210
Mercury (Hg)	0.050	mg/kg	0.17	0.486	0.2	2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum (Mo)	0.10	mg/kg					0.2	0.2	0.1	0.1	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.2
Nickel (Ni)	0.50	mg/kg			16	75	5.3	9	5.9	8.3	22	13	9.9	13	20	14	20	11
Phosphorus (P)	3	mg/kg					690	590	520	370	670	480	550	610	620	670	650	630
Potassium (K)	4	mg/kg					400	670	440	600	1900	1100	780	1000	1700	1100	1700	760
Selenium (Se)	0.70	mg/kg					< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silicon (Si)	3.00	mg/kg					1500	2000	1600	680	1400	1000	880	1100	1300	2500	2100	2100
Sodium (Na)	1	mg/kg					90	96	79	61	150	99	84	99	150	130	180	110
Strontium (Sr)	0.10	mg/kg					8.8	9.4	7.8	8.2	20	12	11	13	18	15	17	12
Thallium (Tl)	0.020	mg/kg					0.03	0.06	0.04	0.04	0.22	0.09	0.06	0.11	0.15	0.12	0.16	0.08
Tin (Sn)	0.5	mg/kg					0.7	0.7	0.7	0.7	1	0.7	0.7	0.7	0.8	0.9	1	0.9
Uranium (U)	0.002	mg/kg					1.2	0.97	0.8	1	1.8	1	0.051	0.51	0.44	1.7	1.7	1.5
Vanadium (V)	3.00	mg/kg					12	16	11	12	34	19	16	20	30	23	29	18
Yttrium (Y)	0.004	mg/kg					5	4.7	3.8	4	9.7	6.1	5.6	6.6	8.3	6.3	7.7	5.5
Zinc (Zn)	0.7	mg/kg	123	315	120	820	12	20	15	23	59	30	23	33	40	39	45	29

Notes:

1. PSQG; Provincial Sediment Quality Guidelines for the protection and management of aquatic sediment quality in Ontario
2. CSQG; Canadian Council of Ministers of the Environment Canadian Sediment Quality Guidelines for the protection of aquatic life
3. All values expressed as mg/kg unless otherwise indicated
4. Dark blue shaded values indicate concentrations that exceed the PSQG LEL
5. Gray shaded values indicate concentrations that exceed the PSQG SEL and LEL
6. Blue shaded values indicate concentrations that exceed the CCME ISQG
7. Light blue shaded values indicate concentrations that exceed the CCME ISQG and PEL



Waterbody	Chukuni River														
Sample ID	CR-REF-S01	CR-REF-S02	CR-REF-S03	CR-REF-S04	CR-REF-S05	CR-FDP-S01	CR-FDP-S02	CR-FDP-S03	CR-FDP-S04	CR-FDP-S05	CR-DS-S01	CR-DS-S02	CR-DS-S03	CR-DS-S04	CR-DS-S05
Date Sampled	29-Oct-22	29-Oct-22	29-Oct-22	29-Oct-22	29-Oct-22	28-Oct-22	28-Oct-22	28-Oct-22	28-Oct-22	28-Oct-22	29-Oct-22	29-Oct-22	29-Oct-22	29-Oct-22	29-Oct-22
Time Sampled	10:30	10:10	9:50	9:30	9:00	14:00	13:30	13:00	12:00	11:00	12:30	12:20	12:50	13:10	12:00
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests															
Moisture Content	54.1	54.3	59.8	51.2	55	31.3	31.5	45.5	28.4	50.3	51.9	44.3	36	30.7	25
Loss on ignition @ 550°C	7.76	8.67	10.2	7.25	8.76	1.83	2.08	3.68	1.83	5.24	6.07	4.65	2.96	2.44	1.23
pH (1:2 soil:water)	5.71	5.87	5.88	5.91	5.69	6.99	6.77	5.89	5.98	5.8	6.06	6.29	5.98	6.21	6.3
Particle Size															
Gravel (16mm - 2.0mm)	0.1	0	0	0	0	18.1	3.1	1.6	0.5	0	8.4	1.4	0.2	3.3	9.3
Coarse Sand (2.0mm - 0.2mm)	1.4	1.8	1.4	1.7	1.5	8.9	6.9	3.7	1.8	0.8	28.7	11.5	6.4	29.4	52.9
Fine Sand (0.2mm - 0.062mm)	10.4	10.4	2.8	21.2	6.6	42.9	50.6	48.5	66.8	27.8	21.1	21	54.1	37.6	21.6
Silt (0.062mm - 0.0039mm)	80.4	79.3	86.5	69.3	82.8	26.2	34.3	40	27.7	63.8	37.7	58	35.5	26.3	14.3
Clay (<0.0039mm)	7.8	8.5	9.3	7.8	9	3.9	5.1	6.2	3.2	7.6	4.1	8.1	3.9	3.4	1.8
Nutrients & Organics															
Total Kjeldahl Nitrogen	0.08	0.08	0.12	0.08	0.08	0.03	0.03	0.04	0.04	0.06	0.05	0.06	0.04	0.04	0.02
Total Organic Carbon	5.2	6	6.9	5.2	6.1	1.2	1.1	2.5	1.5	3.9	3.3	3.1	2.2	1.7	1
Metals															
Aluminum (Al)	6800	6800	9200	6400	7800	4700	3700	5200	3200	6900	5200	6400	3600	4200	3500
Antimony (Sb)	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Arsenic (As)	13	13	12	10	15	3.8	3.8	5	4.6	7.8	6.3	9.4	2.9	4.6	5.3
Barium (Ba)	55	57	78	53	66	37	27	40	24	55	39	50	26	30	25
Beryllium (Be)	0.26	0.28	0.35	0.24	0.3	0.15	0.14	0.18	0.12	0.25	0.19	0.25	0.13	0.14	0.12
Bismuth (Bi)	0.18	0.19	0.24	0.17	0.21	0.14	0.1	0.13	0.09	0.17	0.12	0.16	0.09	0.09	< 0.09
Boron (B)	4	4	5	3	4	2	2	3	3	4	2	3	2	2	1
Cadmium (Cd)	0.2	0.19	0.28	0.2	0.23	0.07	0.06	0.12	0.07	0.17	0.1	0.13	0.08	0.07	0.08
Calcium (Ca)	5200	5200	6300	4700	5700	4800	3600	3500	2900	4300	3600	4400	3000	3300	2400
Chromium (Cr)	21	21	28	20	24	17	13	17	11	22	15	21	12	14	10
Cobalt (Co)	5.9	6.1	7.7	5.7	6.9	4.2	3.4	4.6	3.1	6.1	4.6	5.7	3.4	4	3.1
Copper (Cu)	20	20	29	20	26	10	9.1	10	6.8	19	9	13	5.4	11	6.4
Iron (Fe)	13100	12700	17400	12300	14900	11100	9530	10800	7700	13600	9190	13000	6790	9800	7220
Lead (Pb)	7	7	9	6.4	8.2	3.1	2.9	3.9	3.2	6	3.7	4.8	2.8	3.3	3
Lithium (Li)	12	12	17	12	14	10	8	11	7	13	10	13	7	8	7
Magnesium (Mg)	3600	3600	5000	3500	4200	3600	2400	3100	1900	3900	2900	3900	2100	2600	2000
Manganese (Mn)	280	260	320	230	310	170	130	150	110	230	190	250	110	150	150
Mercury (Hg)	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum (Mo)	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.7	0.4	0.2	0.3	0.5	0.2	0.1
Nickel (Ni)	23	24	32	23	30	12	9.2	13	8.9	22	12	15	7.9	11	8.6
Phosphorus (P)	710	720	730	650	710	660	630	570	590	630	570	650	580	570	440
Potassium (K)	1100	1100	1500	1100	1300	910	620	940	490	1200	800	1100	540	650	520
Selenium (Se)	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silicon (Si)	1800	2000	2300	2600	2100	1900	1800	2100	1700	1900	2100	2400	1800	1900	1700
Sodium (Na)	140	130	170	130	140	120	100	110	83	130	110	130	88	95	81
Strontium (Sr)	16	16	20	14	17	10	9.2	10	8.3	13	11	13	8.4	9.5	7.4
Thallium (Tl)	0.1	0.1	0.15	0.09	0.12	0.05	0.03	0.07	0.03	0.11	0.11	0.11	0.04	0.04	0.02
Tin (Sn)	0.9	0.9	1	0.8	0.9	0.8	0.8	0.8	1.3	1.1	0.9	0.9	0.8	0.8	0.7
Uranium (U)	2.1	2.3	2.8	1.9	2.4	1.1	0.88	1.2	1	1.6	1.3	1.5	1.2	0.91	0.67
Vanadium (V)	20	20	26	19	23	18	16	17	13	21	16	21	12	16	11
Yttrium (Y)	6.9	6.9	8.5	6.3	7.4	5.1	4.7	5.1	4.3	6.2	4.9	6.5	4.5	4.8	3.4
Zinc (Zn)	39	40	53	37	46	22	17	26	17	39	26	33	18	22	18



Waterbody	Genessee Lake			Unnamed Waterbody 1			Unnamed Waterbody 2			Unnamed Waterbody 5			Unnamed Waterbody 6		
Sample ID	GenL-S01	GenL-S02	GenL-S03	WB-1-S01	WB-1-S02	WB-1-S03	WB-2-S01	WB-2-S02	WB-2-S03	WB-5-S01	WB-5-S02	WB-5-S03	WB-6-S01	WB-6-S02	WB-6-S03
Date Sampled	27-Oct-22	27-Oct-22	26-Oct-22	27-Oct-22	27-Oct-22	27-Oct-22	27-Oct-22	27-Oct-22	27-Oct-22	28-Oct-22	28-Oct-22	28-Oct-22	26-Oct-22	26-Oct-22	26-Oct-22
Time Sampled	12:30	13:00	11:45	17:40	17:30	17:20	14:45	15:30	15:15	10:50	10:40	10:30	17:00	16:30	16:00
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests															
Moisture Content	84.4	85.6	31.5	87.8	85.4	83.8	85.2	86.2	85.7	49.6	79.7	69.5	88.6	88.4	88.7
Loss on ignition @ 550°C	23.2	19.1	1.07	41.4	41.3	39.6	27.2	32.9	29	6.61	26.5	13.9	41.3	44	42.1
pH (1:2 soil:water)	5.9	5.43	5.7	5.26	5.08	5.1	5.37	5.38	5.38	4.19	4.26	4.43	6	5.95	6
Particle Size															
Gravel (16mm - 2.0mm)	4.1	0.4	0	4.5	6.2	3.2	0	0	0	1.7	8	0.9	0	0	0
Coarse Sand (2.0mm - 0.2mm)	20.2	24	11.6	16.4	13.1	13.6	0	0	0	41.6	28.5	29.8	0	0	0
Fine Sand (0.2mm - 0.062mm)	3.6	4.8	81.4	4.5	3.1	3.2	1	0.6	0.9	44.4	33.4	39.9	2.6	0.5	1.1
Silt (0.062mm - 0.0039mm)	70.4	69	6.7	70.2	73.4	75.4	92.5	93.1	92.6	11.7	28.9	28.1	93.8	95.4	94.4
Clay (<0.0039mm)	1.8	1.8	0.2	4.5	4.3	4.6	6.5	6.4	6.5	0.6	1.2	1.3	3.6	4.1	4.5
Nutrients & Organics															
Total Kjeldahl Nitrogen	0.15	0.12	0.03	0.15	0.18	0.16	0.14	0.16	0.12	0.07	0.11	0.12	0.14	0.13	0.15
Total Organic Carbon	21.4	32	1.3	37.2	39.2	37.6	26.6	28.7	28.6	2.2	7.6	6.9	39.7	40.7	36.9
Metals															
Aluminum (Al)	9900	9100	1200	6300	6700	6900	7800	8300	8700	700	1700	2800	12000	12000	12000
Antimony (Sb)	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Arsenic (As)	15	11	2.9	9.3	8.5	7.8	13	23	21	0.7	2.4	2	12	9.5	6.6
Barium (Ba)	100	89	11	61	63	65	70	84	82	5.6	14	15	110	110	120
Beryllium (Be)	0.42	0.4	0.07	0.2	0.23	0.23	0.23	0.25	0.25	0.02	0.05	0.09	0.4	0.42	0.43
Bismuth (Bi)	0.29	0.29	< 0.09	0.12	0.12	0.13	0.28	0.34	0.34	< 0.09	< 0.09	< 0.09	0.31	0.28	0.21
Boron (B)	10	8	2	5	4	4	4	4	4	< 1	< 1	< 1	8	8	8
Cadmium (Cd)	0.54	0.5	< 0.05	0.69	0.66	0.69	0.53	0.6	0.63	< 0.05	0.06	0.07	0.84	0.63	0.51
Calcium (Ca)	6800	5600	1600	6100	5800	5800	4700	5100	5100	350	870	1000	10000	11000	10000
Chromium (Cr)	25	23	2.9	18	17	17	17	16	18	1.3	3.5	5.1	28	29	31
Cobalt (Co)	7.3	6.8	1.1	5.3	5.4	5.5	3.6	3.8	3.9	0.2	0.51	0.77	8.3	8.4	9
Copper (Cu)	18	17	1.2	12	13	13	16	17	17	1	3.5	3.9	23	24	26
Iron (Fe)	22200	16800	3510	8020	8290	8460	8940	10700	10500	533	1360	1910	14600	14900	15900
Lead (Pb)	16	16	2.2	7.7	7.5	7.1	14	18	19	2.6	4.6	4.4	19	13	7.5
Lithium (Li)	16	14	2	7	7	7	9	9	10	< 2	< 2	4	18	18	19
Magnesium (Mg)	3500	3300	520	1800	2000	2100	2300	2200	2400	150	350	580	4300	4400	4700
Manganese (Mn)	480	330	100	180	150	160	100	98	110	7.1	15	20	220	230	230
Mercury (Hg)	0.12	0.09	< 0.05	0.18	0.18	0.13	0.15	0.22	0.21	< 0.05	< 0.05	< 0.05	0.18	0.14	0.11
Molybdenum (Mo)	0.5	0.5	0.1	1	0.7	0.7	1	1.1	1.1	0.2	0.3	0.2	0.9	0.9	0.9
Nickel (Ni)	17	16	1.7	16	15	16	12	13	14	0.7	2	2.8	29	30	32
Phosphorus (P)	980	900	410	530	480	470	580	620	650	45	210	250	620	650	540
Potassium (K)	1100	1100	130	600	590	600	800	830	890	86	140	150	1400	1400	1600
Selenium (Se)	1.3	1.1	< 0.7	1.1	1.2	1.2	0.9	1	1	< 0.7	< 0.7	< 0.7	1.4	1.4	1.3
Silicon (Si)	2500	2000	730	1600	1700	1700	1800	1700	2300	480	820	980	2800	2900	3000
Sodium (Na)	140	150	40	72	66	63	84	80	85	29	45	35	190	190	190
Strontium (Sr)	18	17	4.2	19	19	19	16	17	18	2.3	5.2	5.4	26	26	26
Thallium (Tl)	0.16	0.15	< 0.02	0.1	0.08	0.1	0.12	0.15	0.16	< 0.02	< 0.02	0.04	0.19	0.16	0.19
Tin (Sn)	1.2	1.1	0.7	1.3	1.1	1	1.1	1.2	1.2	0.7	0.8	0.9	1.3	1.2	1
Uranium (U)	4.3	3.3	0.54	1.7	1.9	1.9	1.3	1.3	1.4	0.42	0.59	0.88	2.3	2.6	2.8
Vanadium (V)	29	28	5	13	14	14	20	21	21	< 3	4	6	24	24	27
Yttrium (Y)	10	9.6	2.8	5.7	6.3	6.4	4.8	5.2	5.3	1.1	1.4	1.9	8.6	9	9.8
Zinc (Zn)	60	54	6.5	63	59	63	53	56	62	2.5	7.9	11	85	81	81



Waterbody	Unnamed Watercourse 3		Unnamed Watercourse 3A			Unnamed Watercourse 3B			Unnamed Watercourse 4			Unnamed Watercourse 5		
Sample ID	WC-3-S01	WC-3-S03	WC-3A-S01	WC-3A-S02	WC-3A-S03	WC-3B-S01	WC-3B-S02	WC-3B-S03	WC-4-S01	WC-4-S02	WC-4-S03	WC-5-S01	WC-5-S02	WC-5-S03
Date Sampled	25-Oct-22	25-Oct-22	22-Oct-22	22-Oct-22	22-Oct-22	21-Oct-22	21-Oct-22	21-Oct-22	20-Oct-22	20-Oct-22	20-Oct-22	19-Oct-22	19-Oct-22	19-Oct-22
Time Sampled	10:30	10:00	17:00	16:30	16:00	13:00	12:30	12:00	12:30	12:00	11:00	13:30	13:00	12:30
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests														
Moisture Content	13.3	31.7	43	48.5	43.2	32.6	45.1	46.8	32.4	30.8	33.4	44.4	41.9	52.4
Loss on ignition @ 550°C	0.93	5.86	9.32	9.6	7.44	5.71	10.9	11.4	4	3.31	3.73	8.91	11.2	8.66
pH (1:2 soil:water)	6.24	5.96	5.58	5.69	5.75	6.38	6.12	5.97	7.22	7.18	7.17	5.44	6.28	6.18
Particle Size														
Gravel (16mm - 2.0mm)	77.9	12.8	0.1	1.2	1.5	1.5	1.8	2.6	19.4	2	0.9	4.9	0.2	1
Coarse Sand (2.0mm - 0.2mm)	16.4	52.7	7.8	13.4	13.4	27.6	20.2	20.4	14.9	20.2	29	21.4	3.2	5.8
Fine Sand (0.2mm - 0.062mm)	3.1	18.8	13.5	10.1	14.8	20.4	19.2	23	16	19.4	15.4	7.3	4	2.6
Silt (0.062mm - 0.0039mm)	2.2	13.7	63.8	61.3	57.3	44.3	52.3	49.1	30.7	35.8	32.7	52.2	61.9	64.9
Clay (<0.0039mm)	0.3	2	14.9	14	13.1	6.3	6.6	4.8	19.1	22.7	22.1	14.2	30.6	25.7
Nutrients & Organics														
Total Kjeldahl Nitrogen	0.02	0.08	0.13	0.15	0.08	0.11	0.1	0.08	0.05	0.03	0.04	0.06	0.06	0.08
Total Organic Carbon	1.9	2.6	5.4	5.3	5.2	4.8	5	6	3.3	1.8	1.9	4.7	3	5.6
Metals														
Aluminum (Al)	6700	4200	13000	12000	11000	4800	5100	4600	9300	9300	8900	13000	17000	16000
Antimony (Sb)	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Arsenic (As)	10	4.4	7.8	6.8	6.2	4.4	2.6	4	2.9	3.6	4.2	4.8	5.9	5.1
Barium (Ba)	110	45	100	89	77	43	43	41	94	95	90	99	130	130
Beryllium (Be)	0.2	0.14	0.47	0.4	0.34	0.16	0.15	0.15	0.39	0.38	0.39	0.46	0.61	0.58
Bismuth (Bi)	0.13	0.1	0.26	0.23	0.19	0.09	0.1	0.1	0.2	0.21	0.19	0.25	0.3	0.3
Boron (B)	3	2	5	4	4	2	2	2	5	5	5	5	6	6
Cadmium (Cd)	0.09	0.07	0.2	0.15	0.12	0.07	0.08	0.08	0.13	0.11	0.11	0.19	0.17	0.24
Calcium (Ca)	4500	3900	6700	6100	5400	3300	3500	3500	8100	6900	5600	5100	5800	5900
Chromium (Cr)	22	13	33	30	28	14	14	13	27	27	26	35	42	42
Cobalt (Co)	10	4.4	13	11	9.9	5	4.4	4.7	9.2	9.4	9.1	10	15	13
Copper (Cu)	9.1	5.1	18	16	12	5.3	5.8	5.5	16	14	13	17	21	22
Iron (Fe)	20600	11300	23600	21300	19500	12400	10600	10300	18100	19200	18100	21800	27200	26000
Lead (Pb)	5.2	3.4	11	9.6	8.5	3.5	3.6	3.4	7.3	7.5	7.5	9.8	11	10
Lithium (Li)	14	8	19	18	15	8	9	8	19	18	18	21	26	26
Magnesium (Mg)	3900	2100	5100	4700	4300	2100	2200	1900	6500	6100	5500	6300	7800	8000
Manganese (Mn)	1500	550	730	660	590	220	170	220	430	550	560	410	670	610
Mercury (Hg)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Molybdenum (Mo)	0.4	0.2	0.6	0.4	0.4	0.4	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2
Nickel (Ni)	13	7.2	22	19	17	7.1	7.4	6.7	20	20	19	21	28	27
Phosphorus (P)	580	600	770	720	700	600	570	580	500	610	430	590	620	650
Potassium (K)	1100	570	1600	1400	1300	430	450	400	1900	1800	1700	1900	2500	2500
Selenium (Se)	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silicon (Si)	2300	2000	1600	1400	1400	2200	2100	2100	2700	2300	2800	2000	2500	3100
Sodium (Na)	96	78	140	130	120	79	79	72	160	150	140	140	190	200
Strontium (Sr)	13	10	22	21	19	11	11	11	14	14	12	17	19	19
Thallium (Tl)	0.13	0.05	0.23	0.19	0.17	0.06	0.06	0.06	0.17	0.16	0.14	0.2	0.27	0.28
Tin (Sn)	0.9	0.7	1.4	1.2	1	0.8	0.8	0.8	1.1	1.1	1.1	1.1	1.1	1.2
Uranium (U)	0.83	0.82	1	0.73	0.31	0.74	0.84	0.76	1	1	0.93	0.82	0.87	0.86
Vanadium (V)	25	17	41	36	33	18	16	15	29	30	28	36	45	43
Yttrium (Y)	5.2	4.6	9.9	8.9	7.8	4.7	4.8	4.4	7	6.7	6.4	6.7	8.1	7.8
Zinc (Zn)	31	18	47	44	40	19	20	19	39	38	36	83	80	84



Waterbody	Unnamed Watercourse 6									Unnamed Watercourse 7					
	Sample ID	WC-6B-01-S01	WC-6B-01-S02	WC-6B-01-S03	WC-6B-S01	WC-6B-S03	WC-6C-S01	WC-6C-S02	WC-6C-S03	WC-7-S01	WC-7-S02	WC-7-S03	WC-7A-03-S01	WC-7A-03-S02	WC-7A-03-S03
Date Sampled	23-Oct-22	23-Oct-22	23-Oct-22	23-Oct-22	23-Oct-22	24-Oct-22	24-Oct-22	24-Oct-22	24-Oct-22	24-Oct-22	24-Oct-22	24-Oct-22	20-Oct-22	20-Oct-22	20-Oct-22
Time Sampled	13:30	13:00	12:30	16:00	15:00	15:00	14:30	14:00	13:05	12:30	11:45	12:30	12:00	11:30	
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests															
Moisture Content	22.4	26.2	25.5	35.8	25.6	44	49.7	50.2	56.2	56.9	59.8	79	80.7	66.6	
Loss on ignition @ 550°C	0.72	0.95	4.18	3.82	3.76	6.95	8.97	7.27	10.2	11.7	17.6	41.1	47.8	21.5	
pH (1:2 soil:water)	5.32	5.41	5.68	5.9	6.21	6.57	6.79	6.67	5.89	5.7	6.09	5.35	5.09	5.35	
Particle Size															
Gravel (16mm - 2.0mm)	15.4	9.1	15.8	5	15.8	0	0.3	0.7	4.2	0.1	0.8	5.5	16.2	12.5	
Coarse Sand (2.0mm - 0.2mm)	73.1	72.9	64.7	69.3	64.7	3.2	5.3	1.8	10.7	10.3	7.5	25.3	37.9	48	
Fine Sand (0.2mm - 0.062mm)	8.4	15.1	14.6	8	14.6	5	2.8	1.4	15.9	25.9	9.2	7	7.7	7.7	
Silt (0.062mm - 0.0039mm)	3	2.8	4.6	15.7	4.6	71.2	64.8	72.7	59.7	54.9	65.5	55.7	35.4	28.8	
Clay (<0.0039mm)	0.1	0.1	0.2	2	0.2	20.6	26.8	23.3	9.5	8.7	16.9	6.5	2.9	3	
Nutrients & Organics															
Total Kjeldahl Nitrogen	< 0.01	0.01	0.02	0.06	0.02	0.05	0.06	0.04	0.14	0.15	0.05	0.23	0.2	0.22	
Total Organic Carbon	1.3	1.1	2.2	2.5	1.8	4.8	4.6	4.5	6.7	6.7	12.3	49.2	50.2	14.8	
Metals															
Aluminum (Al)	2100	2000	3300	7400	5200	16000	19000	18000	11000	9800	15000	8000	6000	6100	
Antimony (Sb)	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	
Arsenic (As)	1.4	0.7	1.1	4	12	5	5	4.1	3.1	3.4	4.7	3.9	3.2	1.9	
Barium (Ba)	14	10	17	49	34	130	130	130	73	70	110	71	55	48	
Beryllium (Be)	0.06	0.08	0.13	0.18	0.12	0.48	0.58	0.51	0.35	0.31	0.55	0.25	0.16	0.14	
Bismuth (Bi)	< 0.09	< 0.09	< 0.09	0.09	< 0.09	0.27	0.3	0.28	0.19	0.17	0.26	0.16	0.11	< 0.09	
Boron (B)	< 1	< 1	< 1	2	2	5	6	5	4	4	6	7	6	5	
Cadmium (Cd)	< 0.05	< 0.05	0.06	0.09	< 0.05	0.18	0.28	0.22	0.18	0.23	0.27	0.2	0.21	0.14	
Calcium (Ca)	1500	1300	2700	4000	3200	9100	12000	9300	5700	5600	8600	9500	9100	6600	
Chromium (Cr)	4.9	7	7.5	18	12	43	48	47	29	27	39	25	20	19	
Cobalt (Co)	2.3	2.1	2.3	5.7	6	12	13	11	8.9	9.1	13	4.6	3.6	3	
Copper (Cu)	2.5	4.3	6	8	4.4	25	28	26	16	15	21	9.5	5.9	4.3	
Iron (Fe)	3490	2960	3360	10400	10100	25800	29700	27000	15700	14700	22100	12000	7390	6690	
Lead (Pb)	2.1	2.6	3.3	5.5	4.5	10	11	10	7.4	7.4	11	10	8.8	6.8	
Lithium (Li)	5	4	7	11	8	24	27	27	16	15	23	9	6	6	
Magnesium (Mg)	1100	870	1100	2900	2100	8000	9400	8800	4500	4200	6500	3200	2400	2300	
Manganese (Mn)	66	52	46	230	450	520	570	420	390	400	480	190	180	150	
Mercury (Hg)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.06	0.11	0.08	0.06	
Molybdenum (Mo)	0.1	0.3	0.4	0.2	0.2	0.4	0.3	0.5	0.6	0.6	0.8	0.3	0.2	0.2	
Nickel (Ni)	3.3	3.2	4.1	10	7.4	29	32	31	19	17	28	11	7.1	6.8	
Phosphorus (P)	280	240	410	420	380	690	750	750	640	580	640	600	620	500	
Potassium (K)	170	140	160	710	450	2600	3100	2900	1300	1200	2200	1200	830	820	
Selenium (Se)	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	
Silicon (Si)	980	400	540	1100	860	1600	1700	1500	1300	1200	1600	2800	2400	2400	
Sodium (Na)	40	28	34	120	92	210	260	250	120	110	160	87	75	74	
Strontium (Sr)	6.6	4.6	7.9	15	12	23	28	26	18	17	27	24	22	17	
Thallium (Tl)	< 0.02	< 0.02	0.03	0.08	0.04	0.28	0.33	0.32	0.17	0.16	0.27	0.13	0.09	0.09	
Tin (Sn)	0.7	1.6	1.2	0.7	0.6	0.9	1.1	1	1	0.9	1.1	1.1	1.1	1	
Uranium (U)	0.82	1	2.6	< 0.002	< 0.002	0.62	0.67	1.1	1.2	1.3	2.5	0.83	0.99	1.1	
Vanadium (V)	6	5	6	16	14	43	46	44	26	24	36	18	11	11	
Yttrium (Y)	3.2	3	5.7	5	4	11	11	10	7.8	7.3	10	3.6	2.7	2.5	
Zinc (Zn)	7.7	6.4	11	29	21	59	78	71	50	47	71	31	24	23	



Waterbody	Unnamed Watercourse 7A						Unnamed Watercourse 8		
Sample ID	WC-7A-07-S01	WC-7A-07-S02	WC-7A-07-S03	WC-7A-08-S01	WC-7A-08-S02	WC-7A-08-S03	WC-8-S01	WC-8-S02	WC-8-S03
Date Sampled	22-Oct-22	22-Oct-22	22-Oct-22	20-Oct-22	20-Oct-22	20-Oct-22	25-Oct-22	25-Oct-22	25-Oct-22
Time Sampled	13:30	13:00	12:30	15:45	15:15	14:45	16:50	16:30	16:10
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests									
Moisture Content	44.9	47.3	41.1	58	59	60.1	35.3	30.1	32.9
Loss on ignition @ 550°C	10.3	11	9.52	17.6	16	18.9	3.95	2.08	4.53
pH (1:2 soil:water)	5.47	5.65	5.76	5.72	5.55	5.81	6.37	6.19	6.62
Particle Size									
Gravel (16mm - 2.0mm)	0.3	1.2	0.1	5.1	7.3	2.5	2.4	1.4	1.1
Coarse Sand (2.0mm - 0.2mm)	9.8	11.8	20.9	22	20.3	22.7	8.7	7.4	8.8
Fine Sand (0.2mm - 0.062mm)	6.7	7.6	6.4	5.3	6	6.7	53.2	75.1	78.9
Silt (0.062mm - 0.0039mm)	65.7	64.7	57.3	53.2	52	54.5	32.6	14.7	10.1
Clay (<0.0039mm)	17.6	14.6	15.2	14.4	14.3	13.5	3	1.4	1
Nutrients & Organics									
Total Kjeldahl Nitrogen	0.14	0.14	0.08	0.13	0.13	0.17	0.09	0.04	0.04
Total Organic Carbon	6.1	6.4	4.3	14.3	8	18.5	2.1	1.9	2.5
Metals									
Aluminum (Al)	18000	17000	17000	19000	20000	20000	1700	1800	1700
Antimony (Sb)	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Arsenic (As)	8.8	9	12	9.9	9.4	11	0.9	0.9	1.1
Barium (Ba)	130	130	130	120	120	120	13	14	13
Beryllium (Be)	0.63	0.57	0.61	0.54	0.57	0.54	0.06	0.05	0.06
Bismuth (Bi)	0.31	0.31	0.3	0.3	0.31	0.3	< 0.09	< 0.09	< 0.09
Boron (B)	5	6	5	7	7	7	< 1	< 1	< 1
Cadmium (Cd)	0.34	0.36	0.28	0.25	0.25	0.24	< 0.05	< 0.05	< 0.05
Calcium (Ca)	6100	5900	5500	7900	7900	8200	1700	2000	1800
Chromium (Cr)	42	41	39	48	49	49	4.3	4.6	4.3
Cobalt (Co)	14	14	21	12	13	12	1.4	1.5	1.4
Copper (Cu)	19	17	18	15	16	15	1.3	1.5	1.3
Iron (Fe)	27000	25600	30200	26800	27900	27300	3160	3180	3000
Lead (Pb)	14	14	19	16	17	16	1.5	1.7	1.5
Lithium (Li)	22	21	19	30	29	30	4	4	4
Magnesium (Mg)	7000	6700	6400	8900	9100	9200	770	810	770
Manganese (Mn)	670	710	1300	490	530	430	55	57	67
Mercury (Hg)	< 0.05	0.06	< 0.05	0.05	0.05	0.09	< 0.05	< 0.05	< 0.05
Molybdenum (Mo)	0.4	0.4	0.7	0.1	0.2	0.2	< 0.1	< 0.1	< 0.1
Nickel (Ni)	26	24	26	27	28	27	2.5	2.5	2.4
Phosphorus (P)	810	740	850	520	560	560	350	400	340
Potassium (K)	2300	2200	2100	2700	2800	2800	160	170	160
Selenium (Se)	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Silicon (Si)	2400	3200	2400	2400	1800	1700	1100	1200	1100
Sodium (Na)	130	120	120	170	160	170	41	41	39
Strontium (Sr)	20	19	18	24	24	25	4.8	5.3	5
Thallium (Tl)	0.27	0.26	0.24	0.34	0.33	0.32	< 0.02	< 0.02	0.03
Tin (Sn)	1.1	1.1	1.1	1.3	1.2	1.2	0.7	0.7	0.7
Uranium (U)	1.2	1.1	1	1.4	1.7	1.6	0.5	0.78	0.49
Vanadium (V)	45	42	55	40	42	40	5	6	5
Yttrium (Y)	6.8	5.7	6.2	6.1	6.5	6	2.2	2.8	2.1
Zinc (Zn)	69	72	67	91	92	92	7.2	7.4	7.4



Table D1-2: 2023 Sediment Quality Results

Waterbody							Dixie Creek											
Sample ID							DC-01-S1	DC-01-S2	DC-01-S3	DC-02-S1	DC-02-S2	DC-02-S3	DC-03-S1	DC-03-S2	DC-03-S3	DC-04-S1	DC-04-S2	DC-04-S3
Date Sampled							01-Oct-2023	01-Oct-2023	01-Oct-2023	29-Sep-2023	29-Sep-2023	29-Sep-2023	28-Sep-2023	28-Sep-2023	28-Sep-2023	30-Sep-2023	30-Sep-2023	30-Sep-2023
Time Sampled							11:40	12:00	12:20	09:30	09:12	09:50	14:15	14:00	13:45	11:35	11:05	11:20
Parameter	Lowest Detection Limit	Units	CSQG ISQG	CSQG PEL	PSQG LEL	PSQG SEL	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	
Physical Tests																		
Moisture Content	0.25	%					53.3	90.7	49.7	34.9	47.5	47.5	39.2	46.8	42.6	59.3	49.6	59.9
Loss on ignition @ 550°C	1	%					16.9	8.8	6.2	5.4	8.3	8.4	4.9	6.3	7.6	13.9	9	13.1
pH (1:2 soil:water)	0.10	pH units					6.19	6.09	6.4	6.7	6.56	6.43	6.84	6.25	6.75	6.46	6.75	6.44
Ash content @ 550°C	1.00	%					83.1	91.2	93.8	94.6	91.7	91.6	95.1	93.6	92.4	86.1	91	86.9
Particle Size																		
Clay (< 0.0039 mm)	1.0	%					6.6	11.6	14.4	10.3	13.4	11.3	15.5	13.7	14.3	21.5	18.5	15.9
Silt (0.0039 - 0.062 mm)	1.0	%					40.2	48.7	55.6	29.1	51	48	42.1	55.7	41.3	66.5	69.6	72.3
Fine Sand (0.062 - 0.2 mm)	1.0	%					53.1	39.6	29.6	60.6	33.4	40.7	41.4	30.6	41.3	12	11.9	11.8
Coarse Sand (0.2 - 2.0 mm)	1.0	%					4.4	0	2.7	27.6	2.6	1.3	1.2	0	5.8	0	0	0
Gravel (2.0 - 16.0 mm)	1.0	%					<1.0	<1.0	<1.0	<1.0	2.2	<1.0	1	<1.0	3.1	<1.0	<1.0	<1.0
Nutrients & Organics																		
Total Kjeldahl Nitrogen	0.02	%					0.32	0.294	0.158	0.144	0.226	0.229	0.14	0.215	0.188	0.507	0.3	0.392
Total Organic Carbon	0.10	%			1	10	2.32	19.6	1.89	1.87	2.36	2.46	1.19	2.47	1.62	5.73	3.22	4.91
Organic Matter	0.20	%					4	33.8	3.26	3.22	4.07	4.24	2.05	4.26	2.79	9.88	5.55	8.46
Metals																		
Aluminum (Al)	50	mg/kg					3200	13200	6840	5940	9430	6280	5740	6540	7660	14100	10400	10100
Antimony (Sb)	0.10	mg/kg					<0.10	0.54	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	<0.10
Arsenic (As)	0.10	mg/kg	5.9	17	6	33	1.7	13.6	2.4	1.68	2.48	1.98	1.73	2.02	2.23	4.19	2.66	2.65
Barium (Ba)	0.50	mg/kg					16.2	82.2	40.1	45.3	64.4	37.2	36.1	37.5	41.2	73.7	51.9	50.8
Beryllium (Be)	0.10	mg/kg					<0.10	0.28	0.19	0.17	0.23	0.17	0.17	0.18	0.2	0.39	0.25	0.24
Bismuth (Bi)	0.20	mg/kg					<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	5.0	mg/kg					<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7	<5.0	<5.0
Cadmium (Cd)	0.020	mg/kg	0.6	3.5	0.6	10	0.06	0.588	0.088	0.067	0.115	0.093	0.065	0.074	0.077	0.22	0.13	0.112
Calcium (Ca)	50	mg/kg					2830	9140	4150	3620	4920	4360	3430	3860	3990	7670	5530	6070
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	9.63	27.4	19.4	15.6	23.1	17.2	15.5	17.6	18.6	34.8	25.1	24.7
Cobalt (Co)	0.10	mg/kg					2.47	7.31	5.29	4.28	5.89	4.38	4.42	4.54	4.95	9.74	5.7	5.35
Copper (Cu)	0.50	mg/kg	35.7	197	16	110	4.51	20.4	7.96	6.74	10.3	8.06	6.45	7.09	7.67	21	9.34	9.33
Iron (Fe)	50	mg/kg			21200	43766	5450	12400	10600	9010	12600	9430	9330	9880	10800	17800	12300	12000
Lead (Pb)	0.50	mg/kg	35	91.3	31	250	2.12	14.3	3.76	2.7	3.74	3.01	2.85	2.98	3.01	5.69	4.41	4.34
Lithium (Li)	2.0	mg/kg					3.7	11.3	8	7.4	10.2	8	7.4	7.8	8.7	15.4	11	10.8
Magnesium (Mg)	20	mg/kg					1420	4200	3070	2770	4090	3040	2920	3070	3400	6560	4500	4290
Manganese (Mn)	1.0	mg/kg			460	1100	108	199	190	188	252	198	209	234	245	450	277	286
Mercury (Hg)	0.005	mg/kg	0.17	0.486	0.2	2	0.0148	0.112	0.0242	0.0128	0.0202	0.0199	0.0135	0.0151	0.0147	0.023	0.0256	0.0268
Molybdenum (Mo)	0.10	mg/kg					0.16	1.11	0.18	0.14	0.19	0.2	0.13	0.18	0.16	0.97	0.32	0.34
Nickel (Ni)	0.50	mg/kg			16	75	5.09	27.2	11	9.04	12.9	9.84	8.97	9.57	10.4	23	13.4	13
Phosphorus (P)	50	mg/kg					535	610	653	474	659	561	528	586	536	672	706	698
Potassium (K)	100	mg/kg					410	1340	980	860	1300	900	830	900	1040	2160	1240	1080
Selenium (Se)	0.20	mg/kg					<0.20	1.02	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.65	0.2	0.22
Silver (Ag)	0.10	mg/kg					<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	50	mg/kg					94	197	169	133	205	143	141	152	154	300	208	175
Strontium (Sr)	0.50	mg/kg					9.57	28.4	16.2	13.9	19.2	14.2	13.2	14.4	15.2	27.7	22.8	22.5
Sulfur (S)	1000	mg/kg					<1000	2600	<1000	<1000	<1000	<1000	<1000	<1000	<1000	1900	<1000	<1000
Thallium (Tl)	0.050	mg/kg					<0.050	0.14	0.096	0.082	0.112	0.084	0.08	0.087	0.088	0.208	0.121	0.114
Tin (Sn)	2.0	mg/kg					<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	1.0	mg/kg					409	310	678	645	819	664	568	665	692	955	870	783
Tungsten (W)	0.5	mg/kg					<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.050	mg/kg					0.68	1.73	0.904	0.928	1.17	1.29	0.843	0.976	0.886	2.78	1.36	1.36
Vanadium (V)	0.20	mg/kg					11.4	24.6	22.3	18.5	26.9	19.9	17.9	20.1	21.6	39.4	27.6	26.8
Zinc (Zn)	2.0	mg/kg	123	315	120	820	12.7	76.5	26.7	22.2	31.9	25	22.5	24.9	25.8	52.5	35.4	33.8
Zirconium (Zr)	1.0	mg/kg					2.1	5.5	4.7	4.6	6.6	4.7	4	4	4.8	11.1	4.9	4.5

Notes:

1. PSQG; Provincial Sediment Quality Guidelines for the protection and management of aquatic sediment quality in Ontario
2. CSQG; Canadian Council of Ministers of the Environment Canadian Sediment Quality Guidelines for the protection of aquatic life
3. All values expressed as mg/kg unless otherwise indicated
4. Dark blue shaded values indicate concentrations that exceed the PSQG LEL
5. Gray shaded values indicate concentrations that exceed the PSQG SEL and LEL
6. Blue shaded values indicate concentrations that exceed the CCME ISQG
7. Light blue shaded values indicate concentrations that exceed the CCME ISQG and PEL



Waterbody	Chukuni River														
Sample ID	CR-REF-S1	CR-REF-S2	CR-REF-S3	CR-REF-S4	CR-REF-S5	CR-FDP-S1	CR-FDP-S2	CR-FDP-S3	CR-FDP-S4	CR-FDP-S5	CR-DS-S1	CR-DS-S2	CR-DS-S3	CR-DS-S4	CR-DS-S5
Date Sampled	26-Sep-2023	26-Sep-2023	26-Sep-2023	26-Sep-2023	26-Sep-2023	27-Sep-2023	27-Sep-2023	27-Sep-2023	27-Sep-2023	27-Sep-2023	30-Sep-2023	30-Sep-2023	30-Sep-2023	30-Sep-2023	30-Sep-2023
Time Sampled	15:40	16:20	16:40	16:55	17:15	14:30	15:00	15:20	16:00	16:30	13:00	13:30	13:45	14:00	14:15
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests															
Moisture Content	64.1	58.5	63.4	63	62	50.1	38.5	49.8	36.6	37.6	33.1	35.2	41.2	45.5	42.8
Loss on ignition @ 550°C	9.5	8	11	9.7	8.6	4.8	2.6	3.6	1.9	1.9	1.6	2	3.3	4.5	4.4
pH (1:2 soil:water)	6.66	6.55	6.29	6.33	6.11	6.18	6.52	6.79	8.16	7.76	6.68	8.01	6.54	6.73	6.25
Ash content @ 550°C	90.5	92	89	90.3	91.4	95.2	97.4	96.4	98.1	98.1	98.4	98	96.7	95.5	95.5
Particle Size															
Clay (< 0.0039 mm)	14.8	11.8	17.3	10.1	10.8	9.2	5.5	9.8	16.3	6.8	4.4	7.5	10	13.7	10
Silt (0.0039 - 0.062 mm)	72.3	64.4	71.6	74.1	73.6	55.7	27.9	29.8	33.6	22.3	11.7	39.1	24.4	49.3	36.4
Fine Sand (0.062 - 0.2 mm)	12.9	23.8	11.1	15.8	15.6	35.1	66.5	43.7	38.1	63.6	70	44.3	65.6	35.9	53.6
Coarse Sand (0.2 - 2.0 mm)	0	0	0	0	0	0	0	17	1.4	2.8	41.7	11.2	2.3	6.6	7.3
Gravel (2.0 - 16.0 mm)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	16.7	12	7.3	13.9	9.1	<1.0	1.1	<1.0
Nutrients & Organics															
Total Kjeldahl Nitrogen	0.312	0.301	0.365	0.335	0.314	0.206	0.106	0.133	0.071	0.077	0.067	0.096	<0.020	0.176	0.154
Total Organic Carbon	3.92	3.23	4.43	3.8	3.26	1.94	1.15	1.94	0.73	0.72	0.83	0.74	1.15	2.12	1.65
Organic Matter	6.76	5.57	7.64	6.55	5.62	3.34	1.98	3.34	1.26	1.24	1.43	1.28	1.98	3.65	2.84
Metals															
Aluminum (Al)	9410	8720	12200	9380	9050	7240	5070	8090	5750	4860	5460	6430	4250	7550	5440
Antimony (Sb)	0.83	0.81	1.05	0.79	0.74	0.54	0.27	0.38	0.13	0.16	0.24	0.14	<0.10	0.14	0.3
Arsenic (As)	19.6	10.2	14	12.2	11	8.74	6.14	6.57	3.68	4.28	5.52	4.57	3.91	7.26	4.9
Barium (Ba)	60.2	51.6	70	55.8	55	40.8	27.5	47.6	35	26.5	29.8	32.9	24.1	41.5	30.1
Beryllium (Be)	0.32	0.28	0.4	0.32	0.31	0.23	0.16	0.24	0.18	0.14	0.15	0.16	0.13	0.21	0.14
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	<5.0	<5.0	5.7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	0.192	0.166	0.212	0.174	0.17	0.104	0.057	0.089	0.046	0.049	0.064	0.059	0.05	0.091	0.078
Calcium (Ca)	6780	5830	7250	6610	5930	4780	3780	5100	7400	3790	3810	6550	3100	4540	3840
Chromium (Cr)	26.7	24.9	32.7	25.9	25.4	22.1	17.1	25	20.7	17.4	16.9	22.6	13.1	23.2	16.8
Cobalt (Co)	6.82	6.11	8.08	6.54	6.46	5.3	4.04	5.96	4.39	3.87	4.2	4.96	3.53	5.54	4.18
Copper (Cu)	21.6	19.5	27.6	20.8	19.6	14.1	8.72	13.4	12.3	8.01	7.25	11.5	6.34	12.3	8.3
Iron (Fe)	15800	13400	18300	14700	14300	12700	10800	14400	12500	10600	10700	13700	6740	11800	9160
Lead (Pb)	6.81	6.11	8	6.93	6.27	4.44	2.98	4.48	2.91	2.69	3.32	2.67	2.32	3.89	3.1
Lithium (Li)	14	12.4	17.1	13.9	13.3	11.7	8.8	13	10.3	8	8.6	8.3	5.9	9.4	7
Magnesium (Mg)	4780	4220	5660	4470	4570	3860	2830	4460	4430	2870	2970	5210	2340	3990	2930
Manganese (Mn)	407	274	394	357	335	225	180	291	182	177	188	220	152	251	197
Mercury (Hg)	0.0447	0.0349	0.0486	0.0407	0.0383	0.0232	0.0123	0.0189	0.009	0.0091	0.0128	0.0093	0.0099	0.0123	0.0139
Molybdenum (Mo)	0.32	0.32	0.36	0.29	0.27	0.23	0.21	0.36	0.3	0.16	0.16	0.33	0.17	0.26	0.19
Nickel (Ni)	25.5	23.6	31.4	24.9	23.5	17.4	11.6	17.6	12	10.7	11.2	12.9	8.51	14.6	11.7
Phosphorus (P)	833	744	834	815	788	756	693	740	721	619	613	745	542	706	679
Potassium (K)	1680	1530	2120	1590	1600	1240	850	1550	1280	860	870	1130	640	1270	800
Selenium (Se)	0.44	0.38	0.48	0.43	0.37	0.21	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.21	<0.20
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	218	196	246	203	196	183	134	199	192	142	148	176	113	178	142
Strontium (Sr)	27.5	24.7	30	26.5	25.8	19.1	14	19.9	17.3	13.1	14.9	16.5	12.2	18.1	14.7
Sulfur (S)	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	0.136	0.129	0.167	0.143	0.134	0.102	0.07	0.111	0.087	0.062	0.072	0.082	0.059	0.104	0.071
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	848	824	947	808	788	767	684	815	750	654	673	767	590	817	700
Tungsten (W)	0.82	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	1.92	1.66	2.21	2.12	1.76	1.19	0.862	1.12	0.787	0.76	0.763	0.768	0.855	1.11	1.37
Vanadium (V)	28.1	25.8	33.6	27.1	26.4	23.4	20.4	27	24.2	20.8	19.6	26.2	14.5	25	18.9
Zinc (Zn)	45	41	55.2	44.4	42	33.2	22.7	34.2	22.1	20.2	22.5	24.2	18.9	30.2	25.1
Zirconium (Zr)	7.4	7	9.3	7.2	7.2	5.5	4	6	5.5	4.2	3.7	4.6	3.4	7.9	3.8



Waterbody	Genessee Lake						Pakwash Lake								Unnamed Waterbody 1		
Sample ID	GL-S1	GL-S2	GL-S3	PKS-S1	PKS-S2	PKS-S3	PKS-S4	PKS-S5	PKD-S1	PKD-S2	PKD-S3	PKD-S4	PKD-S5	WB-1-S1	WB-1-S2	WB-1-S3	
Date Sampled	16-Sep-2023	16-Sep-2023	16-Sep-2023	30-Sep-2023	30-Sep-2023	30-Sep-2023	30-Sep-2023	30-Sep-2023	01-Oct-2023	01-Oct-2023	01-Oct-2023	01-Oct-2023	01-Oct-2023	10-Sep-2023	10-Sep-2023	10-Sep-2023	
Time Sampled	12:00	14:10	10:10	16:00	16:30	16:45	17:00	17:15	13:00	12:45	12:30	12:10	11:45	11:00	11:45	12:30	
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	
Physical Tests																	
Moisture Content	52	84	81.9	60.1	59.9	53.5	53	53.4	55.8	57.9	63.5	62.2	61.2	88.4	89.7	86.2	
Loss on ignition @ 550°C	5	19.5	19.8	7.3	6.8	5.8	5.6	5.7	6.1	5.9	8.2	8.3	8.3	39	42.3	40.9	
pH (1:2 soil:water)	5.81	5.98	6.14	6.19	6.14	6	6.12	6.03	5.96	6	5.97	6.32	6.28	5.98	5.97	5.96	
Ash content @ 550°C	95	80.5	80.2	92.7	93.2	94.2	94.4	94.3	93.9	94.1	91.8	91.7	91.7	61	57.7	59.1	
Particle Size																	
Clay (< 0.0039 mm)	4.2	7.4	7.2	17.1	17.5	13.7	13.8	8.7	11.2	11.5	14.7	13.5	13	18.6	20.9	27.9	
Silt (0.0039 - 0.062 mm)	15.2	66.5	55.3	75.1	68.8	72.9	71.2	73.8	71	71.8	73.6	74.5	73.6	79.8	77.7	70.8	
Fine Sand (0.062 - 0.2 mm)	80.6	26.1	37.5	7.8	13.7	13.4	15	17.5	17.8	16.7	11.7	12	13.4	1.5	1.4	1.3	
Coarse Sand (0.2 - 2.0 mm)	3.3	0	1.8	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gravel (2.0 - 16.0 mm)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Nutrients & Organics																	
Total Kjeldahl Nitrogen	0.254	0.808	0.838	0.262	0.245	0.21	0.226	0.227	0.245	0.238	0.316	0.32	0.294	1.59	2.22	1.39	
Total Organic Carbon	2.04	8.14	7.96	3.28	3.13	3.26	2.72	2.61	2.76	2.56	3.66	3.69	3.87	18.3	20	19.1	
Organic Matter	3.52	14	13.7	5.65	5.4	5.62	4.69	4.5	4.76	4.41	6.31	6.36	6.67	31.5	34.5	32.9	
Metals																	
Aluminum (Al)	2990	9590	9600	11000	9940	8730	8900	9280	9940	9560	11800	11400	10900	8480	8310	7330	
Antimony (Sb)	0.15	0.65	0.49	0.52	0.56	0.51	0.4	0.46	0.59	0.53	0.55	0.55	0.48	0.21	0.24	0.23	
Arsenic (As)	4.14	11.6	11.8	11.8	12.5	9.53	11.4	10.8	11.7	12.6	12.5	11.9	13.1	6.6	7.21	8.91	
Barium (Ba)	21.7	69.8	77.1	62.6	57.2	47.6	45.1	50	57	53.5	67.9	68.2	65.7	52.8	54.8	47.6	
Beryllium (Be)	0.12	0.33	0.34	0.28	0.28	0.23	0.24	0.23	0.24	0.26	0.33	0.3	0.3	0.25	0.23	0.23	
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.30	<0.30	
Boron (B)	<5.0	6.4	7.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<7.5	<7.6	
Cadmium (Cd)	0.131	0.384	0.39	0.142	0.153	0.129	0.119	0.122	0.127	0.125	0.151	0.159	0.145	0.471	0.506	0.482	
Calcium (Ca)	2390	5820	6210	5730	5470	4880	4940	5000	5330	5250	5570	5580	5510	6810	7230	6640	
Chromium (Cr)	7.23	22.9	23.3	30.2	28.6	24.7	24.8	25.5	27	30.2	32.7	32.3	30.8	17.7	18.2	15.8	
Cobalt (Co)	2.55	6.14	6.42	7.43	7	6.1	6.07	6.36	6.56	6.47	7.91	8	7.73	5.33	5.09	4.94	
Copper (Cu)	3.93	15.5	15.1	17.9	17.1	14.9	13.7	14.5	15.9	14.8	18.4	19.1	18.4	12.4	13.3	11.1	
Iron (Fe)	6120	15300	18000	15900	15000	13000	13300	12900	13700	13700	17000	16800	16100	7920	7990	7520	
Lead (Pb)	3.43	13.3	11.2	6.05	5.93	5.1	4.73	5.06	5.72	5.41	6.43	6.3	6.13	10.4	6.31	6.55	
Lithium (Li)	4.1	11.8	12.6	13.2	12.5	11	11.1	11.5	12	12	14.8	14.8	14.7	7.3	7.2	6.3	
Magnesium (Mg)	1100	3500	3310	5260	4860	4280	4440	4570	4580	4520	5670	5520	5320	2060	2070	1960	
Manganese (Mn)	138	321	394	436	402	332	351	316	387	381	455	450	464	161	129	154	
Mercury (Hg)	0.027	0.0873	0.0817	0.0383	0.0343	0.0292	0.0285	0.0288	0.0352	0.0304	0.0402	0.0394	0.036	0.1	0.0963	0.0875	
Molybdenum (Mo)	0.18	0.6	0.46	0.3	0.28	0.25	0.23	0.26	0.51	0.28	0.28	0.29	0.3	0.67	0.78	0.64	
Nickel (Ni)	4.54	14.9	15	23.6	22.5	20.2	18.7	20	22	20.8	25	25.1	24	15.2	15.6	14	
Phosphorus (P)	530	993	941	825	844	798	765	734	822	834	786	814	759	498	447	401	
Potassium (K)	340	1240	1140	1640	1510	1260	1240	1300	1470	1420	1760	1700	1620	850	860	790	
Selenium (Se)	0.23	0.84	0.9	0.32	0.3	0.28	0.26	0.27	0.3	0.29	0.37	0.36	0.33	1.07	1.21	1.03	
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.16	<0.16	<0.16	
Sodium (Na)	80	185	164	225	208	179	192	200	203	202	234	215	214	110	103	94	
Strontium (Sr)	8.97	22.7	20.8	24.1	22.5	19.5	19.2	19.5	22.6	21.8	23.9	24.1	22.4	20.8	22.9	21.3	
Sulfur (S)	<1000	1500	1300	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	2500	2700	2500	
Thallium (Tl)	0.065	0.146	0.146	0.14	0.132	0.109	0.101	0.11	0.124	0.121	0.152	0.147	0.14	0.097	0.102	0.098	
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<3.0	<3.0	<3.0	
Titanium (Ti)	391	547	532	969	901	809	811	842	885	871	950	892	845	274	274	254	
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.75	<0.75	<0.76	
Uranium (U)	0.789	2.5	2.98	1.63	1.61	1.38	1.3	1.39	1.46	1.41	1.72	1.72	1.74	1.36	1.51	1.4	
Vanadium (V)	9.8	31.1	29.1	31.2	28.8	25.2	25.1	26	27.4	27.1	32.3	31.5	30.3	15.8	15.3	13.7	
Zinc (Zn)	17	52.2	52.3	46.6	44.5	38.5	38.2	41	41.8	41.7	50.3	50.8	47.6	59.5	67.6	58.7	
Zirconium (Zr)	1.2	3.6	3.5	6.2	5.8	5.3	4.7	5	5.8	5.2	6.1	6.1	5.9	<1.5	<1.5	<1.5	



Waterbody	Unnamed Waterbody 2			Unnamed Waterbody 3			Unnamed Waterbody 6			Unnamed Watercourse 3		Unnamed Watercourse 4			Unnamed Watercourses	
Sample ID	WB-2-S1	WB-2-S2	WB-2-S3	WB-3-S1	WB-3-S2	WB-3-S3	WB-6-S1	WB-6-S2	WB-6-S3	WC-3B-S1	WC-3B-S2	WC-4-S1	WC-4-S2	WC-4-S3	WC-5-S3	WC-5-S2
Date Sampled	09-Sep-2023	09-Sep-2023	09-Sep-2023	02-Oct-2023	02-Oct-2023	02-Oct-2023	02-Oct-2023	02-Oct-2023	02-Oct-2023	12-Sep-2023	12-Sep-2023	11-Sep-2023	11-Sep-2023	11-Sep-2023	07-Sep-2023	07-Sep-2023
Time Sampled	13:20	16:30	17:07	13:30	14:40	14:15	11:15	11:25	11:32	16:20	15:55	15:40	16:05	16:20	15:40	15:40
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests																
Moisture Content	86.2	85.9	86	88.3	93	88.2	91	88.1	88.7	53.9	55.5	37.1	41.1	37.1	47.3	53.8
Loss on ignition @ 550°C	33.2	31.8	31	89.6	88	85.8	43.2	40.8	41.4	11.7	11.9	7.4	5.1	5.2	9.5	6.9
pH (1:2 soil:water)	5.75	5.84	5.83	5.41	5.47	5.48	6.52	6.56	6.58	5.71	5.9	6.47	6.97	6.6	6.08	7.01
Ash content @ 550°C	66.8	68.2	69	10.4	12	14.2	56.8	59.2	58.5	88.3	88.1	92.6	94.9	94.8	90.5	93.1
Particle Size																
Clay (< 0.0039 mm)	17.9	27.4	25	33.9	42.9	26.9	11.2	6.5	10.6	9	10	37.2	31.1	36.9	32.5	45.4
Silt (0.0039 - 0.062 mm)	62.2	59	57.4	64.1	53.5	66.7	47	45.5	46.8	69.6	71.1	23.5	23.1	19.6	53.7	44.5
Fine Sand (0.062 - 0.2 mm)	19.9	13.6	17.6	2	3.6	6.4	41.8	48	42.6	21.4	18.9	34.5	23.4	43	13.3	10
Coarse Sand (0.2 - 2.0 mm)	0	0	0	0	0	0	0	0	0	0	0	13	6.5	12	3.9	0
Gravel (2.0 - 16.0 mm)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.8	22.4	<1.0	<1.0	<1.0
Nutrients & Organics																
Total Kjeldahl Nitrogen	0.972	1.2	1.18	1.3	1.56	1.3	1.71	1.94	1.73	0.32	0.325	0.144	0.11	0.085	0.242	0.212
Total Organic Carbon	11.7	12	11.6	35.1	35.5	35.5	19.5	19.6	19.5	2.7	2.08	2.12	1.74	0.86	2.94	1.9
Organic Matter	20.2	20.7	20	60.5	61.2	61.2	33.6	33.8	33.6	4.65	3.58	3.65	3	1.48	5.07	3.28
Metals																
Aluminum (Al)	11900	12100	11400	3620	3480	5790	13800	14000	11600	7470	6730	14400	17000	12600	17500	22600
Antimony (Sb)	0.91	0.78	0.58	1.01	0.69	1.32	0.73	<0.15	0.47	<0.10	<0.10	0.11	0.11	<0.10	0.15	0.18
Arsenic (As)	36.7	28.4	22	15.8	21.9	19	14	5.78	12.3	5.07	3.54	6.03	5.14	5.26	5.83	8.38
Barium (Ba)	93.1	84.8	77.2	89.7	82.8	86.9	85.9	88.7	77.9	45.8	41.3	99.4	108	80.1	94.2	149
Beryllium (Be)	0.28	0.29	0.26	0.27	0.2	0.35	0.36	0.36	0.34	0.16	0.16	0.49	0.49	0.38	0.49	0.67
Bismuth (Bi)	0.23	0.21	0.22	<0.30	<0.30	<0.30	<0.30	<0.30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.21
Boron (B)	<5.0	<5.0	<5.0	<7.6	<7.5	<7.4	7.7	<7.6	5.8	<5.0	<5.0	7.4	7.4	5.8	6.4	8.8
Cadmium (Cd)	0.522	0.497	0.502	0.352	0.275	0.394	0.621	0.351	0.558	0.088	0.083	0.148	0.132	0.071	0.154	0.161
Calcium (Ca)	6590	6540	5930	10200	9900	9320	9470	9130	9810	5390	4940	9650	17700	7430	6360	8620
Chromium (Cr)	21.1	21.3	20.7	4.56	4.66	7.06	3.56	30.6	26.4	18.5	17.2	35.6	44.9	31	42.2	58.5
Cobalt (Co)	4.49	4.3	4.21	2.55	2.74	3.62	7.74	7.74	7.27	6.48	5.04	10.3	11.2	8.59	10.6	17.3
Copper (Cu)	20.5	20.1	18.5	18.4	21.6	26	22.3	22.4	19.4	6.71	6.33	17.4	21.5	13.3	16.8	25.5
Iron (Fe)	13500	12600	11600	5780	7600	5790	13400	14100	13100	11800	10800	21400	25000	18600	22100	31800
Lead (Pb)	18	16.7	15.7	10.6	5.31	13.1	15.6	5.23	13.3	3.82	3.6	7.36	7.66	6.43	8.45	11.4
Lithium (Li)	8.6	8.4	8.4	<3.0	<3.0	<3.0	14.5	15.3	14.4	8.4	8.1	18.3	23	15.1	20.9	29.4
Magnesium (Mg)	2550	2600	2710	1100	1250	1250	4490	4650	4200	2720	2620	7510	11500	6650	7310	10400
Manganese (Mn)	125	121	120	441	722	374	205	235	215	396	198	1100	1080	813	448	858
Mercury (Hg)	0.198	0.186	0.162	0.132	0.0843	0.126	0.122	0.0767	0.118	0.0262	0.0277	0.0178	0.0159	0.0133	0.0332	0.0276
Molybdenum (Mo)	1.44	1.38	1.26	0.3	0.47	0.43	1.21	1.04	0.94	0.35	0.38	0.33	0.47	0.33	0.18	0.32
Nickel (Ni)	15.4	15.3	15.2	6.55	7.04	10	29	28.7	26.5	8.8	8.21	22.7	27.7	19.4	22.8	34.4
Phosphorus (P)	864	895	764	450	885	600	698	605	708	751	744	724	754	600	660	779
Potassium (K)	1180	1170	1130	240	910	370	1650	1720	1540	690	630	2590	3520	2310	2560	3740
Selenium (Se)	0.97	1.05	0.95	1.01	1.07	1.26	1.19	1.07	0.96	<0.20	<0.20	0.22	<0.20	<0.20	<0.20	<0.20
Silver (Ag)	0.13	0.13	0.1	<0.15	<0.15	<0.15	<0.15	<0.15	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.1
Sodium (Na)	123	124	122	<76	100	<74	217	217	212	134	127	244	359	210	246	374
Strontium (Sr)	25.1	23.6	22.4	53	48.5	50.6	30.5	29.7	30.4	22.7	18.6	26.4	34.2	19.7	28.5	39.1
Sulfur (S)	2600	2400	2000	4400	4200	5000	2600	2400	2800	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	0.168	0.155	0.148	<0.076	<0.075	<0.074	0.153	0.155	0.161	0.101	0.087	0.198	0.243	0.172	0.221	0.323
Tin (Sn)	<2.0	<2.0	<2.0	<3.0	<3.0	<3.0	<3.0	<3.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	311	307	288	56.7	55.1	108	480	559	340	751	689	989	1250	865	1060	1410
Tungsten (W)	<0.50	<0.50	<0.50	<0.76	<0.75	<0.74	<0.75	<0.76	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	1.1	1.14	1.14	1.25	1.3	1.92	1.96	2.07	1.59	0.855	0.774	1.26	1.34	0.818	0.715	0.918
Vanadium (V)	29.8	29.5	27.3	6.1	6.26	8.62	27.8	28.8	23.3	23.8	22.6	45.4	53.5	38.6	47.2	68.1
Zinc (Zn)	64.3	62.5	59.2	21.1	27.3	27	82.9	69.8	75.3	23.3	20.9	43.6	52.2	36.5	74.2	96.4
Zirconium (Zr)	1.3	1.2	1.4	<1.5	<1.5	<1.5	2.9	3.3	5.5	2.5	2.4	11.3	13.4	10.4	5.9	10.8



Waterbody e 5		Unnamed Watercourse 6											
Sample ID	WC-5-S1	WC-6A-US-S1	WC-6A-US-S2	WC-6A-US-S3	WC-6B-S1	WC-6B-S2	WC-6B-S3	WC-6B-01-S1	WC-6B-01-S2	WC-6B-01-S3	WC-6C-S1	WC-6C-S2	WC-6C-S3
Date Sampled	07-Sep-2023	09-Sep-2023	09-Sep-2023	09-Sep-2023	14-Sep-2023	14-Sep-2023	14-Sep-2023	14-Sep-2023	14-Sep-2023	14-Sep-2023	16-Sep-2023	16-Sep-2023	16-Sep-2023
Time Sampled	15:40	14:45	15:45	16:00	15:30	16:00	16:30	12:20	13:00	13:45	15:50	16:10	16:40
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests													
Moisture Content	48.6	68.8	69.7	60.2	61.2	29.9	41.6	59.5	54.3	23.7	24.6	34.4	49.1
Loss on ignition @ 550°C	10.8	17	17.2	15.5	10.9	2.1	6.6	3.3	10.3	<1.0	6.6	7.2	10.8
pH (1:2 soil:water)	6.79	6.41	6.91	6.35	6.68	6.65	6.8	7.34	6.94	6.55	7.55	7.37	7.3
Ash content @ 550°C	89.2	83	82.8	84.5	89.1	97.9	93.4	96.7	89.7	99	93.4	92.8	89.2
Particle Size													
Clay (< 0.0039 mm)	44.4	31.7	30.5	27.9	9.3	3.1	6	9.6	17.2	1.9	29.8	32.2	44.8
Silt (0.0039 - 0.062 mm)	46.5	55.7	57.4	57.1	43.9	6.3	22.3	14.6	20.9	0	30	33.4	45.4
Fine Sand (0.062 - 0.2 mm)	7.9	12.6	12.1	15	46.2	90.2	70.7	73.9	58.5	94.3	39.6	33.9	9.7
Coarse Sand (0.2 - 2.0 mm)	0	0	0	0	23	77.7	50.8	63	42	80.7	32.7	22.7	0
Gravel (2.0 - 16.0 mm)	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	1	1.9	3.4	3.8	<1.0	<1.0	<1.0
Nutrients & Organics													
Total Kjeldahl Nitrogen	0.231	0.408	0.336	0.339	0.282	0.066	0.184	0.072	0.227	0.036	0.152	0.173	0.19
Total Organic Carbon	3.21	5.52	5.83	5.2	3.52	1.75	2.89	3.35	3.32	0.62	0.56	1.04	3.51
Organic Matter	5.53	9.52	10	8.96	6.07	3.02	4.98	5.78	5.72	1.07	0.96	1.79	6.05
Metals													
Aluminum (Al)	20000	19700	19000	18600	11400	6040	8910	22700	21100	2330	2290	2420	20500
Antimony (Sb)	0.15	0.16	0.15	0.14	0.1	<0.10	<0.10	0.14	<0.10	<0.10	<0.10	<0.10	0.13
Arsenic (As)	5.5	10.4	21.8	9.62	18.2	16.8	13.8	5.74	4.84	1.28	1.64	2.27	6.28
Barium (Ba)	135	143	158	112	80.9	43.3	54.2	148	126	10.5	10.8	11.8	139
Beryllium (Be)	0.61	0.53	0.52	0.47	0.25	0.14	0.2	0.59	0.56	<0.10	<0.10	<0.10	0.55
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	8.4	7.7	7.3	7.4	<5.0	<5.0	<5.0	8.2	7.8	<5.0	<5.0	<5.0	7.3
Cadmium (Cd)	0.243	0.337	0.325	0.304	0.117	0.062	0.083	0.248	0.167	0.022	0.024	0.034	0.19
Calcium (Ca)	7330	9480	9330	8660	6240	3880	5030	10300	9550	1870	1820	2070	9990
Chromium (Cr)	51.9	42.3	41.3	39.2	25	14.4	19.9	52.9	50.6	5.33	5.17	5.26	49.4
Cobalt (Co)	12.8	15	18.4	13.5	13.5	7.93	8.78	11.9	11.6	2.16	2.61	2.71	12.8
Copper (Cu)	23.4	19.1	18.9	18.2	9.18	4.27	6.67	23.2	21.3	2.44	1.76	2.44	23.1
Iron (Fe)	27700	23900	24600	21800	16700	10800	13000	27800	26400	3110	3180	3310	27900
Lead (Pb)	8.53	8.87	8.74	8.42	5.56	3.54	4.29	8.25	8.03	2.39	1.76	2.52	8.86
Lithium (Li)	25.5	23.5	21.6	21.4	13.3	7.6	10.4	27.2	26	3.5	3.8	3.7	23.7
Magnesium (Mg)	9300	7760	7610	7140	4250	2520	3440	11300	10100	1000	1000	953	10300
Manganese (Mn)	576	1160	1780	820	1350	948	863	702	658	65.2	117	102	758
Mercury (Hg)	0.0221	0.0466	0.0427	0.0516	0.0393	0.0122	0.0235	0.0364	0.038	0.0113	0.0098	0.0134	0.0325
Molybdenum (Mo)	0.26	0.47	0.48	0.46	0.34	0.27	0.3	0.59	0.35	0.16	0.15	0.21	0.33
Nickel (Ni)	29.8	25	24.9	23.2	13	7.6	10.4	30.9	29.2	3.15	3.02	3.05	29.7
Phosphorus (P)	771	765	832	798	663	470	566	844	751	327	329	358	859
Potassium (K)	3270	2500	2410	2280	1100	610	890	3800	3380	190	170	180	3440
Selenium (Se)	<0.20	0.26	0.31	0.2	0.21	<0.20	0.22	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Silver (Ag)	<0.10	0.11	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	315	282	286	261	225	142	183	388	355	<50	<50	<50	353
Strontium (Sr)	33.6	39.3	39.2	36.2	27.4	16.1	21.9	39.1	32.9	8.3	7.87	8.86	33.5
Sulfur (S)	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	0.276	0.234	0.223	0.213	0.157	0.086	0.118	0.303	0.272	<0.050	<0.050	<0.050	0.263
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	1240	1040	1030	1030	800	578	712	1380	1360	429	358	430	1300
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	0.64	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.782	1.59	1.64	1.42	1.24	0.628	0.938	1.57	1.28	0.709	0.724	0.945	1.24
Vanadium (V)	59.4	49.8	50.6	46.3	30.8	19	25.2	58.5	54.5	6.26	6.18	6.89	56.4
Zinc (Zn)	98.4	117	127	118	35.7	21.2	27.5	72.9	64.1	6.3	7.1	7	61.4
Zirconium (Zr)	11.5	5.1	4.7	5.4	2.1	1.1	1.5	11.2	9.1	<1.0	<1.0	<1.0	12.4



Waterbody	Unnamed Watercourse 7			Unnamed Watercourse 8		
Sample ID	WC-7-S1	WC-7-S2	WC-7-S3	WC-8-S1	WC-8-S2	WC-8-S3
Date Sampled	30-Sep-2023	30-Sep-2023	30-Sep-2023	11-Sep-2023	11-Sep-2023	11-Sep-2023
Time Sampled	09:51	10:10	10:25	15:35	16:00	14:50
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests						
Moisture Content	53.6	59.2	73	34.2	29.7	50.4
Loss on ignition @ 550°C	11.1	11.7	21.2	1.6	4.8	8.1
pH (1:2 soil:water)	6.45	6.27	6.1	6.84	6.57	6.55
Ash content @ 550°C	88.9	88.3	78.8	98.4	95.2	91.9
Particle Size						
Clay (< 0.0039 mm)	20.3	16.9	25.6	2.6	3.3	5.2
Silt (0.0039 - 0.062 mm)	47.7	59.5	55.8	10.6	22	26.1
Fine Sand (0.062 - 0.2 mm)	32	23.6	18.6	86.8	74.7	68.7
Coarse Sand (0.2 - 2.0 mm)	3.2	0	0	23.2	6.7	5
Gravel (2.0 - 16.0 mm)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nutrients & Organics						
Total Kjeldahl Nitrogen	0.31	0.325	0.489	0.047	0.081	0.166
Total Organic Carbon	3.36	3.61	8.74	0.45	1.3	2.89
Organic Matter	5.79	6.22	15.1	0.78	2.24	4.98
Metals						
Aluminum (Al)	9800	11200	14200	1930	2620	2960
Antimony (Sb)	<0.10	<0.10	0.13	<0.10	<0.10	<0.10
Arsenic (As)	2.6	3.15	5.22	1.14	1.14	1.54
Barium (Ba)	52.6	57.3	80.9	9.4	13.9	16.4
Beryllium (Be)	0.24	0.27	0.36	<0.10	<0.10	<0.10
Bismuth (Bi)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	<5.0	<5.0	5.7	<5.0	<5.0	<5.0
Cadmium (Cd)	0.134	0.144	0.269	<0.020	0.022	0.036
Calcium (Ca)	4970	5510	7990	1980	2720	3280
Chromium (Cr)	24.7	26.3	34.6	4.63	6.39	7.09
Cobalt (Co)	7.1	7.11	9.64	1.38	1.77	2.12
Copper (Cu)	9.66	10.7	18.4	1.24	2	2.85
Iron (Fe)	12400	12800	16800	3110	3960	4770
Lead (Pb)	3.84	4.31	6.48	1.23	1.52	1.67
Lithium (Li)	11	11.4	14.7	3.2	4.3	4.5
Magnesium (Mg)	4510	4500	6050	806	1030	1160
Manganese (Mn)	284	329	552	67.8	80.7	104
Mercury (Hg)	0.0288	0.0345	0.0657	<0.0050	<0.0050	0.008
Molybdenum (Mo)	0.44	0.46	1	<0.10	<0.10	0.1
Nickel (Ni)	14.1	14.6	20.4	2.2	2.9	3.31
Phosphorus (P)	596	626	674	380	485	401
Potassium (K)	1260	1260	1700	180	270	300
Selenium (Se)	0.22	0.26	0.49	<0.20	<0.20	<0.20
Silver (Ag)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	177	185	233	<50	71	86
Strontium (Sr)	19.3	20.9	28.9	6.12	8.91	10.6
Sulfur (S)	<1000	<1000	1000	<1000	<1000	<1000
Thallium (Tl)	0.121	0.126	0.165	<0.050	<0.050	<0.050
Tin (Sn)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	692	770	856	308	446	440
Tungsten (W)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	1.15	1.26	2.2	0.328	0.513	0.676
Vanadium (V)	25	27.1	36.6	5.81	8.36	9.35
Zinc (Zn)	37.1	39.3	54.3	6.7	8.6	10.2
Zirconium (Zr)	5.7	5.6	8	1.2	1.8	1.6



Table D1-3: 2024 Sediment Quality Results

Waterbody		Trout River										Chukuni River														
Sample ID		TR-1	TR-2	TR-3	CR-OP-1	CR-OP-2	CR-REF-S1	CR-REF-S2	CR-REF-S3	CR-REF-S4	CR-REF-S5	CR-FDP-S1	CR-FDP-S2	CR-FDP-S3	CR-FDP-S4	CR-FDP-S5	CR-DS-S1	CR-DS-S2	CR-DS-S3	CR-DS-S4	CR-DS-S5					
Date Sampled		16-Jun-2024	16-Jun-2024	16-Jun-2024	15-Jun-2024	15-Jun-2024	14-Sep-2024	14-Sep-2024	14-Sep-2024	14-Sep-2024	14-Sep-2024	13-Sep-2024	13-Sep-2024	13-Sep-2024	13-Sep-2024	13-Sep-2024	12-Sep-2024	12-Sep-2024	12-Sep-2024	12-Sep-2024	12-Sep-2024					
Time Sampled		12:30	13:30	14:00	12:10	13:00	08:45	09:10	09:30	09:40	10:00	09:30	09:45	10:30	11:00	11:15	13:40	14:00	14:30	15:15	15:30					
Parameter	Lowest Detection Limit	Units	CSQG ISQG	CSQG PEL	PSQG LEL	PSQG SEL	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment				
Physical Tests																										
Loss on ignition @ 550°C	1	%					7.8	7.4	7.5	1.7	7.1	4.2	6.7	4.6	3.9	3	4.3	2.9	6.6	2.7	1.5	3.1	7.9	4	4	11.4
Moisture	0.25	%					58.5	58.8	60.2	27	52	42	49.7	42.9	37.5	33.6	48.7	34.4	48.5	37.8	23.9	35	40.1	34.8	35	55
pH (1:2 soil:water)	0.1	pH units					6.73	6.69	6.72	8	7.24	7.92	6.39	6.76	6.95	7.48	6.89	6.66	6.68	8.03	7.65	7.27	6.65	7.59	7.3	6.63
Ash content @ 550°C	1	%					92.2	92.6	92.4	98.3	92.9	95.8	93.3	95.4	96.1	97	95.7	97.1	93.4	97.3	98.5	96.9	92.1	96	96	88.6
Particle Size																										
Gravel (>2mm)	1	%					1.00	1.00	1.00	1.00	1.2	1.00	1.00	1.9	2.7	1.00	1.00	1.00	1.00	2.5	1.00	1.00	1.00	1.00	1.00	1.00
Coarse Sand (2.0mm - 0.25mm)	1	%					3	3	3	68.4	7.8	3	3	6.2	10.8	6.8	3	3	6.9	9.4	8.1	41.1	17.6	5.2	20.1	
Fine Sand (0.25mm - 0.063mm)	1	%					2	2.2	2.2	27.2	48.3	36	47.6	58.6	48.3	78.8	38.6	66.3	41.7	40.2	66	64.3	34.5	26.6	41.4	36
Silt (0.063mm - 0.004mm)	1	%					67.9	72.3	71.2	2.2	27.4	46.3	41.2	24.8	30.6	8.8	50.7	25.2	42.6	24.3	17.9	21.2	17	20.8	43.2	35.3
Clay (<0.004mm)	1	%					29.9	25.2	26	1.3	16.5	16	11	8.5	7.6	5.2	10.4	7.4	15.4	26.1	6.1	5.8	6.6	35	11.2	9
Nutrients & Organics																										
Carbon, total organic [TOC]	0.1	%			1	10	2.87	2.84	2.97	0.44	2.82	1.33	2.42	1.55	1.52	0.6	1.57	0.94	1.9	0.8	0.54	0.84	1.09	0.76	1.2	1.64
Organic matter	0.2	%					4.95	4.9	5.12	0.76	4.86	2.29	4.17	2.67	2.62	1.03	2.71	1.62	3.28	1.38	0.93	1.45	1.88	1.31	2.07	2.83
Metals																										
Aluminum	50	mg/kg					20400	17500	3590	2340	8540	6770	8010	6310	5850	3390	8260	5900	9760	8970	4530	5310	5190	8540	7140	6370
Antimony	0.1	mg/kg					0.16	0.14	0.1	0.16	0.15	0.22	0.66	0.28	0.35	0.13	0.53	0.25	0.4	0.16	0.18	0.23	0.21	0.21	0.11	0.3
Arsenic	0.1	mg/kg	5.9	17	6	33	3.58	3.22	2.8	3.74	8.02	10.2	9.01	5.68	4.91	5.01	7.06	5.3	7.28	7.41	4.3	4.21	3.02	11.7	5.68	4.71
Barium	0.5	mg/kg					116	99.6	60.6	9.41	48.9	36.4	43.1	32.3	29.9	20.2	38.8	25.7	52.2	49.8	23	23	21.7	52.9	32.4	29.7
Beryllium	0.1	mg/kg					0.49	0.45	0.15	<0.10	0.24	0.19	0.22	0.19	0.15	0.11	0.22	0.16	0.25	0.22	0.12	0.14	0.13	0.24	0.19	0.17
Bismuth	0.2	mg/kg					0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.3	<0.20	<0.20	<0.20
Boron	5	mg/kg					6.3	5.7	8.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium	0.02	mg/kg	0.6	3.5	0.6	10	0.218	0.206	6.17	0.038	0.117	0.085	0.136	0.081	0.082	0.051	0.102	0.062	0.114	0.068	0.048	0.06	0.05	0.102	0.072	0.093
Calcium	50	mg/kg					7830	7960	166000	4040	6640	6430	4940	3930	3860	3130	4860	3740	5120	7140	3390	3470	3300	5080	4310	3920
Chromium	0.5	mg/kg	37.3	90	26	110	55.9	50.2	6.6	6.19	22.5	19.2	21	16	17	9.84	23.2	18.6	27.1	26.5	16.8	15.4	22.8	23.8	20.5	18.1
Cobalt	0.1	mg/kg					12.5	11.3	2.57	2.03	6.08	5.05	5.76	4.3	4.19	3.02	5.63	4.27	6.61	5.97	4	4.54	6.36	4.9	4.41	
Copper	0.5	mg/kg	35.7	197	16	110	20.9	21	14.6	4.14	11.7	11.7	15.8	8.9	9.84	5.43	14.3	8.46	16.3	13.1	7.5	6.74	7.41	10.2	9.58	9.16
Iron	50	mg/kg			21200	43766	27500	25000	6980	4580	11900	11100	12000	9420	9950	6140	12700	11100	15100	16000	11000	8770	17600	13400	11000	9670
Lead	0.5	mg/kg	35	91.3	31	250	8.81	7.68	62.9	1.26	4.14	4.05	5.19	3.64	3.44	2.37	4.26	2.82	4.74	3.74	2.42	2.86	2.16	5.05	3.1	3.06
Lithium	2	mg/kg					23.9	21.4	5.6	3	9.7	8	8.6	6.9	6.4	4.1	10.3	6.8	11.8	10.8	6.3	5.5	5.4	10.4	7.8	6.9
Magnesium	20	mg/kg					9460	8760	85700	1290	3790	4510	3840	3080	3250	1910	4220	3160	5210	5400	2900	2880	3130	4780	3660	3350
Manganese	1	mg/kg			460	1100	699	592	554	73.4	223	283	307	242	175	142	234	180	276	257	160	154	130	323	221	171
Mercury	0.005	mg/kg	0.17	0.486	0.2	2	0.0494	0.0422	0.116	0.0051	0.0176	0.0116	0.0219	0.0133	0.0152	0.0082	0.0217	0.0122	0.0192	0.009	0.0071	0.0114	0.0083	0.012	0.0118	0.0177
Molybdenum	0.1	mg/kg					0.36	0.31	0.9	0.12	0.31	0.2	0.26	0.17	0.19	0.11	0.31	0.18	0.31	0.29	0.15	0.22	0.71	0.42	0.23	0.28
Nickel	0.5	mg/kg			16	75	31.2	27.8	5.94	5.66	14.9	13.8	20.8	12.5	13.1	7.22	18.5	12.1	19.7	16.1	10.4	10.6	11.2	16.8	12.6	12.6
Phosphorus	50	mg/kg					808	748	224	305	552	697	714	578	592	414	713	672	720	706	606	639	580	626	737	646
Potassium	100	mg/kg					2820	2480	820	270	1320	1120	1140	910	820	510	1160	810	1530	1520	670	670	670	1460	1040	850
Selenium	0.2	mg/kg					0.37	0.32	<0.20	<0.20	0.26	0.22	0.3	<0.20	<0.20	<0.20	0.27	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Silver	0.1	mg/kg					0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium	50	mg/kg					357	326	341	73	181	155	181	135	138	94	178	142	193	225	124	124	120	183	165	140
Strontium	0.5	mg/kg					33.8	31.9	1770	8.89	21.3	18.3	21.9	16.6	16.1	10.5	23.5	15.5	21	19.8	14.5	14.6	14.7	17.8	18	16.1
Sulfur	1000	mg/kg					<1000	<1000	4500	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Thallium	0.05	mg/kg					0.24	0.22	0.08	<0.050	0.11	0.11	0.10	0.08	0.07	<0.050	0.10	0.07	0.13	0.11	0.06	0.06	0.05	0.10	0.08	0.07
Tin	2	mg/kg					<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium	1	mg/kg					1410	1250	91.2	338	846	706	815	636	647	477	830	739	849	874	666	657	710	790	821	666
Tungsten	0.5	mg/kg					<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium	0.05	mg/kg					1.42	1.3	0.762	0.442	2.06	1.06	1.46	1.06	0.973	0.813	1.23	0.884	1.22	0.842	0.775	0.761	0.713	0.693	1.05	1.06
Vanadium	0.2	mg/kg					51.4	44.8	11.4	7.36	24.8	20.8	22.8	17.6	19											



Waterbody	Pakwash Lake												Genessee Lake			Unnamed Waterbody 6		
Sample ID	PKL-N-S1	PKL-N-S2	PKL-N-S3	PKL-D-S1	PKL-D-S2	PKL-D-S3	PKL-C-S1	PKL-C-S2	PKL-C-S3	PKL-S-S1	PKL-S-S2	PKL-S-S3	GL-S1	GL-S2	GL-S3	WB-6-S1	WB-6-S2	WB-6-S3
Date Sampled	14-Sep-2024	14-Sep-2024	14-Sep-2024	24-Oct-2024	24-Oct-2024	24-Oct-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024	18-Sep-2024	15-Sep-2024	15-Sep-2024	15-Sep-2024	21-Sep-2024	21-Sep-2024	21-Sep-2024
Time Sampled	14:30	14:45	15:00	11:00	12:00	12:15	13:30	14:00	14:15	09:45	10:15	10:45	09:00	09:30	10:00	11:00	11:30	12:00
Parameter	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Physical Tests																		
Loss on ignition @ 550°C	6.2	5.4	9.9	9.9	9.8	9.7	2.4	9.2	12.2	1.2	1.8	1.1	1.4	17.5	20.9	42.4	43.4	44.1
Moisture	52.6	50.6	63.8	79.4	77.6	77.5	34.8	58.6	72.5	30.4	34.2	23.4	29.6	80.5	80.8	91	92.6	92.2
pH (1:2 soil:water)	6.48	6.56	6.26	6.15	6.27	6.22	6.89	6.6	6.45	7.48	7.02	7.02	6.37	5.92	6.2	6.45	6.66	6.56
Ash content @ 550°C	93.8	94.6	90.1	90.1	90.2	90.3	97.6	90.8	87.8	98.7	98.2	98.8	98.5	82.5	79.1	57.6	56.5	55.8
Particle Size																		
Gravel (>2mm)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.1	1.00	1.00	1.00	1.00	1.00	1.00
Coarse Sand (2.0mm - 0.25mm)	3	3	3	1.00	1.00	1.00	3.1	3	3	6.3	3.2	22.9	6.8	3	3	3	3	3
Fine Sand (0.25mm - 0.063mm)	14.8	15.5	3.9	2.4	2.5	2.4	55.3	10.6	3.3	65.7	58	52.5	88.2	27.3	29.3	39.3	39.5	37.7
Silt (0.063mm - 0.004mm)	69	70.6	71.4	26.7	26.7	24.8	35.4	62.7	38.3	22.1	30.8	18.1	4.4	59	58.3	50.9	51.3	53
Clay (<0.004mm)	16	13.7	24.2	70.8	70.7	72.8	7.9	26.6	58.2	7.3	9.7	5.4	2.4	13.5	11.3	9.5	8.9	9.1
Nutrients & Organics																		
Carbon, total organic [TOC]	2.36	2.17	4.13	2.94	3	3	0.84	3.2	4.15	0.38	0.6	0.44	0.59	8.04	9.2	23.2	19.6	20.4
Organic matter	4.07	3.74	7.12	5.07	5.17	5.17	1.45	5.52	7.15	0.66	1.03	0.76	1.02	13.9	15.9	40	33.8	35.2
Metals																		
Aluminum	11700	10900	15300	29800	28400	28000	6840	21100	31600	4620	7330	4510	1320	12000	12200	14400	14900	14100
Antimony	0.69	0.59	0.63	1.35	1.19	1.29	0.3	0.59	1.24	0.22	0.25	0.21	<0.10	0.4	0.47	0.55	0.48	0.26
Arsenic	13.4	12.2	16.4	16.5	14.8	15.8	7.82	12.2	16.1	7.94	7.13	9.11	2.04	9.74	12.8	12.9	12.2	8.67
Barium	66	53.2	92.2	203	191	181	40.3	129	185	28.4	39.7	27.4	8.02	83.6	89.6	100	102	98.8
Beryllium	0.29	0.26	0.4	0.77	0.82	0.78	0.17	0.54	0.76	0.14	0.18	0.14	<0.10	0.39	0.38	0.36	0.37	0.33
Bismuth	<0.20	<0.20	<0.20	0.31	0.28	0.29	<0.20	0.21	0.26	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron	<5.0	<5.0	5.5	10	9.7	9.3	<5.0	6.4	9.4	<5.0	<5.0	<5.0	<5.0	7.2	8.1	7.2	7.9	7.2
Cadmium	0.143	0.145	0.212	0.274	0.278	0.286	0.074	0.26	0.283	0.067	0.079	0.049	0.042	0.352	0.413	0.585	0.538	0.442
Calcium	6200	5670	6920	7300	7280	7070	3540	7490	8700	2630	3480	2650	1220	6080	7500	10600	11200	9710
Chromium	29.4	27.8	40.5	72.7	69.6	68.1	17.4	53.8	75.2	13	19.4	13.2	2.84	26.3	27.4	31.6	31.4	31
Cobalt	7.22	6.59	9.83	16.6	15.8	15.3	4.22	12.4	15.8	3.58	4.64	3.33	1.1	7.24	7.51	8.49	8.29	7.94
Copper	17.5	15.7	23.5	34.4	32.6	32.7	7.28	26.2	40.8	5.07	7.54	4.72	1.28	17.6	17.6	22.5	22.5	21.8
Iron	15900	14800	22200	41700	39700	37900	8920	26500	37200	7200	10100	7060	3290	16500	20100	14600	14200	13500
Lead	6.54	5.7	7.69	15.8	14.9	15.4	3.77	10.3	13.8	3.21	3.85	3.36	1.37	9.68	11.6	15.1	12.6	8.04
Lithium	13.8	12	19.8	37	36	35.6	7.3	24.8	39.1	5.4	7.8	6.1	<2.0	13.1	12.8	13.8	14.7	12.8
Magnesium	5210	5070	7330	13100	12600	12000	3200	9510	12600	2280	3360	2320	494	4040	4210	4940	4850	4650
Manganese	450	404	625	757	685	670	250	553	538	279	328	260	62.1	360	466	240	238	228
Mercury	0.0347	0.0299	0.0464	0.0814	0.0765	0.0831	0.0176	0.0448	0.0607	0.0165	0.0164	0.0118	0.0051	0.0677	0.0825	0.117	0.116	0.107
Molybdenum	0.33	0.28	0.4	0.44	0.43	0.41	0.15	0.64	0.71	0.11	0.15	0.11	0.12	0.68	0.58	1.06	1.29	1.25
Nickel	23.6	21.6	30.2	52.8	50	49.8	11.9	35.4	53.8	8.82	12.6	8.69	1.8	17.4	17.5	30.9	30.2	29.1
Phosphorus	895	906	922	837	788	769	720	906	819	503	619	548	313	1020	995	710	753	757
Potassium	1530	1420	2410	5330	4890	4640	830	3150	5210	670	1050	660	120	1270	1230	1640	1650	1610
Selenium	0.3	0.31	0.45	0.47	0.47	0.43	<0.20	0.45	0.74	<0.20	<0.20	<0.20	<0.20	0.89	1.02	1.24	1.23	1.13
Silver	<0.10	<0.10	<0.10	<0.15	0.12	0.12	<0.10	0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.12	0.10
Sodium	223	214	264	415	398	389	122	289	355	106	160	105	153	190	190	242	242	247
Strontium	27.1	25.8	31.2	36	35.7	33	15.2	32.8	41.6	11	15.9	11	5	24.1	24.6	34.2	34.6	32.1
Sulfur	<1000	<1000	<1000	<1500	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	1600	1500	2800	2900	2800
Thallium	0.15	0.13	0.19	0.41	0.39	0.39	0.09	0.28	0.38	0.07	0.10	0.07	<0.050	0.18	0.17	0.18	0.18	0.16
Tin	<2.0	<2.0	<2.0	<3.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium	952	932	1080	1530	1340	1340	547	1250	1480	431	619	439	227	604	591	423	460	458
Tungsten	<0.50	<0.50	<0.50	<0.75	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium	1.58	1.4	2.01	2.15	2.08	2.11	0.815	2.45	3.33	0.584	0.78	0.662	0.358	2.94	3.36	1.98	2.01	1.9
Vanadium	30.4	28.5	39.6	71.2	69	67.2	16.7	51.5	68.2	13.8	20	13.5	4.44	33.6	33.8	27.8	29	28.2
Zinc	45.6	42	61.7	115	110	110	22.9	73.2	101	16.6	23.4	16.9	7.1	55	59.2	86.2	82.1	75.4
Zirconium	6.9	5.8	8	10.7	12.4	11.3	3	11.2	14.4	2.4	3.6	2.3	<1.0	3.6	4.3	6.7	5.7	5.2



Table D1-4: 2022 Particle Size Distribution (%) and Summary Statistics

Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt (0.0039 - 0.062 mm)	% Fine Sand (0.062 - 0.2 mm)	% Coarse Sand (0.2 - 2.0 mm)	% Gravel (2.0 - 16.0 mm)
Dixie Creek 01	DC01-S01	4.10	52.20	35.90	6.70	1.10
	DC01-S02	5.30	57.30	30.10	6.50	0.80
	DC01-S03	3.90	40.30	45.00	9.60	1.10
Mean		4.43	49.93	37.00	7.60	1.00
Median		4.10	52.20	35.90	6.70	1.10
Minimum		3.90	40.30	30.10	6.50	0.80
Maximum		5.30	57.30	45.00	9.60	1.10
Standard Deviation		0.76	8.72	7.51	1.73	0.17
Standard Error		0.44	5.04	4.34	1.00	0.10
Dixie Creek 02	DC02-S01	1.70	11.70	9.30	76.20	1.10
	DC02-S02	12.80	67.60	8.30	10.40	0.90
	DC02-S03	9.10	38.60	23.90	28.30	0.20
Mean		7.87	39.30	13.83	38.30	0.73
Median		9.10	38.60	9.30	28.30	0.90
Minimum		1.70	11.70	8.30	10.40	0.20
Maximum		12.80	67.60	23.90	76.20	1.10
Standard Deviation		5.65	27.96	8.73	34.02	0.47
Standard Error		3.26	16.14	5.04	19.64	0.27
Dixie Creek 03	DC03-S01	6.40	40.90	37.90	13.70	0.90
	DC03-S02	10.10	54.40	24.90	8.40	2.10
	DC03-S03	27.10	57.00	10.80	2.30	2.80
Mean		14.53	50.77	24.53	8.13	1.93
Median		10.10	54.40	24.90	8.40	2.10
Minimum		6.40	40.90	10.80	2.30	0.90
Maximum		27.10	57.00	37.90	13.70	2.80
Standard Deviation		11.04	8.64	13.55	5.70	0.96
Standard Error		6.37	4.99	7.83	3.29	0.55
Dixie Creek 04	DC04-S01	11.10	77.80	8.80	2.20	0.10
	DC04-S02	18.10	71.00	9.00	1.80	0.20
	DC04-S03	9.30	72.50	14.80	3.20	0.20
Mean		12.83	73.77	10.87	2.40	0.17
Median		11.10	72.50	9.00	2.20	0.20
Minimum		9.30	71.00	8.80	1.80	0.10
Maximum		18.10	77.80	14.80	3.20	0.20
Standard Deviation		4.65	3.57	3.41	0.72	0.06
Standard Error		2.68	2.06	1.97	0.42	0.03
Chukuni River - REF	CR-REF-S01	7.80	80.40	10.40	1.40	0.10
	CR-REF-S02	8.50	79.30	10.40	1.80	0.00
	CR-REF-S03	9.30	86.50	2.80	1.40	0.00
	CR-REF-S04	7.80	69.30	21.20	1.70	0.00
	CR-REF-S05	9.00	82.80	6.60	1.50	0.00
Mean		8.48	79.66	10.28	1.56	0.02
Median		8.50	80.40	10.40	1.50	0.00
Minimum		7.80	69.30	2.80	1.40	0.00
Maximum		9.30	86.50	21.20	1.80	0.10
Standard Deviation		0.68	6.42	6.87	0.18	0.04
Standard Error		0.31	2.87	3.07	0.08	0.02



Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt (0.0039 - 0.062 mm)	% Fine Sand (0.062 - 0.2 mm)	% Coarse Sand (0.2 - 2.0 mm)	% Gravel (2.0 - 16.0 mm)
Chukuni River - FDP	CR-FDP-S01	3.90	26.20	42.90	8.90	18.10
	CR-FDP-S02	5.10	34.30	50.60	6.90	3.10
	CR-FDP-S03	6.20	40.00	48.50	3.70	1.60
	CR-FDP-S04	3.20	27.70	66.80	1.80	0.50
	CR-FDP-S05	7.60	63.80	27.80	0.80	0.00
	Mean	5.20	38.40	47.32	4.42	4.66
	Median	5.10	34.30	48.50	3.70	1.60
	Minimum	3.20	26.20	27.80	0.80	0.00
	Maximum	7.60	63.80	66.80	8.90	18.10
	Standard Deviation	1.76	15.23	14.07	3.42	7.61
	Standard Error	0.79	6.81	6.29	1.53	3.40
Chukuni River - DS	CR-DS-S01	4.10	37.70	21.10	28.70	8.40
	CR-DS-S02	8.10	58.00	21.00	11.50	1.40
	CR-DS-S03	3.90	35.50	54.10	6.40	0.20
	CR-DS-S04	3.40	26.30	37.60	29.40	3.30
	CR-DS-S05	1.80	14.30	21.60	52.90	9.30
	Mean	4.26	34.36	31.08	25.78	4.52
	Median	3.90	35.50	21.60	28.70	3.30
	Minimum	1.80	14.30	21.00	6.40	0.20
	Maximum	8.10	58.00	54.10	52.90	9.30
	Standard Deviation	2.33	16.11	14.69	18.28	4.12
	Standard Error	1.04	7.21	6.57	8.18	1.84
Genessee Lake	GenL-S01	1.80	70.40	3.60	20.20	4.10
	GenL-S02	1.80	69.00	4.80	24.00	0.40
	GenL-S03	0.20	6.70	81.40	11.60	0.00
	Mean	1.27	48.70	29.93	18.60	1.50
	Median	1.80	69.00	4.80	20.20	0.40
	Minimum	0.20	6.70	3.60	11.60	0.00
	Maximum	1.80	70.40	81.40	24.00	4.10
	Standard Deviation	0.92	36.38	44.58	6.35	2.26
	Standard Error	0.53	21.00	25.74	3.67	1.31
Unnamed Waterbody 1	WB-1-S01	4.50	70.20	4.50	16.40	4.50
	WB-1-S02	4.30	73.40	3.10	13.10	6.20
	WB-1-S03	4.60	75.40	3.20	13.60	3.20
	Mean	4.47	73.00	3.60	14.37	4.63
	Median	4.50	73.40	3.20	13.60	4.50
	Minimum	4.30	70.20	3.10	13.10	3.20
	Maximum	4.60	75.40	4.50	16.40	6.20
	Standard Deviation	0.15	2.62	0.78	1.78	1.50
	Standard Error	0.09	1.51	0.45	1.03	0.87
Unnamed Waterbody 2	WB-2-S01	6.50	92.50	1.00	0.00	0.00
	WB-2-S02	6.40	93.10	0.60	0.00	0.00
	WB-2-S03	6.50	92.60	0.90	0.00	0.00
	Mean	6.47	92.73	0.83	0.00	0.00
	Median	6.50	92.60	0.90	0.00	0.00
	Minimum	6.40	92.50	0.60	0.00	0.00
	Maximum	6.50	93.10	1.00	0.00	0.00
	Standard Deviation	0.06	0.32	0.21	0.00	0.00
	Standard Error	0.03	0.19	0.12	0.00	0.00



Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt (0.0039 - 0.062 mm)	% Fine Sand (0.062 - 0.2 mm)	% Coarse Sand (0.2 - 2.0 mm)	% Gravel (2.0 - 16.0 mm)
Unnamed Waterbody 5	WB-5-S01	0.60	11.70	44.40	41.60	1.70
	WB-5-S02	1.20	28.90	33.40	28.50	8.00
	WB-5-S03	1.30	28.10	39.90	29.80	0.90
Mean		1.03	22.90	39.23	33.30	3.53
Median		1.20	28.10	39.90	28.80	1.70
Minimum		0.60	11.70	33.40	28.50	0.90
Maximum		1.30	28.90	44.40	41.60	8.00
Standard Deviation		0.38	9.71	5.53	7.22	3.89
Standard Error		0.22	5.60	3.19	4.17	2.25
Unnamed Waterbody 6	WB-6-S01	3.60	93.80	2.60	0.00	0.00
	WB-6-S02	4.10	95.40	0.50	0.00	0.00
	WB-6-S03	4.50	94.40	1.10	0.00	0.00
Mean		4.07	94.53	1.40	0.00	0.00
Median		4.10	94.40	1.10	0.00	0.00
Minimum		3.60	93.80	0.50	0.00	0.00
Maximum		4.50	95.40	2.60	0.00	0.00
Standard Deviation		0.45	0.81	1.08	0.00	0.00
Standard Error		0.26	0.47	0.62	0.00	0.00
Unnamed Watercourse 3	WC-3-S01	0.30	2.20	3.10	16.40	77.90
	WC-3-S03	2.00	13.70	18.80	52.70	12.80
	Mean	1.15	7.95	10.95	34.55	45.35
Median		1.15	7.95	10.95	34.55	45.35
Minimum		0.30	2.20	3.10	16.40	12.80
Maximum		2.00	13.70	18.80	52.70	77.90
Standard Deviation		1.20	8.13	11.10	25.67	46.03
Standard Error		0.85	5.75	7.85	18.15	32.55
Unnamed Watercourse 3A	WC-3A-S01	14.90	63.80	13.50	7.80	0.10
	WC-3A-S02	14.00	61.30	10.10	13.40	1.20
	WC-3A-S03	13.10	57.30	14.80	13.40	1.50
Mean		14.00	60.80	12.80	11.53	0.93
Median		14.00	61.30	13.50	13.40	1.20
Minimum		13.10	57.30	10.10	7.80	0.10
Maximum		14.90	63.80	14.80	13.40	1.50
Standard Deviation		0.90	3.28	2.43	3.23	0.74
Standard Error		0.52	1.89	1.40	1.87	0.43
Unnamed Watercourse 3B	WC-3B-S01	6.30	44.30	20.40	27.60	1.50
	WC-3B-S02	6.60	52.30	19.20	20.20	1.80
	WC-3B-S03	4.80	49.10	23.00	20.40	2.60
Mean		5.90	48.57	20.87	22.73	1.97
Median		6.30	49.10	20.40	20.40	1.80
Minimum		4.80	44.30	19.20	20.20	1.50
Maximum		6.60	52.30	23.00	27.60	2.60
Standard Deviation		0.96	4.03	1.94	4.22	0.57
Standard Error		0.56	2.32	1.12	2.43	0.33
Unnamed Watercourse 4	WC-4-S01	19.10	30.70	16.00	14.90	19.40
	WC-4-S02	22.70	35.80	19.40	20.20	2.00
	WC-4-S03	22.10	32.70	15.40	29.00	0.90
Mean		21.30	33.07	16.93	21.37	7.43
Median		22.10	32.70	16.00	20.20	2.00
Minimum		19.10	30.70	15.40	14.90	0.90
Maximum		22.70	35.80	19.40	29.00	19.40
Standard Deviation		1.93	2.57	2.16	7.12	10.38
Standard Error		1.11	1.48	1.25	4.11	5.99



Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt ($0.0039 - 0.062$ mm)	% Fine Sand ($0.062 - 0.2$ mm)	% Coarse Sand ($0.2 - 2.0$ mm)	% Gravel ($2.0 - 16.0$ mm)
Unnamed Watercourse 5	WC-5-S01	14.20	52.20	7.30	21.40	4.90
	WC-5-S02	30.60	61.90	4.00	3.20	0.20
	WC-5-S03	25.70	64.90	2.60	5.80	1.00
Mean		23.50	59.67	4.63	10.13	2.03
Median		25.70	61.90	4.00	5.80	1.00
Minimum		14.20	52.20	2.60	3.20	0.20
Maximum		30.60	64.90	7.30	21.40	4.90
Standard Deviation		8.42	6.64	2.41	9.84	2.51
Standard Error		4.86	3.83	1.39	5.68	1.45
Unnamed Watercourse 6B	WC-6B-S01	2.00	15.70	8.00	69.30	5.00
	WC-6B-S03	0.20	4.60	14.60	64.70	15.80
	Mean	1.10	10.15	11.30	67.00	10.40
Median		1.10	10.15	11.30	67.00	10.40
Minimum		0.20	4.60	8.00	64.70	5.00
Maximum		2.00	15.70	14.60	69.30	15.80
Standard Deviation		1.27	7.85	4.67	3.25	7.64
Standard Error		0.90	5.55	3.30	2.30	5.40
Unnamed Watercourse 6B-01	WC-6B-01-S01	0.10	3.00	8.40	73.10	15.40
	WC-6B-01-S02	0.10	2.80	15.10	72.90	9.10
	WC-6B-01-S03	0.20	4.60	14.60	64.70	15.80
Mean		0.13	3.47	12.70	70.23	13.43
Median		0.10	3.00	14.60	72.90	15.40
Minimum		0.10	2.80	8.40	64.70	9.10
Maximum		0.20	4.60	15.10	73.10	15.80
Standard Deviation		0.06	0.99	3.73	4.79	3.76
Standard Error		0.03	0.57	2.15	2.77	2.17
Unnamed Watercourse 6C	WC-6C-S01	20.60	71.20	5.00	3.20	0.00
	WC-6C-S02	26.80	64.80	2.80	5.30	0.30
	WC-6C-S03	23.30	72.70	1.40	1.80	0.70
Mean		23.57	69.57	3.07	3.43	0.33
Median		23.30	71.20	2.80	3.20	0.30
Minimum		20.60	64.80	1.40	1.80	0.00
Maximum		26.80	72.70	5.00	5.30	0.70
Standard Deviation		3.11	4.20	1.81	1.76	0.35
Standard Error		1.79	2.42	1.05	1.02	0.20
Unnamed Watercourse 7	WC-7-S01	9.50	59.70	15.90	10.70	4.20
	WC-7-S02	8.70	54.90	25.90	10.30	0.10
	WC-7-S03	16.90	65.50	9.20	7.50	0.80
Mean		11.70	60.03	17.00	9.50	1.70
Median		9.50	59.70	15.90	10.30	0.80
Minimum		8.70	54.90	9.20	7.50	0.10
Maximum		16.90	65.50	25.90	10.70	4.20
Standard Deviation		4.52	5.31	8.40	1.74	2.19
Standard Error		2.61	3.06	4.85	1.01	1.27
Unnamed Watercourse 7A-03	WC-7A-03-S01	6.50	55.70	7.00	25.30	5.50
	WC-7A-03-S02	2.90	35.40	7.70	37.90	16.20
	WC-7A-03-S03	3.00	28.80	7.70	48.00	12.50
Mean		4.13	39.97	7.47	37.07	11.40
Median		3.00	35.40	7.70	37.90	12.50
Minimum		2.90	28.80	7.00	25.30	5.50
Maximum		6.50	55.70	7.70	48.00	16.20
Standard Deviation		2.05	14.02	0.40	11.37	5.43
Standard Error		1.18	8.09	0.23	6.57	3.14



Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt (0.0039 - 0.062 mm)	% Fine Sand (0.062 - 0.2 mm)	% Coarse Sand (0.2 - 2.0 mm)	% Gravel (2.0 - 16.0 mm)
Unnamed Watercourse 7A-07	WC-7A-07-S01	17.60	65.70	6.70	9.80	0.30
	WC-7A-07-S02	14.60	64.70	7.60	11.80	1.20
	WC-7A-07-S03	15.20	57.30	6.40	20.90	0.10
Mean		15.80	62.57	6.90	14.17	0.53
Median		15.20	64.70	6.70	11.80	0.30
Minimum		14.60	57.30	6.40	9.80	0.10
Maximum		17.60	65.70	7.60	20.90	1.20
Standard Deviation		1.59	4.59	0.62	5.92	0.59
Standard Error		0.92	2.65	0.36	3.42	0.34
Unnamed Watercourse 7A-08	WC-7A-08-S01	14.40	53.20	5.30	22.00	5.10
	WC-7A-08-S02	14.30	52.00	6.00	20.30	7.30
	WC-7A-08-S03	13.50	54.50	6.70	22.70	2.50
Mean		14.07	53.23	6.00	21.67	4.97
Median		14.30	53.20	6.00	22.00	5.10
Minimum		13.50	52.00	5.30	20.30	2.50
Maximum		14.40	54.50	6.70	22.70	7.30
Standard Deviation		0.49	1.25	0.70	1.23	2.40
Standard Error		0.28	0.72	0.40	0.71	1.39
Unnamed Watercourse 8	WC-8-S01	3.00	32.60	53.20	8.70	2.40
	WC-8-S02	1.40	14.70	75.10	7.40	1.40
	WC-8-S03	1.00	10.10	78.90	8.80	1.10
Mean		1.80	19.13	69.07	8.30	1.63
Median		1.40	14.70	75.10	8.70	1.40
Minimum		1.00	10.10	53.20	7.40	1.10
Maximum		3.00	32.60	78.90	8.80	2.40
Standard Deviation		1.06	11.89	13.87	0.78	0.68
Standard Error		0.61	6.86	8.01	0.45	0.39

Notes:

Concentrations less than the reportable detection limit were given the lowest reportable value for calculation of summary statistics (e.g., a



Table D1-5: 2023 Particle Size Distribution (%) and Summary Statistics

Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt (0.0039 - 0.062 mm)	% Fine Sand (0.062 - 0.2 mm)	% Coarse Sand (0.2 - 2.0 mm)	% Gravel (2.0 - 16.0 mm)
Dixie Creek 01	DC-01-S1	6.6	40.2	53.1	4.4	<1.0
	DC-01-S2	11.6	48.7	39.6	0	<1.0
	DC-01-S3	14.4	55.6	29.6	2.7	<1.0
Mean		10.87	48.17	40.77	2.37	-
Median		11.60	48.70	39.60	2.70	-
Minimum		6.60	40.20	29.60	0.00	0.00
Maximum		14.40	55.60	53.10	4.40	0.00
Standard Deviation		3.95	7.71	11.79	2.22	-
Standard Error		2.28	4.45	6.81	1.28	-
Dixie Creek 02	DC-02-S1	10.3	29.1	60.6	27.6	<1.0
	DC-02-S2	13.4	51	33.4	2.6	2.2
	DC-02-S3	11.3	48	40.7	1.3	<1.0
Mean		11.67	42.70	44.90	10.50	2.20
Median		11.30	48.00	40.70	2.60	2.20
Minimum		10.30	29.10	33.40	1.30	2.20
Maximum		13.40	51.00	60.60	27.60	2.20
Standard Deviation		1.58	11.87	14.08	14.82	-
Standard Error		0.91	6.85	8.13	8.56	-
Dixie Creek 03	DC-03-S1	15.5	42.1	41.4	1.2	1
	DC-03-S2	13.7	55.7	30.6	0	<1.0
	DC-03-S3	14.3	41.3	41.3	5.8	3.1
Mean		14.50	46.37	37.77	2.33	2.05
Median		14.30	42.10	41.30	1.20	2.05
Minimum		13.70	41.30	30.60	0.00	1.00
Maximum		15.50	55.70	41.40	5.80	3.10
Standard Deviation		0.92	8.09	6.21	3.06	1.48
Standard Error		0.53	4.67	3.58	1.77	1.05
Dixie Creek 04	DC-04-S1	21.5	66.5	12	0	<1.0
	DC-04-S2	18.5	69.6	11.9	0	<1.0
	DC-04-S3	15.9	72.3	11.8	0	<1.0
Mean		18.63	69.47	11.90	0.00	-
Median		18.50	69.60	11.90	0.00	-
Minimum		15.90	66.50	11.80	0.00	0.00
Maximum		21.50	72.30	12.00	0.00	0.00
Standard Deviation		2.80	2.90	0.10	0.00	-
Standard Error		1.62	1.68	0.06	0.00	-
Chukuni River -REF	CR-REF-S1	14.8	72.3	12.9	0	<1.0
	CR-REF-S2	11.8	64.4	23.8	0	<1.0
	CR-REF-S3	17.3	71.6	11.1	0	<1.0
	CR-REF-S4	10.1	74.1	15.8	0	<1.0
	CR-REF-S5	10.8	73.6	15.6	0	<1.0
Mean		12.96	71.20	15.84	0.00	-
Median		11.80	72.30	15.60	0.00	-
Minimum		10.10	64.40	11.10	0.00	0.00
Maximum		17.30	74.10	23.80	0.00	0.00
Standard Deviation		3.02	3.93	4.86	0.00	-
Standard Error		1.35	1.76	2.17	0.00	-



Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt (0.0039 - 0.062 mm)	% Fine Sand (0.062 - 0.2 mm)	% Coarse Sand (0.2 - 2.0 mm)	% Gravel (2.0 - 16.0 mm)
Chukuni River -FDP	CR-FDP-S1	9.2	55.7	35.1	0	<1.0
	CR-FDP-S2	5.5	27.9	66.5	0	<1.0
	CR-FDP-S3	9.8	29.8	43.7	17	16.7
	CR-FDP-S4	16.3	33.6	38.1	1.4	12
	CR-FDP-S5	6.8	22.3	63.6	2.8	7.3
	Mean	9.52	33.86	49.40	4.24	12.00
	Median	9.20	29.80	43.70	1.40	12.00
	Minimum	5.50	22.30	35.10	0.00	7.30
	Maximum	16.30	55.70	66.50	17.00	16.70
	Standard Deviation	4.17	12.87	14.65	7.23	4.70
	Standard Error	1.87	5.76	6.55	3.23	2.71
Chukuni River -DS	CR-DS-S1	4.4	11.7	70	41.7	13.9
	CR-DS-S2	7.5	39.1	44.3	11.2	9.1
	CR-DS-S3	10	24.4	65.6	2.3	<1.0
	CR-DS-S4	13.7	49.3	35.9	6.6	1.1
	CR-DS-S5	10	36.4	53.6	7.3	<1.0
	Mean	9.12	32.18	53.88	13.82	8.03
	Median	10.00	36.40	53.60	7.30	9.10
	Minimum	4.40	11.70	35.90	2.30	1.10
	Maximum	13.70	49.30	70.00	41.70	13.90
	Standard Deviation	3.44	14.48	14.25	15.90	6.47
	Standard Error	1.54	6.48	6.37	7.11	3.73
Genessee Lake	GL-S1	4.2	15.2	80.6	3.3	<1.0
	GL-S2	7.4	66.5	26.1	0	<1.0
	GL-S3	7.2	55.3	37.5	1.8	<1.0
	Mean	6.27	45.67	48.07	1.70	-
	Median	7.20	55.30	37.50	1.80	-
	Minimum	4.20	15.20	26.10	0.00	0.00
	Maximum	7.40	66.50	80.60	3.30	0.00
	Standard Deviation	1.79	26.97	28.75	1.65	-
	Standard Error	1.03	15.57	16.60	0.95	-
Pakwash Lake	PKS-S1	17.1	75.1	7.8	0	<1.0
	PKS-S2	17.5	68.8	13.7	0	<1.0
	PKS-S3	13.7	72.9	13.4	0	<1.0
	PKS-S4	13.8	71.2	15	0	<1.0
	PKS-S5	8.7	73.8	17.5	0	<1.0
	Mean	14.16	72.36	13.48	0.00	-
	Median	13.80	72.90	13.70	0.00	-
	Minimum	8.70	68.80	7.80	0.00	0.00
	Maximum	17.50	75.10	17.50	0.00	0.00
	Standard Deviation	3.53	2.44	3.56	0.00	-
	Standard Error	1.58	1.09	1.59	0.00	-
Pakwash Lake	PKD-S1	11.2	71	17.8	0	<1.0
	PKD-S2	11.5	71.8	16.7	0	<1.0
	PKD-S3	14.7	73.6	11.7	0	<1.0
	PKD-S4	13.5	74.5	12	0	<1.0
	PKD-S5	13	73.6	13.4	0	<1.0
	Mean	12.78	72.90	14.32	0.00	-
	Median	13.00	73.60	13.40	0.00	-
	Minimum	11.20	71.00	11.70	0.00	0.00
	Maximum	14.70	74.50	17.80	0.00	0.00
	Standard Deviation	1.45	1.45	2.78	0.00	-
	Standard Error	0.65	0.65	1.24	0.00	-



Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt (0.0039 - 0.062 mm)	% Fine Sand (0.062 - 0.2 mm)	% Coarse Sand (0.2 - 2.0 mm)	% Gravel (2.0 - 16.0 mm)
Unnamed Waterbody 1	WB-1-S1	18.6	79.8	1.5	0	<1.0
	WB-1-S2	20.9	77.7	1.4	0	<1.0
	WB-1-S3	27.9	70.8	1.3	0	<1.0
	Mean	22.47	76.10	1.40	0.00	-
	Median	20.90	77.70	1.40	0.00	-
	Minimum	18.60	70.80	1.30	0.00	0.00
	Maximum	27.90	79.80	1.50	0.00	0.00
	Standard Deviation	4.84	4.71	0.10	0.00	-
	Standard Error	2.80	2.72	0.06	0.00	-
Unnamed Waterbody 2	WB-2-S1	17.9	62.2	19.9	0	<1.0
	WB-2-S2	27.4	59	13.6	0	<1.0
	WB-2-S3	25	57.4	17.6	0	<1.0
	Mean	23.43	59.53	17.03	0.00	-
	Median	25.00	59.00	17.60	0.00	-
	Minimum	17.90	57.40	13.60	0.00	0.00
	Maximum	27.40	62.20	19.90	0.00	0.00
	Standard Deviation	4.94	2.44	3.19	0.00	-
	Standard Error	2.85	1.41	1.84	0.00	-
Unnamed Waterbody 3	WB-3-S1	33.9	64.1	2	0	<1.0
	WB-3-S2	42.9	53.5	3.6	0	<1.0
	WB-3-S3	26.9	66.7	6.4	0	<1.0
	Mean	34.57	61.43	4.00	0.00	-
	Median	33.90	64.10	3.60	0.00	-
	Minimum	26.90	53.50	2.00	0.00	0.00
	Maximum	42.90	66.70	6.40	0.00	0.00
	Standard Deviation	8.02	6.99	2.23	0.00	-
	Standard Error	4.63	4.04	1.29	0.00	-
Unnamed Waterbody 6	WB-6-S1	11.2	47	41.8	0	<1.0
	WB-6-S2	6.5	45.5	48	0	<1.0
	WB-6-S3	10.6	46.8	42.6	0	<1.0
	Mean	9.43	46.43	44.13	0.00	-
	Median	10.60	46.80	42.60	0.00	-
	Minimum	6.50	45.50	41.80	0.00	0.00
	Maximum	11.20	47.00	48.00	0.00	0.00
	Standard Deviation	2.56	0.81	3.37	0.00	-
	Standard Error	1.48	0.47	1.95	0.00	-
Unnamed Watercourse 3B	WC-3B-S1	9	69.6	21.4	0	<1.0
	WC-3B-S2	10	71.1	18.9	0	<1.0
	Mean	9.50	70.35	20.15	0.00	-
	Median	9.50	70.35	20.15	0.00	-
	Minimum	9.00	69.60	18.90	0.00	0.00
	Maximum	10.00	71.10	21.40	0.00	0.00
	Standard Deviation	0.71	1.06	1.77	0.00	-
	Standard Error	0.50	0.75	1.25	0.00	-
Unnamed Watercourse 4	WC-4-S1	37.2	23.5	34.5	13	4.8
	WC-4-S2	31.1	23.1	23.4	6.5	22.4
	WC-4-S3	36.9	19.6	43	12	<1.0
	Mean	35.07	22.07	33.63	10.50	13.60
	Median	36.90	23.10	34.50	12.00	13.60
	Minimum	31.10	19.60	23.40	6.50	4.80
	Maximum	37.20	23.50	43.00	13.00	22.40
	Standard Deviation	3.44	2.15	9.83	3.50	12.45
	Standard Error	1.99	1.24	5.67	2.02	8.80



Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt (0.0039 - 0.062 mm)	% Fine Sand (0.062 - 0.2 mm)	% Coarse Sand (0.2 - 2.0 mm)	% Gravel (2.0 - 16.0 mm)
Unnamed Watercourse 5	WC-5-S3	32.5	53.7	13.3	3.9	<1.0
	WC-5-S2	45.4	44.5	10	0	<1.0
	WC-5-S1	44.4	46.5	7.9	0	1.2
	Mean	40.77	48.23	10.40	1.30	1.20
	Median	44.40	46.50	10.00	0.00	1.20
	Minimum	32.50	44.50	7.90	0.00	1.20
	Maximum	45.40	53.70	13.30	3.90	1.20
	Standard Deviation	7.18	4.84	2.72	2.25	-
	Standard Error	4.14	2.79	1.57	1.30	-
Unnamed Watercourse 6A-US	WC-6A-US-S1	31.7	55.7	12.6	0	<1.0
	WC-6A-US-S2	30.5	57.4	12.1	0	<1.0
	WC-6A-US-S3	27.9	57.1	15	0	<1.0
	Mean	30.03	56.73	13.23	0.00	-
	Median	30.50	57.10	12.60	0.00	-
	Minimum	27.90	55.70	12.10	0.00	0.00
	Maximum	31.70	57.40	15.00	0.00	0.00
	Standard Deviation	1.94	0.91	1.55	0.00	-
	Standard Error	1.12	0.52	0.90	0.00	-
Unnamed Watercourse 6B	WC-6B-S1	9.3	43.9	46.2	23	<1.0
	WC-6B-S2	3.1	6.3	90.2	77.7	<1.0
	WC-6B-S3	6	22.3	70.7	50.8	1
	Mean	6.13	24.17	69.03	50.50	1.00
	Median	6.00	22.30	70.70	50.80	1.00
	Minimum	3.10	6.30	46.20	23.00	1.00
	Maximum	9.30	43.90	90.20	77.70	1.00
	Standard Deviation	3.10	18.87	22.05	27.35	-
	Standard Error	1.79	10.89	12.73	15.79	-
Unnamed Watercourse 6B-01	WC-6B-01-S1	9.6	14.6	73.9	63	1.9
	WC-6B-01-S2	17.2	20.9	58.5	42	3.4
	WC-6B-01-S3	1.9	0	94.3	80.7	3.8
	Mean	9.57	11.83	75.57	61.90	3.03
	Median	9.60	14.60	73.90	63.00	3.40
	Minimum	1.90	0.00	58.50	42.00	1.90
	Maximum	17.20	20.90	94.30	80.70	3.80
	Standard Deviation	7.65	10.72	17.96	19.37	1.00
	Standard Error	4.42	6.19	10.37	11.19	0.58
Unnamed Watercourse 6C	WC-6C-S1	29.8	30	39.6	32.7	<1.0
	WC-6C-S2	32.2	33.4	33.9	22.7	<1.0
	WC-6C-S3	44.8	45.4	9.7	0	<1.0
	Mean	35.60	36.27	27.73	18.47	-
	Median	32.20	33.40	33.90	22.70	-
	Minimum	29.80	30.00	9.70	0.00	0.00
	Maximum	44.80	45.40	39.60	32.70	0.00
	Standard Deviation	8.06	8.09	15.88	16.76	-
	Standard Error	4.65	4.67	9.17	9.67	-
Unnamed Watercourse 7	WC-7-S1	20.3	47.7	32	3.2	<1.0
	WC-7-S2	16.9	59.5	23.6	0	<1.0
	WC-7-S3	25.6	55.8	18.6	0	<1.0
	Mean	20.93	54.33	24.73	1.07	-
	Median	20.30	55.80	23.60	0.00	-
	Minimum	16.90	47.70	18.60	0.00	0.00
	Maximum	25.60	59.50	32.00	3.20	0.00
	Standard Deviation	4.38	6.04	6.77	1.85	-
	Standard Error	2.53	3.48	3.91	1.07	-



Waterbody	Replicate Station	Particle Size				
		% Clay (< 0.0039 mm)	% Silt (0.0039 - 0.062 mm)	% Fine Sand (0.062 - 0.2 mm)	% Coarse Sand (0.2 - 2.0 mm)	% Gravel (2.0 - 16.0 mm)
Unnamed Watercourse 8	WC-8-S1	2.6	10.6	86.8	23.2	<1.0
	WC-8-S2	3.3	22	74.7	6.7	<1.0
	WC-8-S3	5.2	26.1	68.7	5	<1.0
Mean		3.70	19.57	76.73	11.63	-
Median		3.30	22.00	74.70	6.70	-
Minimum		2.60	10.60	68.70	5.00	0.00
Maximum		5.20	26.10	86.80	23.20	0.00
Standard Deviation		1.35	8.03	9.22	10.05	-
Standard Error		0.78	4.64	5.32	5.80	-

Notes:

Concentrations less than the reportable detection limit were given the lowest reportable value for calculation of summary statistics (e.g., a



Table D1-6: 2024 Particle Size Distribution (%) and Summary Statistics

Waterbody	Replicate Station	Particle Size				
		Gravel (>2mm)	Coarse Sand (2.0mm - 0.25mm)	Fine Sand (0.25mm - 0.063mm)	Silt (0.063mm - 0.004mm)	Clay (<0.004mm)
Trout River	TR-1	1.00	3	2	67.9	29.9
	TR-2	1.00	3	2.2	72.3	25.2
	TR-3	1.00	3	2.2	71.2	26
	Mean	1.00	3.00	2.13	70.47	27.03
	Median	1.00	3.00	2.20	71.20	26.00
	Minimum	1.00	3.00	2.00	67.90	25.20
	Maximum	1.00	3.00	2.20	72.30	29.90
	Standard Deviation	0.00	0.00	0.12	2.29	2.51
	Standard Error	0.00	0.00	0.07	1.32	1.45
Chukuni River - REF	CR-REF-S1	1.00	3	36	46.3	16
	CR-REF-S2	1.00	3	47.6	41.2	11
	CR-REF-S3	1.9	6.2	58.6	24.8	8.5
	CR-REF-S4	2.7	10.8	48.3	30.6	7.6
	CR-REF-S5	1.00	6.8	78.8	8.8	5.2
	Mean	1.52	5.96	53.86	30.34	9.66
	Median	1.00	6.20	48.30	30.60	8.50
	Minimum	1.00	3.00	36.00	8.80	5.20
	Maximum	2.70	10.80	78.80	46.30	16.00
	Standard Deviation	0.77	3.23	16.07	14.73	4.11
	Standard Error	0.34	1.44	7.19	6.59	1.84
Chukuni River - FDP	CR-FDP-S1	1.00	3	38.6	50.7	10.4
	CR-FDP-S2	1.00	3	66.3	25.2	7.4
	CR-FDP-S3	1.00	3	41.7	42.6	15.4
	CR-FDP-S4	2.5	6.9	40.2	24.3	26.1
	CR-FDP-S5	1.00	9.4	66	17.9	6.1
	Mean	1.30	5.06	50.56	32.14	13.08
	Median	1.00	3.00	41.70	25.20	10.40
	Minimum	1.00	3.00	38.60	17.90	6.10
	Maximum	2.50	9.40	66.30	50.70	26.10
	Standard Deviation	0.67	2.96	14.27	13.84	8.11
	Standard Error	0.30	1.32	6.38	6.19	3.63
Chukuni River - DS	CR-DS-S1	1.00	8.1	64.3	21.2	5.8
	CR-DS-S2	1.00	41.1	34.5	17	6.6
	CR-DS-S3	1.00	17.6	26.6	20.8	35
	CR-DS-S4	1.00	5.2	41.4	43.2	11.2
	CR-DS-S5	1.00	20.1	36	35.3	9
	Mean	1.00	18.42	40.56	27.50	13.52
	Median	1.00	17.60	36.00	21.20	9.00
	Minimum	1.00	5.20	26.60	17.00	5.80
	Maximum	1.00	41.10	64.30	43.20	35.00
	Standard Deviation	0.00	14.13	14.29	11.20	12.19
	Standard Error	0.00	6.32	6.39	5.01	5.45
Pakwash Lake - North	PKD-S1	1.00	3	14.8	69	16
	PKD-S2	1.00	3	15.5	70.6	13.7
	PKD-S3	1.00	3	3.9	71.4	24.2
	Mean	1.00	3.00	11.40	70.33	17.97
	Median	1.00	3.00	14.80	70.60	16.00
	Minimum	1.00	3.00	3.90	69.00	13.70
	Maximum	1.00	3.00	15.50	71.40	24.20
	Standard Deviation	0.00	0.00	6.50	1.22	5.52
	Standard Error	0.00	0.00	3.76	0.71	3.19



Pakwash Lake - Central	PKL-C-S1	1.00	3.1	55.3	35.4	7.9
	PKL-C-S2	1.00	3	10.6	62.7	26.6
	PKL-C-S3	1.00	3	3.3	38.3	58.2
Mean		1.00	3.03	23.07	45.47	30.90
Median		1.00	3.00	10.60	38.30	26.60
Minimum		1.00	3.00	3.30	35.40	7.90
Maximum		1.00	3.10	55.30	62.70	58.20
Standard Deviation		0.00	0.06	28.15	14.99	25.42
Standard Error		0.00	0.03	16.25	8.66	14.68
Pakwash Lake - Deep Basin	PKL-D-S1	1.00	1.00	2.4	26.7	70.8
	PKL-D-S2	1.00	1.00	2.5	26.7	70.7
	PKL-D-S3	1.00	1.00	2.4	24.8	72.8
Mean		1.00	1.00	2.43	26.07	71.43
Median		1.00	1.00	2.40	26.70	70.80
Minimum		1.00	1.00	2.40	24.80	70.70
Maximum		1.00	1.00	2.50	26.70	72.80
Standard Deviation		0.00	0.00	0.06	1.10	1.18
Standard Error		0.00	0.00	0.03	0.63	0.68
Pakwash Lake - South	PKL-S-S1	1.00	6.3	65.7	22.1	7.3
	PKL-S-S2	1.00	3.2	58	30.8	9.7
	PKL-S-S3	1.1	22.9	52.5	18.1	5.4
Mean		1.03	10.80	58.73	23.67	7.47
Median		1.00	6.30	58.00	22.10	7.30
Minimum		1.00	3.20	52.50	18.10	5.40
Maximum		1.10	22.90	65.70	30.80	9.70
Standard Deviation		0.06	10.59	6.63	6.49	2.15
Standard Error		0.03	6.12	3.83	3.75	1.24
Genessee Lake	GL-S1	1.00	6.8	88.2	4.4	2.4
	GL-S2	1.00	3	27.3	59	13.5
	GL-S3	1.00	3	29.3	58.3	11.3
Mean		1.00	4.27	48.27	40.57	9.07
Median		1.00	3.00	29.30	58.30	11.30
Minimum		1.00	3.00	27.30	4.40	2.40
Maximum		1.00	6.80	88.20	59.00	13.50
Standard Deviation		0.00	2.19	34.60	31.32	5.88
Standard Error		0.00	1.27	19.98	18.08	3.39
Unnamed Waterbody 6	WB-6-S1	1.00	3	39.3	50.9	9.5
	WB-6-S2	1.00	3	39.5	51.3	8.9
	WB-6-S3	1.00	3	37.7	53	9.1
Mean		1.00	3.00	38.83	51.73	9.17
Median		1.00	3.00	39.30	51.30	9.10
Minimum		1.00	3.00	37.70	50.90	8.90
Maximum		1.00	3.00	39.50	53.00	9.50
Standard Deviation		0.00	0.00	0.99	1.12	0.31
Standard Error		0.00	0.00	0.57	0.64	0.18

Notes:

Concentrations less than the reportable detection limit were given the lowest reportable value for calculation of summary statistics (e.g., a concentration of <1 was considered 1).



Table D1-7: Statistical Comparison of Chukuni River 2023 Sediment Grain Size

Gravel (2.0 - 16.0 mm)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	69.67	2	34.83	1.397	0.285	N	
Error	299.25	12	24.94				
Coarse Sand (0.2 - 2.0 mm) ** log transformed							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	17.46	2	8.73	15.421	<0.001	Y	CR-DS>CR-FDP
Error	6.79	12	0.57				CR-DS>CR-REF
Fine Sand (0.062 - 0.2 mm)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	3447.20	2	1723.62	11.214	0.002	Y	CR-REF<CR-FDP
Error	1844.50	12	153.71				CR-REF<CR-DS
Silt (0.0039 - 0.062 mm)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	6284.70	2	3142.33	17.724	<0.001	Y	CR-REF>CR-FDP
Error	2127.50	12	177.29				CR-REF>CR-DS
Clay (< 0.0039 mm)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	49.08	2	24.54	8.176	0.006	Y	CR-REF>CR-FDP
Error	36.02	12	3.00				CR-REF>CR-DS

Notes:

All sampling area comparisons were completed using Analysis of Variance (ANOVA)

"df" represents degrees of freedom

"SS" represents sums of squares

"MS" represents mean square

"F" statistic represents the between / within group variability

"p-value" represents the level of marginal significance within a statistical hypothesis test

"p<0.10" indicated significance of test for null hypothesis (equal means) at an α of 0.10



Table D1-8: Statistical Comparison of Chukuni River 2023 Sediment Grain Size

Gravel (2.0 - 16.0 mm)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	0.68	2	0.34	0.986	0.402	N	
Error	4.15	12	0.35				
Coarse Sand (0.2 - 2.0 mm) ** log transformed							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	4.01	2	2.00	4.733	0.03052	N	
Error	5.08	12	0.42				
Fine Sand (0.062 - 0.2 mm)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	479.63	2	239.82	1.080	0.371	N	
Error	2665.26	12	222.1				
Silt (0.0039 - 0.062 mm)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	54.73	2	27.363	0.1537	0.8592	N	
Error	2135.84	12	177.987				
Clay (< 0.0039 mm) ** log transformed							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Post-hoc
Between Groups	0.14	2	0.07	0.208	0.815	N	
Error	4.11	12	0.34				

Notes:

All sampling area comparisons were completed using Analysis of Variance (ANOVA)

"df" represents degrees of freedom

"SS" represents sums of squares

"MS" represents mean square

"F" statistic represents the between / within group variability

"p-value" represents the level of marginal significance within a statistical hypothesis test

"p<0.10" indicated significance of test for null hypothesis (equal means) at an α of 0.10



Table D2-1: Summary of Benthic Invertebrate Community Descriptors from 2022 Sampling

Waterbody	Station	Total Abundance	TID	Total Taxa Richness	Simpsons Diversity	Simpsons Evenness	% EPT	% Chironomids
Chukuni River	CR-REF-B1	430	6,232	12	0.69	0.14	51.16	22.33
	CR-REF-B2	416	6,029	13	0.60	0.09	60.34	22.84
	CR-REF-B3	165	2,391	8	0.69	0.20	42.42	13.94
	CR-REF-B4	339	4,913	9	0.63	0.12	53.10	26.84
	CR-REF-B5	256	3,710	12	0.64	0.14	58.20	17.97
	<i>Average</i>	<i>321</i>	<i>4,655</i>	<i>11</i>	<i>0.65</i>	<i>0.14</i>	<i>53.04</i>	<i>20.78</i>
	<i>Standard Deviation</i>	<i>100</i>	<i>1,446</i>	<i>2</i>	<i>0.03</i>	<i>0.04</i>	<i>6.26</i>	<i>4.43</i>
	CR-FDP-B1	126	1,826	11	0.61	0.12	9.52	20.63
	CR-FDP-B2	135	1,957	11	0.56	0.13	12.59	9.63
	CR-FDP-B3	201	2,913	10	0.81	0.32	35.32	21.89
	CR-FDP-B4	203	2,942	19	0.77	0.13	12.81	39.90
	CR-FDP-B5	134	1,942	17	0.84	0.27	31.34	16.42
	<i>Average</i>	<i>160</i>	<i>2,316</i>	<i>14</i>	<i>0.72</i>	<i>0.19</i>	<i>20.32</i>	<i>21.69</i>
	<i>Standard Deviation</i>	<i>35</i>	<i>501</i>	<i>4</i>	<i>0.11</i>	<i>0.08</i>	<i>10.76</i>	<i>10.06</i>
	CR-DS-B1	343	4,971	8	0.74	0.29	15.45	41.98
	CR-DS-B2	170	2,464	15	0.89	0.41	24.12	21.18
	CR-DS-B3	244	3,536	11	0.86	0.38	30.74	22.95
	CR-DS-B4	128	1,855	9	0.72	0.26	12.50	31.25
	CR-DS-B5	227	3,290	12	0.74	0.14	11.01	42.29
<i>Average</i>	<i>222</i>	<i>3,223</i>	<i>11</i>	<i>0.79</i>	<i>0.30</i>	<i>18.76</i>	<i>31.93</i>	
<i>Standard Deviation</i>	<i>73</i>	<i>1,059</i>	<i>2</i>	<i>0.07</i>	<i>0.10</i>	<i>7.51</i>	<i>9.00</i>	
Dixie Creek	DC-01-B1	1,555	22,536	12	0.74	0.13	9.45	40.13
	DC-01-B2	2,210	32,029	13	0.72	0.15	15.93	44.89
	DC-01-B3	2,725	39,493	13	0.69	0.09	9.39	49.32
	<i>Average</i>	<i>2,163</i>	<i>31,353</i>	<i>13</i>	<i>0.72</i>	<i>0.12</i>	<i>11.59</i>	<i>44.78</i>
	<i>Standard Deviation</i>	<i>479</i>	<i>6,939</i>	<i>0</i>	<i>0.02</i>	<i>0.02</i>	<i>3.07</i>	<i>3.75</i>
	DC-02-B1	239	3,464	14	0.63	0.07	21.76	56.07
	DC-02-B2	285	4,130	13	0.57	0.12	9.47	64.56
	DC-02-B3	343	4,971	8	0.55	0.13	6.12	65.31
	<i>Average</i>	<i>289</i>	<i>4,188</i>	<i>12</i>	<i>0.58</i>	<i>0.10</i>	<i>12.45</i>	<i>61.98</i>
	<i>Standard Deviation</i>	<i>43</i>	<i>617</i>	<i>3</i>	<i>0.03</i>	<i>0.03</i>	<i>6.72</i>	<i>4.19</i>
	DC-03-B1	267	3,870	11	0.76	0.24	28.09	44.94
	DC-03-B2	333	4,826	19	0.76	0.13	31.83	43.24
	DC-03-B3	92	1,333	13	0.81	0.28	47.83	26.09
	<i>Average</i>	<i>231</i>	<i>3,343</i>	<i>14</i>	<i>0.78</i>	<i>0.22</i>	<i>35.92</i>	<i>38.09</i>
	<i>Standard Deviation</i>	<i>102</i>	<i>1,474</i>	<i>3</i>	<i>0.03</i>	<i>0.06</i>	<i>8.56</i>	<i>8.52</i>
	DC-04-B1	149	2,159	7	0.68	0.19	2.68	51.68
	DC-04-B2	128	1,855	5	0.57	0.19	15.63	62.50
	DC-04-B3	230	3,333	6	0.67	0.26	0.00	42.17
	<i>Average</i>	<i>169</i>	<i>2,449</i>	<i>6</i>	<i>0.64</i>	<i>0.21</i>	<i>6.10</i>	<i>52.12</i>
<i>Standard Deviation</i>	<i>44</i>	<i>637</i>	<i>1</i>	<i>0.05</i>	<i>0.03</i>	<i>6.82</i>	<i>8.30</i>	



Waterbody	Station	Total Abundance	TID	Total Taxa Richness	Simpsons Diversity	Simpsons Evenness	% EPT	% Chironomids
Unnamed Watercourses Flowing into Dixie Creek	WC-4-B1	176	2,551	16	0.77	0.16	5.68	31.82
	WC-4-B2	669	9,696	16	0.66	0.11	6.13	52.02
	WC-4-B3	1,052	15,246	19	0.66	0.08	2.38	47.53
	<i>Average</i>	632	9,164	17	0.70	0.12	4.73	43.79
	<i>Standard Deviation</i>	359	5,197	1	0.05	0.03	1.67	8.66
	WC-3-B1	248	3,594	13	0.58	0.09	0.40	60.89
	WC-3-B2							
	WC-3-B3	563	8,159	10	0.37	0.07	0.00	78.15
	<i>Average</i>	406	5,877	12	0.48	0.08	0.20	69.52
	<i>Standard Deviation</i>	158	2,283	2	0.10	0.01	0.20	8.63
	WC-3B-B1	472	6,841	10	0.72	0.17	0.00	37.29
	WC-3B-B2	400	5,797	6	0.72	0.28	0.00	30.00
	WC-3B-B3	796	11,536	10	0.67	0.12	0.00	38.69
	<i>Average</i>	556	8,058	9	0.70	0.19	0.00	35.33
	<i>Standard Deviation</i>	172	2,496	2	0.03	0.06	0.00	3.81
	WC-3A-B1	320	4,638	8	0.84	0.51	0.00	12.50
	WC-3A-B2	310	4,493	13	0.68	0.16	1.29	8.39
	WC-3A-B3	164	2,377	8	0.81	0.44	0.00	14.63
	<i>Average</i>	265	3,836	10	0.78	0.37	0.43	11.84
	<i>Standard Deviation</i>	71	1,033	2	0.07	0.15	0.61	2.59
WC-5-B1	2,389	34,623	7	0.62	0.12	0.00	42.40	
WC-5-B2	4,176	60,522	13	0.57	0.08	1.15	55.56	
WC-5-B3	2,000	28,986	9	0.65	0.11	0.80	44.80	
<i>Average</i>	2,855	41,377	10	0.62	0.10	0.65	47.59	
<i>Standard Deviation</i>	947	13,732	2	0.03	0.02	0.48	5.72	
Genessee Lake	GL-B1	43	623	6	0.68	0.39	0.00	32.56
	GL-B2	176	2,551	11	0.59	0.14	2.27	18.18
	GL-B3	680	9,855	17	0.56	0.08	8.68	17.06
	<i>Average</i>	300	4,343	11	0.61	0.20	3.65	22.60
	<i>Standard Deviation</i>	274	3,976	4	0.05	0.14	3.67	7.06
Unnamed Waterbody 1	WB-1-B1	1,872	27,130	9	0.56	0.11	0.00	63.25
	WB-1-B2	768	11,130	9	0.74	0.20	4.17	43.75
	WB-1-B3	1,472	21,333	8	0.53	0.13	1.09	63.04
	<i>Average</i>	1,371	19,865	9	0.61	0.15	1.75	56.68
	<i>Standard Deviation</i>	456	6,614	0	0.09	0.04	1.76	9.14
Unnamed Waterbody 2	WB-2-B1	15	217	3	0.24	0.44	0.00	6.67
	WB-2-B2	28	406	2	0.07	0.36	0.00	3.57
	WB-2-B3	25	362	2	0.08	0.54	0.00	4.00
	<i>Average</i>	23	329	2	0.13	0.45	0.00	4.75
	<i>Standard Deviation</i>	6	81	0	0.08	0.08	0.00	1.37
Unnamed Waterbody 5	WB-5-B1	96	1,391	4	0.63	0.53	0.00	8.33
	WB-5-B2	306	4,435	5	0.56	0.26	0.33	57.52
	WB-5-B3	681	9,870	8	0.57	0.17	0.15	51.69
	<i>Average</i>	361	5,232	6	0.59	0.32	0.16	39.18
	<i>Standard Deviation</i>	242	3,507	2	0.03	0.16	0.13	21.94
Unnamed Waterbody 6	WB-6-B1	172	2,493	6	0.65	0.24	0.00	27.91
	WB-6-B2	304	4,406	9	0.71	0.21	1.32	26.32
	WB-6-B3	150	2,174	10	0.74	0.20	1.33	36.67
	<i>Average</i>	209	3,024	8	0.70	0.22	0.88	30.30
	<i>Standard Deviation</i>	68	986	2	0.04	0.01	0.62	4.55



Waterbody	Station	Total Abundance	TID	Total Taxa Richness	Simpsons Diversity	Simpsons Evenness	% EPT	% Chironomids
Unnamed Watercourses Flowing into Waterbody 6	WC-6B-01-B1	1,136	16,464	8	0.41	0.09	1.76	73.94
	WC-6B-01-B2	1,182	17,130	12	0.32	0.06	1.35	81.64
	WC-6B-01-B3	3,254	47,159	11	0.24	0.06	3.93	86.94
	<i>Average</i>	<i>1,857</i>	<i>26,918</i>	<i>10</i>	<i>0.33</i>	<i>0.07</i>	<i>2.35</i>	<i>80.84</i>
	<i>Standard Deviation</i>	<i>988</i>	<i>14,316</i>	<i>2</i>	<i>0.07</i>	<i>0.02</i>	<i>1.13</i>	<i>5.34</i>
	WC-6B-B1	252	3,652	11	0.27	0.06	1.59	84.92
	WC-6B-B2							
	WC-6B-B3	602	8,725	11	0.33	0.06	1.50	81.06
	<i>Average</i>	<i>427</i>	<i>6,188</i>	<i>11</i>	<i>0.30</i>	<i>0.06</i>	<i>1.54</i>	<i>82.99</i>
	<i>Standard Deviation</i>	<i>175</i>	<i>2,536</i>	<i>0</i>	<i>0.03</i>	<i>0.00</i>	<i>0.05</i>	<i>1.93</i>
	WC-6C-B1	2,476	35,884	11	0.59	0.09	1.33	58.48
	WC-6C-B2	5,364	77,739	12	0.64	0.12	0.00	15.21
	WC-6C-B3	8,000	115,942	12	0.66	0.10	0.00	28.80
	<i>Average</i>	<i>5,280</i>	<i>76,522</i>	<i>12</i>	<i>0.63</i>	<i>0.10</i>	<i>0.44</i>	<i>34.16</i>
<i>Standard Deviation</i>	<i>2,256</i>	<i>32,695</i>	<i>0</i>	<i>0.03</i>	<i>0.01</i>	<i>0.63</i>	<i>18.07</i>	
Unnamed Watercourse 7	WC-7-B1	218	3,159	8	0.75	0.24	3.67	37.16
	WC-7-B2	481	6,971	8	0.54	0.14	9.98	66.53
	WC-7-B3	80	1,159	3	0.64	0.69	20.00	40.00
	<i>Average</i>	<i>260</i>	<i>3,763</i>	<i>6</i>	<i>0.64</i>	<i>0.36</i>	<i>11.22</i>	<i>47.89</i>
	<i>Standard Deviation</i>	<i>166</i>	<i>2,411</i>	<i>2</i>	<i>0.09</i>	<i>0.24</i>	<i>6.72</i>	<i>13.23</i>
Unnamed Watercourses Flowing into Unnamed Watercourse 7	WC-7A-03-B1	272	3,942	8	0.70	0.24	0.00	26.47
	WC-7A-03-B2	1,568	22,725	11	0.70	0.15	3.06	48.98
	WC-7A-03-B3	1,002	14,522	11	0.73	0.16	11.18	36.73
	<i>Average</i>	<i>947</i>	<i>13,729</i>	<i>10</i>	<i>0.71</i>	<i>0.18</i>	<i>4.75</i>	<i>37.39</i>
	<i>Standard Deviation</i>	<i>530</i>	<i>7,688</i>	<i>1</i>	<i>0.01</i>	<i>0.04</i>	<i>4.72</i>	<i>9.20</i>
Unnamed Watercourses Flowing into Unnamed Watercourse 7	WC-7A-07-B1	364	5,275	9	0.39	0.15	0.00	76.37
	WC-7A-07-B2	176	2,551	10	0.55	0.16	0.00	65.91
	WC-7A-07-B3	816	11,826	10	0.63	0.17	0.98	57.84
	<i>Average</i>	<i>452</i>	<i>6,551</i>	<i>10</i>	<i>0.52</i>	<i>0.16</i>	<i>0.33</i>	<i>66.71</i>
	<i>Standard Deviation</i>	<i>269</i>	<i>3,893</i>	<i>0</i>	<i>0.10</i>	<i>0.01</i>	<i>0.46</i>	<i>7.59</i>
Unnamed Watercourse 7	WC-7A-08-B1	410	5,942	7	0.41	0.10	0.00	76.10
	WC-7A-08-B2	609	8,826	8	0.64	0.17	2.63	55.17
	WC-7A-08-B3	536	7,768	9	0.58	0.12	1.49	62.69
	<i>Average</i>	<i>518</i>	<i>7,512</i>	<i>8</i>	<i>0.54</i>	<i>0.13</i>	<i>1.37</i>	<i>64.65</i>
	<i>Standard Deviation</i>	<i>82</i>	<i>1,191</i>	<i>1</i>	<i>0.10</i>	<i>0.03</i>	<i>1.08</i>	<i>8.65</i>
Unnamed Watercourse 8	WC-8-B1	2,465	35,725	12	0.32	0.07	6.49	82.43
	WC-8-B2	2,136	30,957	12	0.28	0.06	2.62	84.64
	WC-8-B3	1,027	14,884	14	0.40	0.07	8.57	77.12
	<i>Average</i>	<i>1,876</i>	<i>27,188</i>	<i>13</i>	<i>0.33</i>	<i>0.07</i>	<i>5.89</i>	<i>81.40</i>
	<i>Standard Deviation</i>	<i>615</i>	<i>8,916</i>	<i>1</i>	<i>0.05</i>	<i>0.01</i>	<i>2.46</i>	<i>3.16</i>

Notes:

TID = Total Invertebrate Density

EPT = Ephemeroptera, Plecoptera, and Trichoptera (mayflies, stoneflies, and caddisflies)



Table D2-2: Summary of Benthic Invertebrate Community Descriptors from 2023 Sampling

Waterbody	Station	Total Abundance	TID	Total Taxa Richness	Simpsons Diversity	Simpsons Evenness	% EPT	% Chironomids
Chukuni River	CR-REF-B1	80	1,159	7	0.67	0.44	50.00	16.25
	CR-REF-B2	81	1,174	7	0.59	0.35	4.94	60.49
	CR-REF-B3	186	2,696	5	0.67	0.61	0.00	38.71
	CR-REF-B4	100	1,449	7	0.51	0.29	2.00	68.00
	CR-REF-B5	156	2,261	6	0.62	0.44	6.41	56.41
	<i>Average</i>	<i>121</i>	<i>1,748</i>	<i>6</i>	<i>0.61</i>	<i>0.43</i>	<i>12.67</i>	<i>47.97</i>
	<i>Standard Deviation</i>	<i>43</i>	<i>621</i>	<i>1</i>	<i>0.06</i>	<i>0.11</i>	<i>18.80</i>	<i>18.55</i>
	CR-FDP-B1	174	2,522	11	0.80	0.46	22.41	29.89
	CR-FDP-B2	98	1,420	9	0.78	0.50	35.71	24.49
	CR-FDP-B3	170	2,464	3	0.36	0.52	0.00	16.47
	CR-FDP-B4	73	1,058	7	0.62	0.37	5.48	53.42
	CR-FDP-B5	119	1,725	9	0.71	0.38	20.17	47.06
	<i>Average</i>	<i>127</i>	<i>1,838</i>	<i>8</i>	<i>0.65</i>	<i>0.45</i>	<i>16.75</i>	<i>34.27</i>
	<i>Standard Deviation</i>	<i>40</i>	<i>575</i>	<i>3</i>	<i>0.16</i>	<i>0.06</i>	<i>12.73</i>	<i>13.87</i>
	CR-DS-B1	48	696	6	0.67	0.51	4.17	52.08
CR-DS-B2	73	1,058	5	0.53	0.43	0.00	63.01	
CR-DS-B3	151	2,188	7	0.72	0.51	4.64	45.03	
CR-DS-B4	98	1,420	7	0.68	0.45	4.08	48.98	
CR-DS-B5	98	1,420	8	0.52	0.26	2.04	65.31	
<i>Average</i>	<i>94</i>	<i>1,357</i>	<i>7</i>	<i>0.63</i>	<i>0.43</i>	<i>2.99</i>	<i>54.88</i>	
<i>Standard Deviation</i>	<i>34</i>	<i>495</i>	<i>1</i>	<i>0.08</i>	<i>0.09</i>	<i>1.74</i>	<i>7.93</i>	
Dixie Creek	DC-01-B1	269	3,899	19	0.77	0.23	46.08	34.20
	DC-01-B2	718	10,406	14	0.64	0.20	5.56	57.94
	DC-01-B3	613	8,884	12	0.70	0.28	4.57	49.59
	<i>Average</i>	<i>533</i>	<i>7,729</i>	<i>15</i>	<i>0.70</i>	<i>0.23</i>	<i>18.74</i>	<i>47.24</i>
	<i>Standard Deviation</i>	<i>192</i>	<i>2,779</i>	<i>3</i>	<i>0.05</i>	<i>0.03</i>	<i>19.34</i>	<i>9.83</i>
	DC-02-B1	116	1,681	7	0.39	0.23	8.62	1.72
	DC-02-B2	8	116	3	0.63	0.89	0.00	0.00
	DC-02-B3	11	159	3	0.43	0.58	0.00	0.00
	<i>Average</i>	<i>45</i>	<i>652</i>	<i>4</i>	<i>0.48</i>	<i>0.57</i>	<i>2.87</i>	<i>0.57</i>
	<i>Standard Deviation</i>	<i>50</i>	<i>728</i>	<i>2</i>	<i>0.10</i>	<i>0.27</i>	<i>4.06</i>	<i>0.81</i>
	DC-03-B1	64	928	2	0.12	0.57	0.00	93.75
	DC-03-B2	48	696	4	0.69	0.82	0.00	41.67
	DC-03-B3	8	116	1	0.00	1.00	0.00	0.00
	<i>Average</i>	<i>40</i>	<i>580</i>	<i>2</i>	<i>0.27</i>	<i>0.79</i>	<i>0.00</i>	<i>45.14</i>
	<i>Standard Deviation</i>	<i>24</i>	<i>341</i>	<i>1</i>	<i>0.30</i>	<i>0.18</i>	<i>0.00</i>	<i>38.35</i>
DC-04-B1	27	391	6	0.49	0.32	3.70	7.41	
DC-04-B2	301	4,362	6	0.31	0.24	0.33	6.64	
DC-04-B3	201	2,913	6	0.64	0.46	0.00	7.96	
<i>Average</i>	<i>176</i>	<i>2,556</i>	<i>6</i>	<i>0.48</i>	<i>0.34</i>	<i>1.34</i>	<i>7.34</i>	
<i>Standard Deviation</i>	<i>113</i>	<i>1,641</i>	<i>0</i>	<i>0.13</i>	<i>0.09</i>	<i>1.67</i>	<i>0.54</i>	
Genessee Lake	GL-B1	505	7,319	11	0.79	0.43	1.98	34.06
	GL-B2	169	2,449	8	0.71	0.43	0.00	13.02
	GL-B3	125	1,812	10	0.81	0.52	10.40	36.00
	<i>Average</i>	<i>266</i>	<i>3,860</i>	<i>10</i>	<i>0.77</i>	<i>0.46</i>	<i>4.13</i>	<i>27.69</i>
	<i>Standard Deviation</i>	<i>170</i>	<i>2,460</i>	<i>1</i>	<i>0.04</i>	<i>0.04</i>	<i>4.51</i>	<i>10.41</i>
Pakwash Lake	PKD-B1	136	1,971	9	0.77	0.48	31.62	32.35
	PKD-B2	134	1,942	10	0.80	0.50	21.64	33.58
	PKD-B3	217	3,145	10	0.76	0.41	14.74	23.96
	PKD-B4	203	2,942	9	0.77	0.47	36.45	30.54
	PKD-B5	426	6,174	8	0.78	0.58	20.66	35.68
	<i>Average</i>	<i>223</i>	<i>3,235</i>	<i>9</i>	<i>0.78</i>	<i>0.49</i>	<i>25.02</i>	<i>31.22</i>
	<i>Standard Deviation</i>	<i>107</i>	<i>1,549</i>	<i>1</i>	<i>0.02</i>	<i>0.05</i>	<i>7.88</i>	<i>4.00</i>
	PKS-B1	66	957	7	0.73	0.54	34.85	25.76
	PKS-B2	44	638	8	0.80	0.63	11.36	36.36
	PKS-B3	190	2,754	13	0.78	0.35	30.00	19.47
PKS-B4	154	2,232	10	0.73	0.38	33.77	20.13	
PKS-B5	50	725	7	0.78	0.65	42.00	24.00	
<i>Average</i>	<i>101</i>	<i>1,461</i>	<i>9</i>	<i>0.77</i>	<i>0.51</i>	<i>30.40</i>	<i>25.14</i>	
<i>Standard Deviation</i>	<i>60</i>	<i>865</i>	<i>2</i>	<i>0.03</i>	<i>0.13</i>	<i>10.28</i>	<i>6.08</i>	



Waterbody	Station	Total Abundance	TID	Total Taxa Richness	Simpsons Diversity	Simpsons Evenness	% EPT	% Chironomids
Unnamed Waterbody 1	WB-1-B1	1,120	16,232	12	0.66	0.24	4.29	55.71
	WB-1-B2	177	2,565	3	0.17	0.40	0.00	90.40
	WB-1-B3	3,296	47,768	5	0.44	0.35	0.00	73.79
	Average	1,531	22,188	7	0.42	0.33	1.43	73.30
	Standard Deviation	1,306	18,929	4	0.20	0.07	2.02	14.17
Unnamed Waterbody 2	WB-2-B1	5	72	2	0.32	0.74	0.00	0.00
	WB-2-B2	3	43	1	0.00	1.00	0.00	0.00
	WB-2-B3	1	14	1	0.00	1.00	0.00	0.00
	Average	3	43	1	0.11	0.91	0.00	0.00
	Standard Deviation	2	24	0	0.15	0.12	0.00	0.00
Unnamed Waterbody 3	WB-3-B1	627	9,087	13	0.69	0.25	17.86	51.04
	WB-3-B2	292	4,232	14	0.72	0.26	21.92	49.32
	WB-3-B3	401	5,812	11	0.74	0.35	3.99	47.88
	Average	440	6,377	13	0.72	0.28	14.59	49.41
	Standard Deviation	140	2,022	1	0.02	0.04	7.68	1.29
Unnamed Waterbody 6	WB-6-B1	32	464	5	0.74	0.78	0.00	25.00
	WB-6-B2	325	4,710	9	0.69	0.36	1.23	35.69
	WB-6-B3	266	3,855	10	0.62	0.26	9.40	56.39
	Average	208	3,010	8	0.68	0.47	3.54	39.03
	Standard Deviation	127	1,834	2	0.05	0.22	4.17	13.03
Unnamed Watercourse 3B	WC-3B-B1	216	3,130	7	0.73	0.53	0.00	14.81
	WC-3B-B2	221	3,203	7	0.21	0.18	0.00	1.81
	WC-3B-B3							
	Average	219	3,167	7	0.47	0.36	0.00	8.31
	Standard Deviation	3	36	0	0.26	0.18	0.00	6.50
Unnamed Watercourse 4	WC-4-B1	689	9,986	19	0.66	0.16	8.70	51.09
	WC-4-B2	188	2,725	13	0.85	0.52	6.39	14.89
	WC-4-B3	722	10,464	14	0.78	0.32	28.81	32.13
	Average	533	7,725	15	0.76	0.33	14.63	32.70
	Standard Deviation	244	3,541	3	0.08	0.15	10.07	14.78
Unnamed Watercourse 5	WC-5-B1	513	7,435	10	0.78	0.45	0.00	21.83
	WC-5-B2	1,244	18,029	14	0.66	0.21	0.64	26.05
	WC-5-B3	1,569	22,739	11	0.59	0.22	0.00	21.67
	Average	1,109	16,068	12	0.67	0.29	0.21	23.18
	Standard Deviation	442	6,400	2	0.08	0.11	0.30	2.03
Unnamed Watercourse 6A-US	WC-6A-US-B1	2,018	29,246	9	0.73	0.41	0.00	23.79
	WC-6A-US-B2	737	10,681	6	0.68	0.52	0.00	30.39
	WC-6A-US-B3	2,641	38,275	7	0.64	0.40	0.00	45.44
	Average	1,799	26,068	7	0.68	0.44	0.00	33.21
	Standard Deviation	793	11,487	1	0.04	0.05	0.00	9.06
Unnamed Watercourse 6B	WC-6B-B1	1,080	15,652	9	0.55	0.25	0.00	57.78
	WC-6B-B2	640	9,275	5	0.46	0.37	0.00	68.75
	WC-6B-B3							
	Average	860	12,464	7	0.51	0.31	0.00	63.27
	Standard Deviation	220	3,188	2	0.05	0.06	0.00	5.49
Unnamed Watercourse 6B-01	WC-6B-01-B1	1,443	20,913	11	0.65	0.26	0.00	51.00
	WC-6B-01-B2	2,232	32,348	12	0.60	0.21	1.80	54.84
	WC-6B-01-B3	1,728	25,043	9	0.62	0.29	3.70	52.31
	Average	1,801	26,101	11	0.62	0.25	1.83	52.72
	Standard Deviation	326	4,728	1	0.02	0.03	1.51	1.59
Unnamed Watercourse 6C	WC-6C-B1	6,688	96,928	13	0.45	0.14	3.83	72.73
	WC-6C-B2	1,810	26,232	11	0.71	0.31	1.77	29.17
	WC-6C-B3	1,616	23,420	10	0.68	0.31	10.89	22.77
	Average	3,371	48,860	11	0.61	0.26	5.50	41.56
	Standard Deviation	2,347	34,008	1	0.12	0.08	3.91	22.20
Unnamed Watercourse 7	WC-7-B1	516	7,478	9	0.79	0.53	10.08	29.46
	WC-7-B2	399	5,783	11	0.67	0.28	9.52	14.04
	WC-7-B3	342	4,957	9	0.69	0.36	1.46	51.46
	Average	419	6,072	10	0.72	0.39	7.02	31.65
	Standard Deviation	72	1,050	1	0.05	0.10	3.94	15.36
Unnamed Watercourse 8	WC-8-B1	1,965	28,478	11	0.51	0.19	7.33	68.40
	WC-8-B2	2,514	36,435	14	0.65	0.20	7.00	56.01
	WC-8-B3	829	12,014	12	0.82	0.45	7.72	32.33
	Average	1,769	25,643	12	0.66	0.28	7.35	52.25
	Standard Deviation	702	10,169	1	0.12	0.12	0.29	14.96

Notes:

TID = Total Invertebrate Density

EPT = Ephemeroptera, Plecoptera, and Trichoptera (mayflies, stoneflies, and caddisflies)



Table D2-3: Summary of Benthic Invertebrate Community Descriptors from 2024 Sampling

Waterbody	Station	Total Abundance	TID	Total Taxa Richness	Simpsons Diversity	Simpsons Evenness	% EPT	% Chironomids
Chukuni River	CR-REF-B1	217	3,145	8	0.79	0.58	14.74	27.65
	CR-REF-B2	171	2,478	8	0.62	0.33	4.68	46.78
	CR-REF-B3	323	4,681	17	0.80	0.30	17.04	31.58
	CR-REF-B4	109	1,580	9	0.64	0.31	5.50	54.13
	CR-REF-B5	769	11,145	14	0.79	0.34	24.44	22.89
	<i>Average</i>	<i>318</i>	<i>4,606</i>	<i>11</i>	<i>0.73</i>	<i>0.37</i>	<i>13.28</i>	<i>36.61</i>
	<i>Standard Deviation</i>	<i>236</i>	<i>3,423</i>	<i>4</i>	<i>0.08</i>	<i>0.11</i>	<i>7.42</i>	<i>11.87</i>
	CR-FDP-B1	86	1,246	10	0.82	0.56	13.96	22.09
	CR-FDP-B2	229	3,319	13	0.71	0.27	15.29	47.60
	CR-FDP-B3	205	2,971	7	0.43	0.25	0.00	9.76
	CR-FDP-B4	53	768	9	0.84	0.69	0.00	26.42
	CR-FDP-B5	168	2,435	12	0.80	0.41	10.12	16.67
	<i>Average</i>	<i>148</i>	<i>2,148</i>	<i>10</i>	<i>0.72</i>	<i>0.44</i>	<i>7.87</i>	<i>24.51</i>
	<i>Standard Deviation</i>	<i>68</i>	<i>985</i>	<i>2</i>	<i>0.15</i>	<i>0.17</i>	<i>6.65</i>	<i>12.82</i>
	CR-DS-B1	91	1,319	5	0.74	0.78	0.00	19.78
CR-DS-B2	124	1,797	6	0.78	0.76	0.00	16.13	
CR-DS-B3	52	754	2	0.26	0.68	0.00	84.62	
CR-DS-B4	136	1,971	7	0.77	0.62	0.00	17.65	
CR-DS-B5	80	1,159	6	0.72	0.60	0.00	30.00	
<i>Average</i>	<i>97</i>	<i>1,400</i>	<i>5</i>	<i>0.66</i>	<i>0.69</i>	<i>0.00</i>	<i>33.64</i>	
<i>Standard Deviation</i>	<i>30</i>	<i>440</i>	<i>2</i>	<i>0.20</i>	<i>0.07</i>	<i>0.00</i>	<i>25.95</i>	
Genessee Lake	GL-B1	91	1,319	5	0.74	0.78	0.00	19.78
	GL-B2	124	1,797	6	0.78	0.76	0.00	16.13
	GL-B3	52	754	2	0.26	0.68	0.00	84.62
	<i>Average</i>	<i>89</i>	<i>1,290</i>	<i>4</i>	<i>0.60</i>	<i>0.74</i>	<i>0.00</i>	<i>40.18</i>
	<i>Standard Deviation</i>	<i>29</i>	<i>426</i>	<i>2</i>	<i>0.24</i>	<i>0.05</i>	<i>0.00</i>	<i>31.46</i>
Pakwash Lake	PKL-N-B1	82	1,188	12	0.81	0.45	35.37	23.17
	PKL-N-B2	124	1,797	12	0.80	0.42	29.03	32.26
	PKL-N-B3	166	2,406	10	0.76	0.41	18.68	40.96
	<i>Average</i>	<i>124</i>	<i>1,797</i>	<i>11</i>	<i>0.79</i>	<i>0.43</i>	<i>27.69</i>	<i>32.13</i>
	<i>Standard Deviation</i>	<i>34</i>	<i>497</i>	<i>1</i>	<i>0.02</i>	<i>0.01</i>	<i>6.88</i>	<i>7.26</i>
	PKL-C-B1	76	1,101	10	0.81	0.52	35.53	21.05
	PKL-C-B2	74	1,072	12	0.67	0.25	17.56	54.05
	PKL-C-B3	91	1,319	9	0.71	0.39	2.20	6.59
	<i>Average</i>	<i>80</i>	<i>1,164</i>	<i>10</i>	<i>0.73</i>	<i>0.39</i>	<i>18.43</i>	<i>27.23</i>
	<i>Standard Deviation</i>	<i>8</i>	<i>110</i>	<i>1</i>	<i>0.06</i>	<i>0.11</i>	<i>13.62</i>	<i>19.86</i>
PKL-S-B1	61	884	9	0.68	0.35	40.98	39.34	
PKL-S-B2	23	333	8	0.78	0.57	39.13	26.09	
PKL-S-B3	166	2,406	12	0.63	0.22	56.62	21.69	
<i>Average</i>	<i>83</i>	<i>1,208</i>	<i>10</i>	<i>0.70</i>	<i>0.38</i>	<i>45.58</i>	<i>29.04</i>	
<i>Standard Deviation</i>	<i>60</i>	<i>876</i>	<i>2</i>	<i>0.06</i>	<i>0.14</i>	<i>7.85</i>	<i>7.50</i>	
Unnamed Waterbody 6	WB-6-B1	350	5,072	9	0.64	0.31	0.00	57.14
	WB-6-B2	172	2,493	12	0.74	0.31	1.16	46.51
	WB-6-B3	268	3,884	10	0.77	0.43	2.98	41.79
	<i>Average</i>	<i>263</i>	<i>3,816</i>	<i>10</i>	<i>0.71</i>	<i>0.35</i>	<i>1.38</i>	<i>48.48</i>
	<i>Standard Deviation</i>	<i>73</i>	<i>1,054</i>	<i>1</i>	<i>0.05</i>	<i>0.06</i>	<i>1.23</i>	<i>6.42</i>

Notes:

TID = Total Invertebrate Density

EPT = Ephemeroptera, Plecoptera, and Trichoptera (mayflies, stoneflies, and caddisflies)



Table D2-4: 2022 BIC Indices Statistical Comparison (Dixie Creek)

Total Invertebrate Density (log transformed)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	12.382	3	4.13	24.33	0.0002	Y	DC-01>DC-02
Error	1.357	8	0.17				DC-01>DC-03
							DC-01>DC-04
Taxa Richness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	117.7	3	39.22	5.41	0.0251	Y	DC-03>DC-04
Error	58	8	7.25				DC-01>DC-04
Evenness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.031		0.010	4.35	0.0428	Y	DC-03>DC-02
Error	0.019		0.002				DC-04>DC-02
Simpsons Diversity							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.067	3	0.022	12.56	0.0022	Y	DC-03>DC-04
Error	0.014	8	0.002				DC-03>DC-02
							DC-01>DC-02
Percent Chironomids							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	944.4	3	314.8	4.85	0.033	Y	DC-02>DC-03
Error	519.3	8	64.91				
Percent EPT							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	1576.8	3	525.6	8.03	0.0085	Y	DC-03>DC-01
Error	523.5	8	65.4				DC-03>DC-02
							DC-03>DC-04
Bray-Curtis Index (dbRDA analysis)							
R ²	Adjusted R ²	F value	p-value	p<0.10	Site Comparison		
0.7349	0.67	11.09	0.05	Y	DC-01≠DC-02		
0.6208	0.53	6.55	0.12	N	DC-01=DC-03		
0.7695	0.71	13.35	0.07	Y	DC-01≠DC-04		
0.5546	0.44	4.98	0.09	Y	DC-02≠DC-03		
0.4375	0.30	3.11	0.10	N	DC-04=DC-02		
0.5546	0.44	4.98	0.09	Y	DC-04≠DC-03		

Notes:

- "dbRDA" represents distance based redundancy analysis
- "df" represents degrees of freedom
- "SS" represents sums of squares
- "MS" represents mean square
- "F" statistic represents the between / within group variability
- "p-value" represents the level of marginal significance within a statistical hypothesis test
- "p<0.10" indicated significance of test for null hypothesis (equal means) at an α of 0.10
- "BIC" represents benthic invertebrate community
- Only significant post-hoc comparisons are listed



Table D2-5: 2022 BIC Indices Statistical Comparison (CR-REF vs. CR-DS, CR-FDP)

Total Invertebrate Density							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	1.39E+07	2	6.95E+06	4.818	0.029	Y	CR-REF>CR-FDP
Error	1.73E+07	12	1.44E+06				
Taxa Richness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	24.4	2	12.2	1.262	0.318	N	
Error	116	12	9.7				
Evenness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.065	2	0.032	4.326	0.039	Y	CR-REF<CR-DS
Error	0.090	12	0.007				
Simpsons Diversity							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.048	2	0.024	3.097	0.082	Y	CR-REF<CR-DS
Error	0.094	12	0.008				
Percent Chironomids							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	383.1	2	191.6	2.277	0.145	N	
Error	1009.3	12	84.1				
Percent EPT							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	3748	2	1873.8	21.260	<0.001	Y	CR-REF>CR-FDP
Error	1058	12	88.1				CR-REF>CR-DS
Bray-Curtis Index (dbRDA analysis)							
R ²	Adjusted R ²	F value	p-value	p<0.10	Site Comparison		
0.484	0.419	7.499	0.007	Y	CR-REF vs. CR-DS		
0.374	0.295	4.770	0.020	Y	CR-REF vs. CR-FDP		

Notes:

- "dbRDA" represents distance based redundancy analysis
- "df" represents degrees of freedom
- "SS" represents sums of squares
- "MS" represents mean square
- "F" statistic represents the between / within group variability
- "p-value" represents the level of marginal significance within a statistical hypothesis test
- "p<0.10" indicated significance of test for null hypothesis (equal means) at an α of 0.10
- "BIC" represents benthic invertebrate community
- Only significant post-hoc comparisons are listed



Table D2-6: 2023 BIC Indices Statistical Comparison (Dixie Creek)

Total Invertebrate Density (log transformed)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	18.5	3	6.17	4.611	0.0373	Y	DC-01>DC-02
Error	10.7	8	1.34				DC-01>DC-03
Taxa Richness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	281.58	3	93.86	18.17	0.000626	Y	DC-01>DC-02
Error	41.33	8	5.17				DC-01>DC-03
							DC-01>DC-04
Evenness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.560	3	0.187	4.40	0.0417	Y	DC-01>DC-03
Error	0.339	8	0.042				
Simpsons Diversity							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.282	3	0.094	2.04	0.187	N	
Error	0.368	8	0.046				
Percent Chironomids (log transformed)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	19.59	3	6.529	4.135	0.0481	Y	DC-01>DC-02
Error	12.63	8	1.579				
Percent EPT (non-parametric test)							
Source of Variation	CS	df	MS	F	P-value	p<0.1	Direction
Between Groups	6.3254	3			0.1	Y	DC-01>DC-03
Bray-Curtis Index (dbRDA analysis)							
R ²	Adjusted R ²	F value	p-value	p<0.10	Site Comparison		
0.450	0.312	3.270	0.05	Y	DC-01#DC-02		
0.451	0.314	3.291	0.09	Y	DC-01#DC-03		
0.492	0.366	3.880	0.09	Y	DC-01#DC-04		
0.341	0.176	2.070	0.09	Y	DC-04#DC-02		
0.187	-0.016	0.921	0.58	N	DC-04=DC-03		

Notes:

- "dbRDA" represents distance based redundancy analysis
- "df" represents degrees of freedom
- "SS" represents sums of squares
- "CS" represents chi-squared
- "MS" represents mean square
- "F" statistic represents the between / within group variability
- "p-value" represents the level of marginal significance within a statistical hypothesis test
- "p<0.10" indicated significance of test for null hypothesis (equal means) at an α of 0.10
- "BIC" represents benthic invertebrate community
- Only significant post-hoc comparisons are listed



Table D2-7: 2022 BIC Indices Statistical Comparison (CR-REF vs. CR-DS, CR-FDP)

Total Invertebrate Density							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	6.55E+05	2	3.27E+05	0.817	0.465	N	
Error	4.81E+06	12	4.01E+05				
Taxa Richness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	5.73	2	2.867	0.761	0.488	N	
Error	45.2	12	3.8				
Evenness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.001	2	0.001	0.053	0.949	N	
Error	0.119	12	0.010				
Simpsons Diversity							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.005	2	0.002	0.156	0.857	N	
Error	0.180	12	0.015				
Percent Chironomids							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	1101	2	550.5	2.204	0.153	N	
Error	2998	12	249.8				
Percent EPT (log transformed)							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	3.101	2	1.55	0.986	0.4020	N	
Error	18.876	12	1.573				
Bray-Curtis Index (dbRDA analysis)							
R ²	Adjusted R ²	F value	p-value	p<0.10	Site Comparison		
0.000	-0.125	0.000	0.900	N	CR-REF vs. CR-DS		
0.077	-0.038	0.670	0.544	N	CR-REF vs. CR-FDP		

Notes:

- "dbRDA" represents distance based redundancy analysis
- "df" represents degrees of freedom
- "SS" represents sums of squares
- "MS" represents mean square
- "F" statistic represents the between / within group variability
- "p-value" represents the level of marginal significance within a statistical hypothesis test
- "p<0.10" indicated significance of test for null hypothesis (equal means) at an α of 0.10
- "BIC" represents benthic invertebrate community
- Only significant post-hoc comparisons are listed



Table D2-8: 2024 BIC Indices Statistical Comparison (CR-REF vs. CR-DS, CR-FDP)

Total Invertebrate Density ** Log Transformed							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	2.644	2	1.32	3.658	0.058	Y	CR-REF>CR-DS
Error	4.338	12	0.36				
Taxa Richness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	103.3	2	51.67	5.939	0.0161	Y	CR-REF>CR-DS
Error	104.4	12	8.7				CR-FDP>CR-DS
Evenness							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.279	2	0.140	7.480	0.008	Y	CR-REF>CR-DS
Error	0.224	12	0.019				CR-FDP>CR-DS
Simpsons Diversity ** Log Transformed							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	0.017	2	0.008	0.288	0.755	N	
Error	0.344	12	0.029				
Percent Chironomids							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	398	2	198.8	0.487	0.626	N	
Error	4892	12	407.7				
Percent EPT ** Log Transformed							
Source of Variation	SS	df	MS	F	P-value	p<0.1	Direction
Between Groups	15.98	2	7.988	9.444	0.0034	Y	CR-REF>CR-DS
Error	10.15	12	0.846				CR-FDP>CR-DS

Notes:

- "dbRDA" represents distance based redundancy analysis
- "df" represents degrees of freedom
- "SS" represents sums of squares
- "MS" represents mean square
- "F" statistic represents the between / within group variability
- "p-value" represents the level of marginal significance within a statistical hypothesis test
- "p<0.10" indicated significance of test for null hypothesis (equal means) at an α of 0.10
- "BIC" represents benthic invertebrate community
- Only significant post-hoc comparisons are listed

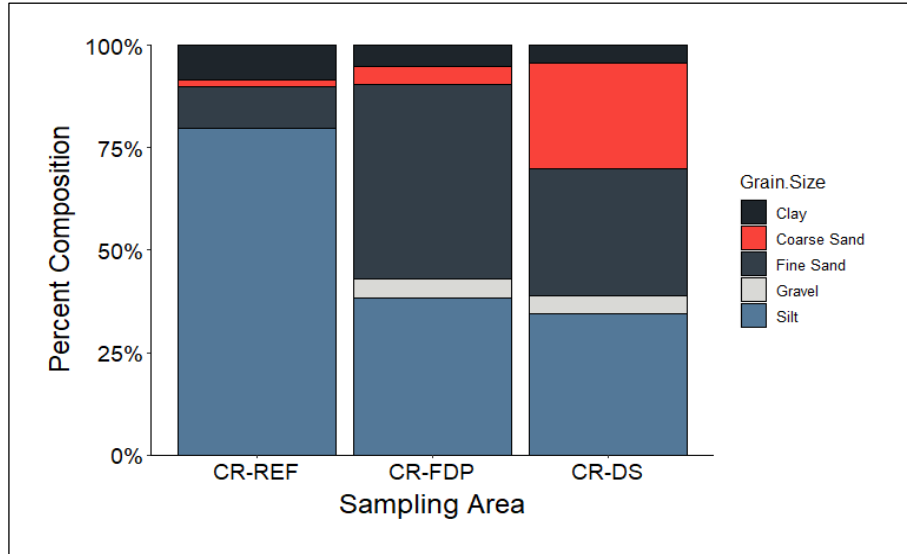


Figure D1-1: Mean Percent Composition of Sediment Grain Size Groupings at Chukuni River Sampling Areas (2023)

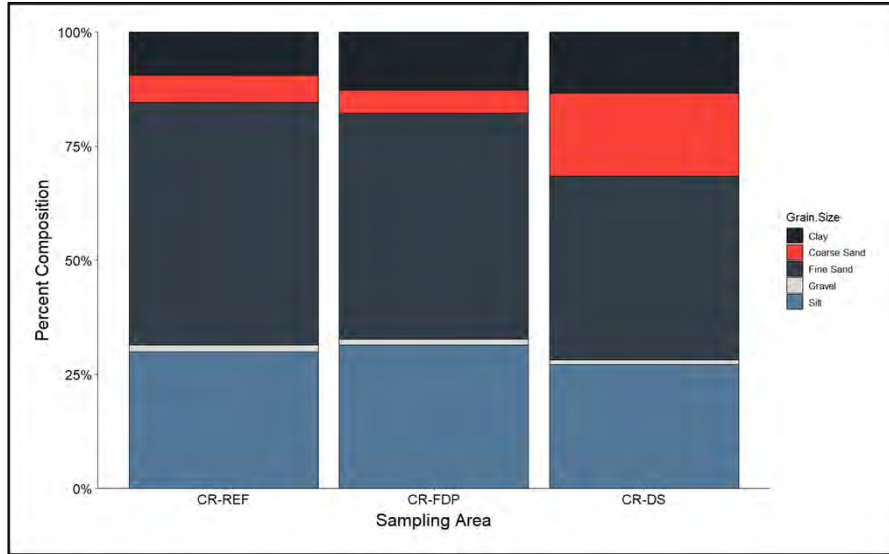


Figure D1-1: Mean Percent Composition of Sediment Grain Size Groupings at Chukuni River Sampling Areas (2024)

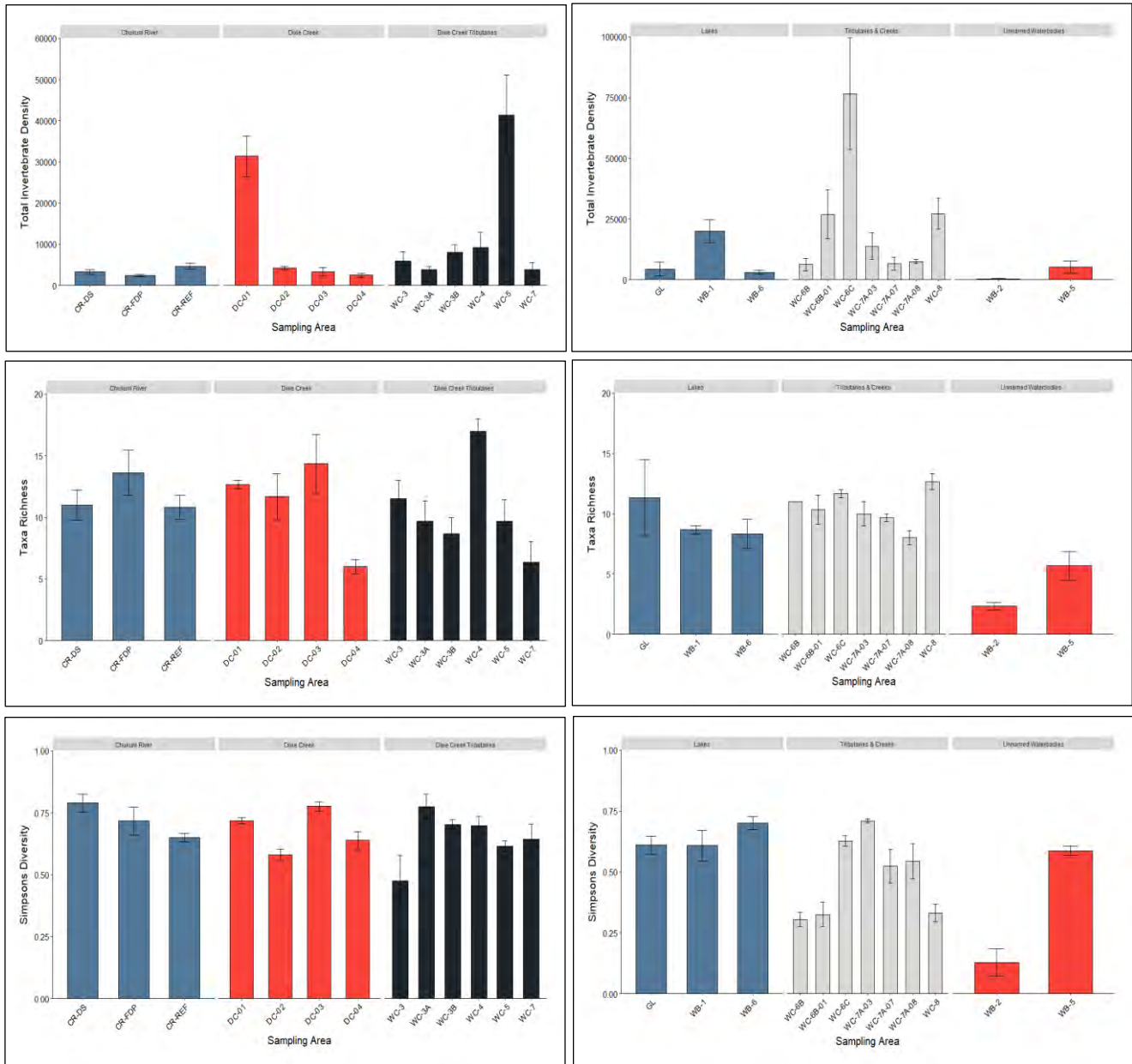


Figure D2-1: Histograms of Mean Benthic Invertebrate Community Descriptors (± standard error; 2022)

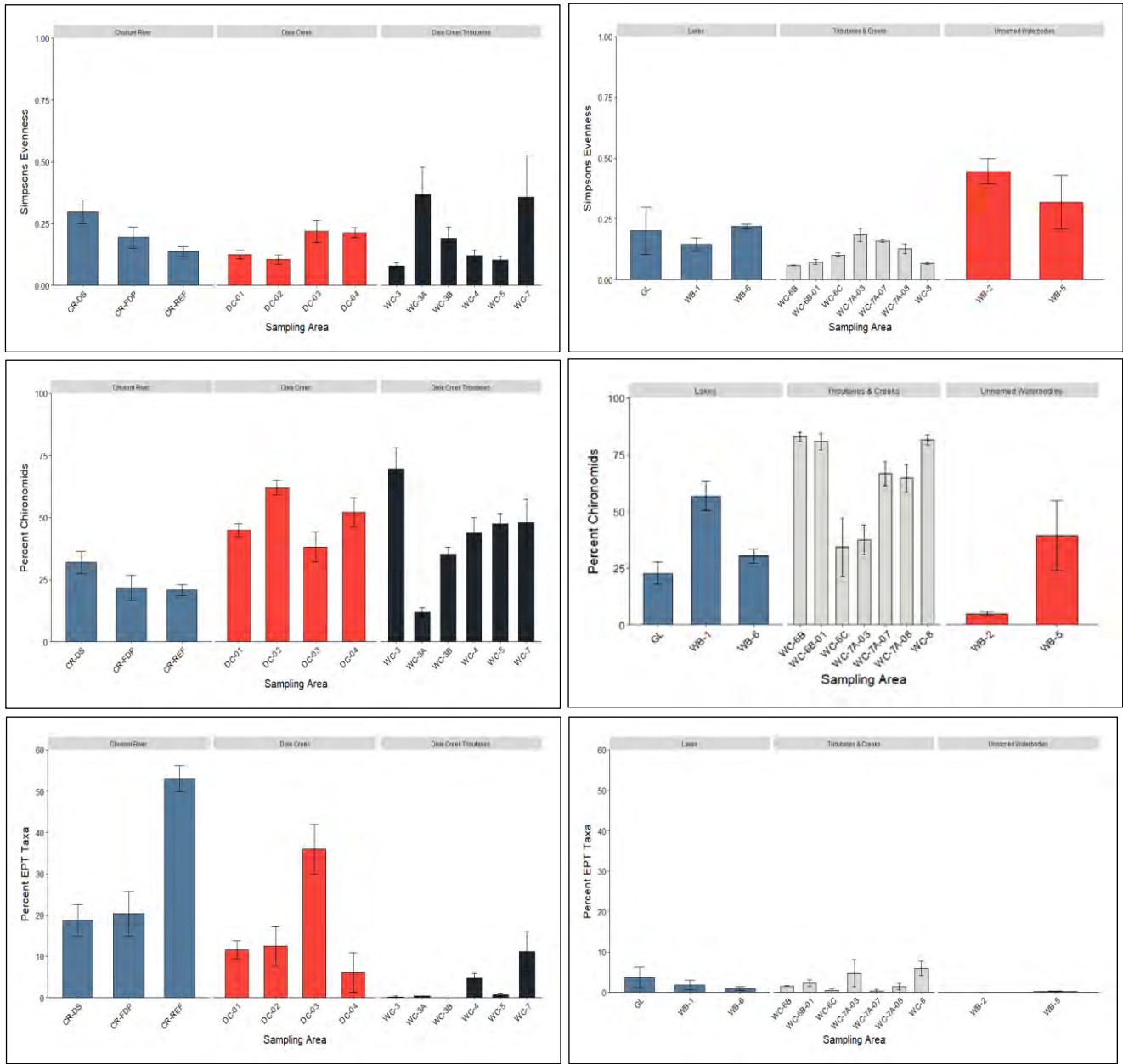


Figure D2-2: Histograms of Mean Benthic Invertebrate Community Descriptors (± standard error; 2022)

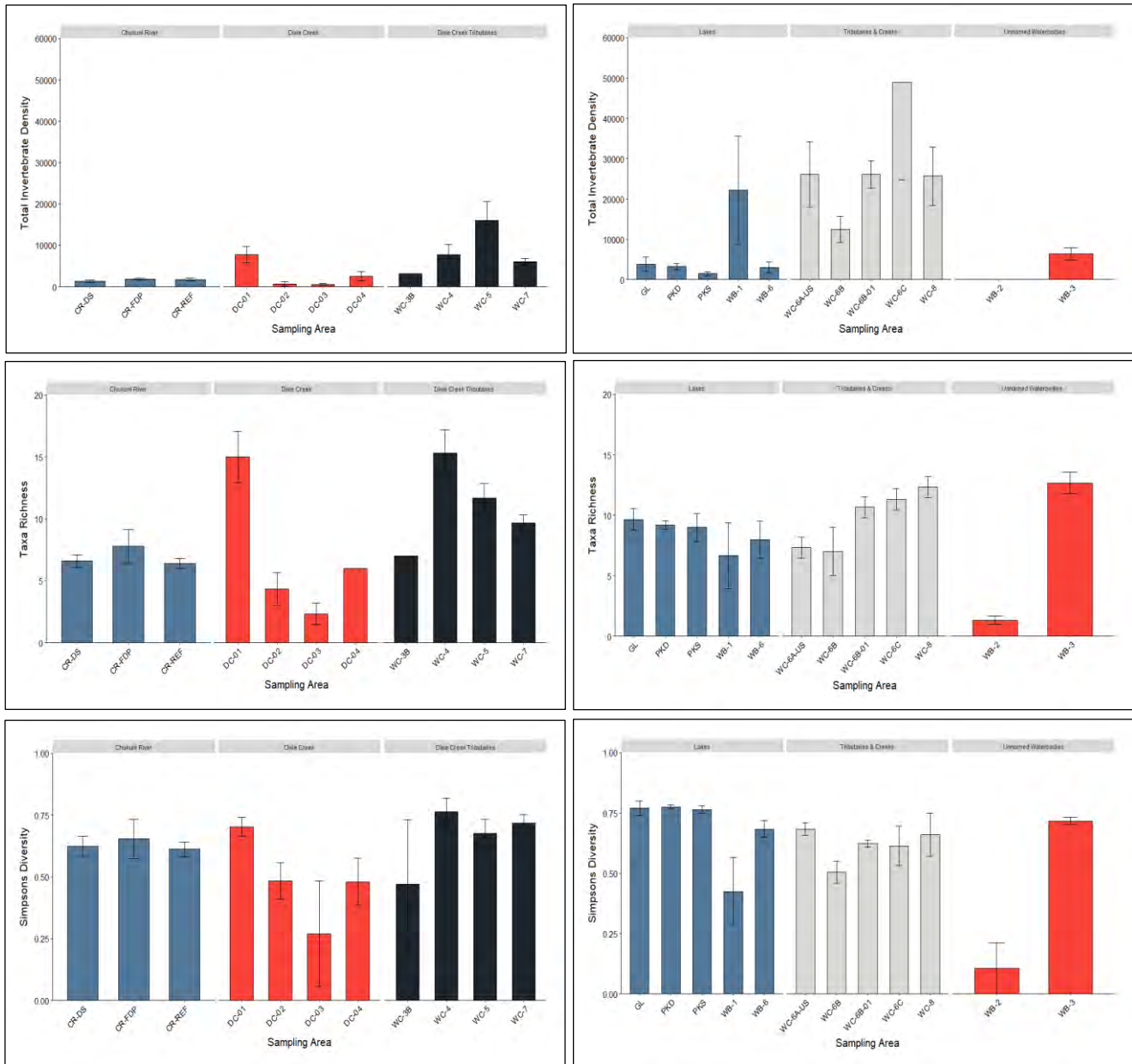


Figure D2-3: Histograms of Mean Benthic Invertebrate Community Descriptors (\pm standard error; 2023)

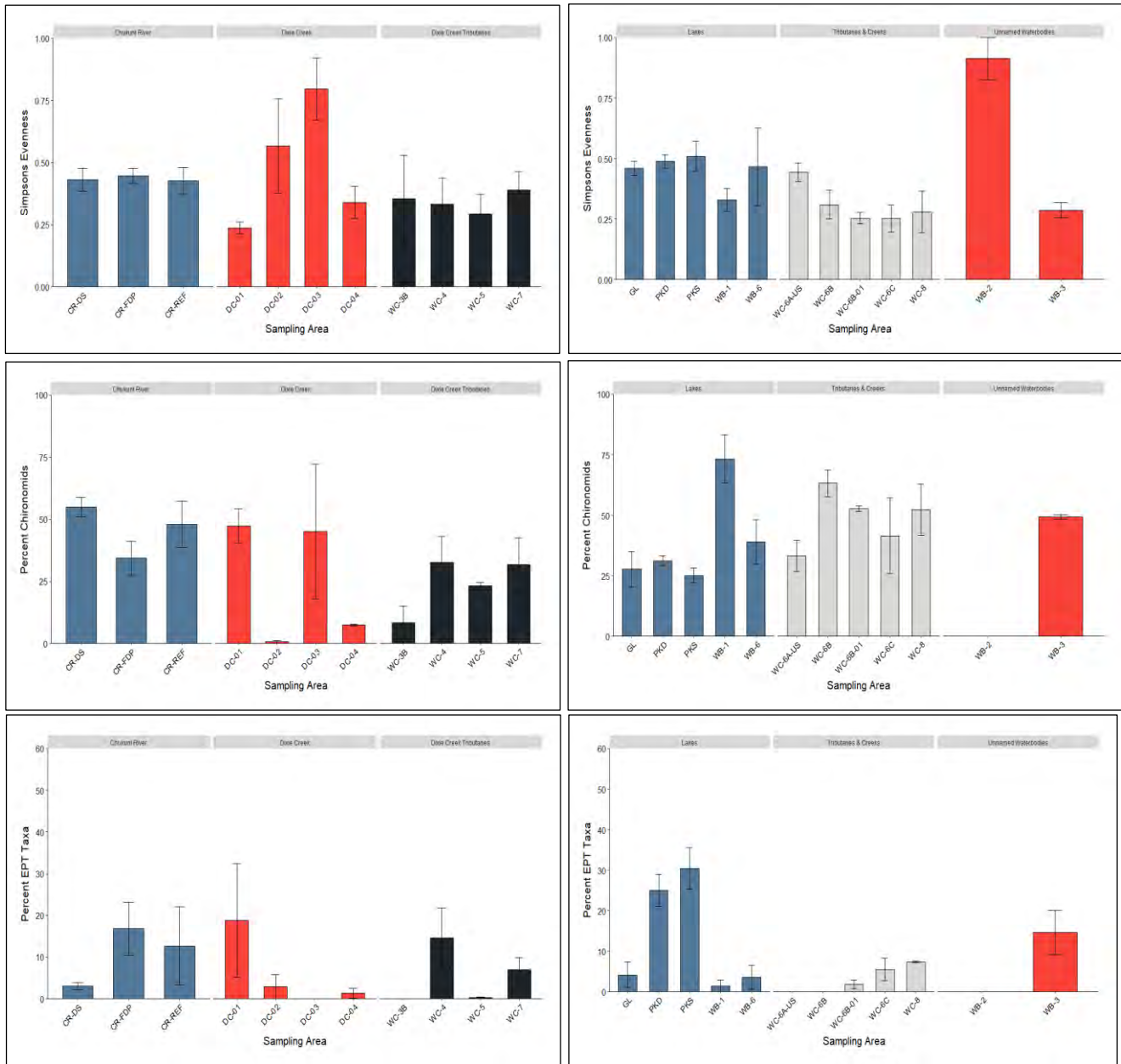


Figure D2-4: Histograms of Mean Benthic Invertebrate Community Descriptors (± standard error; 2023)

Appendix E

Quality Assurance and Quality Control

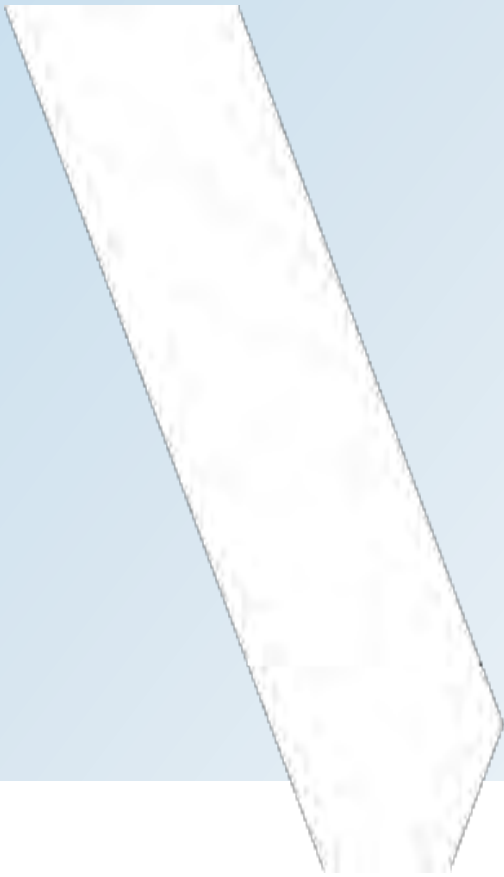




Table E1-1: 2022 Sediment Quality Assurance and Quality Control Table

Parameter	Client Sample ID		SED-DUP-01	DC04-S03	Meets RPD Detection Limit Trigger?	RPD (%)	SED-DUP-02	CR-REF-S04	Meets RPD Detection Limit Trigger?	RPD (%)
	Lowest Detection Limit	Units	25-Oct-2022	25-Oct-2022			29-Oct-22	29-Oct-22		
			Sediment	Sediment			Sediment	Sediment		
Physical Tests										
Moisture Content	0.1	%	45.20	47	YES	2.84	51.0	51.2	YES	0.39
Loss on Ignition @ 550 C	1	%	7.41	7.26	YES	2.04	6.9	7.25	YES	4.95
pH (1:2 soil:water)	0.05	pH units	5.72	5.71	YES	0.17	5.8	5.9	YES	1.19
Particle Size										
Gravel (4.75mm - 3in.)	1.0	%		0.2				0		
Coarse Sand (2.0mm - 4.75mm)	1.0	%		3.2				1.7		
Fine Sand (0.075mm - 0.425mm)	1.0	%		14.8				21.2		
Silt (0.002mm - 0.075mm)	1.0	%		72.5				69.3		
Clay (<0.002mm)	1.0	%		9.3				7.8		
Nutrients & Organics										
Total Kjeldahl Nitrogen	0.02	%	0.1	0.1	YES	11.76	0.1	0.1	YES	47.62
Total Organic Carbon	0.10	%	5.500	4.8	YES	13.59	5.3	5.2	YES	1.90
Metals										
Aluminum (Al)	1	mg/kg	7200	6400	YES	11.76	7700.0	6400.0	YES	18.44
Antimony (Sb)	0.80	mg/kg	< 0.8	< 0.8	NO		< 0.8	< 0.8	NO	
Arsenic (As)	0.50	mg/kg	2.10	2	YES	15.38	13.0	10.0	YES	26.09
Barium (Ba)	0.10	mg/kg	46.00	49.00	YES	6.32	52	53	YES	1.90
Beryllium (Be)	0.02	mg/kg	0.2	0.23	YES	4.44	0.3	0.2	YES	8.00
Bismuth (Bi)	0.09	mg/kg	0.12	0.1	NO		0.2	0.2	NO	
Boron (B)	1.0	mg/kg	2.00	3.00	NO		3.0	3.0	NO	
Cadmium (Cd)	0.050	mg/kg	0.14	0.14	NO		0.2	0.2	YES	5.13
Calcium (Ca)	3	mg/kg	4500.000	4400	YES	2.25	5200	4700	YES	10.10
Chromium (Cr)	0.50	mg/kg	20	19.000	YES	5.13	22.0	20.0	YES	9.52
Cobalt (Co)	0.01	mg/kg	5.1	5	YES	8.16	6.6	5.7	YES	14.63
Copper (Cu)	0.10	mg/kg	9.1	8.0	YES	12.87	24.0	20.0	YES	18.18
Iron (Fe)	1	mg/kg	10500	10400.0	YES	0.96	13400.0	12300.0	YES	8.56
Lead (Pb)	0.10	mg/kg	6	5	YES	19.23	8.3	6.4	YES	25.85
Lithium (Li)	2.0	mg/kg	12.0	12	YES	0.00	12.0	12.0	YES	0.00
Magnesium (Mg)	1	mg/kg	3000.0	3200.00	YES	6.45	3600.0	3500.0	YES	2.82
Manganese (Mn)	0.5	mg/kg	240	210.0	YES	13.33	270.0	230.0	YES	16.00
Mercury (Hg)	0.050	mg/kg	< 0.05	< 0.05	NO		< 0.05	< 0.05	NO	
Molybdenum (Mo)	0.10	mg/kg	0.200	0	NO		0.5	0.2	YES	85.71
Nickel (Ni)	0.50	mg/kg	12.0	11.00	YES	8.70	27.0	23.0	YES	16.00
Phosphorus (P)	3	mg/kg	620.0	630.0	YES	1.60	720.0	650.0	YES	10.22
Potassium (K)	4	mg/kg	790	760.0	YES	3.87	1200.0	1100.0	YES	8.70
Selenium (Se)	0.70	mg/kg	< 0.7	< 0.7	NO		< 0.7	< 0.7	NO	
Silicon (Si)	3.00	mg/kg	1100.00	2100	YES	62.50	1200	2600	YES	73.68
Sodium (Na)	1	mg/kg	95	110.00	YES	14.63	110.0	130.0	YES	16.67
Strontium (Sr)	0.10	mg/kg	14.0	12.00	YES	15.38	17.0	14.0	YES	19.35
Thallium (Tl)	0.020	mg/kg	0.090	0	YES	11.76	0.1	0.1	YES	20.00
Tin (Sn)	0.5	mg/kg	0.6	0.9	NO		0.7	0.8	NO	
Uranium (U)	0.002	mg/kg	0.80	1.5	YES	60.87	1.6	1.9	YES	17.14
Vanadium (V)	3.00	mg/kg	18.0	18.0	YES	0.00	20.0	19.0	YES	5.13
Yttrium (Y)	0.004	mg/kg	6.0	5.5	YES	8.70	7.7	6.3	YES	20.00
Zinc (Zn)	0.7	mg/kg	31.0	29.0	YES	6.67	43.0	37.0	YES	15.00

Notes

1. YES denotes that the average of the two sample concentrations was greater than 5x the requested detection limit (RDL)
2. < denotes values that were less than the RDL
3. Bold values indicate RPD values that were greater than 30%



Table E1-2: 2023 Sediment Quality Assurance and Quality Control Table

Client Sample ID			SED-DUP-01	WB-1-S2	Meets RPD Detection Limit Trigger?	RPD (%)	SED-DUP-02	WC-6B-01-S3	Meets RPD Detection Limit Trigger?	RPD (%)	SED-DUP-03	CR-DS-S3	Meets RPD Detection Limit Trigger?	RPD (%)	SED-DUP-04	PKD-S5	Meets RPD Detection Limit Trigger?	RPD (%)
Date Sampled			10-Sep-2023	10-Sep-2023			14-Sep-2023	14-Sep-2023			30-Sep-2023	30-Sep-2023			01-Oct-2023	01-Oct-2023		
Time Sampled			00:00	11:45			15:40	13:45			12:01	13:45			12:01	11:45		
Parameter	Lowest Detection Limit	Units	Sediment	Sediment			Sediment	Sediment			Sediment	Sediment			Sediment	Sediment		
Physical Tests																		
Moisture Content	0.25	%	88	89.7	YES	1.91	19.2	23.7	YES	20.98	41	41.2	YES	0.49	63	61.2	YES	2.90
Loss on Ignition @ 550 C	1	%	38.9	42.3	YES	8.37	<1.0	<1.0	NO		3	3.3	NO		8	8.3	YES	3.68
pH (1:2 soil:water)	0.10	pH units	5.92	5.97	YES	0.84	6.94	6.55	YES	5.78	6.66	6.54	YES	1.82	6.3	6.28	YES	0.32
Ash content @ 550 C	1.00	%	61.1	57.7	YES	5.72	99.2	99	YES	0.20	97	96.7	YES	0.31	91.9	91.7	YES	0.22
Nutrients & Organics																		
Total Kjeldahl Nitrogen	0.02	%	1.56	2.22	YES	34.92	0.03	0.036	NO		0.112	0.02	YES	139.39	0.325	0.294	YES	10.02
Total Organic Carbon	0.10	%	17.8	20	YES	11.64	0.83	0.62	YES	28.97	1	1.15	YES	13.95	3.3	3.87	YES	15.90
Organic Matter	0.20	%	30.7	34.5	YES	11.66	1.43	1.07	YES	28.80	1.72	1.98	YES	14.05	5.69	6.67	YES	15.86
Metals																		
Aluminum (Al)	50	mg/kg	8300	8310	YES	0.12	2660	2330	YES	13.23	4570	4250	YES	7.26	11400	10900	YES	4.48
Antimony (Sb)	0.10	mg/kg	0.2	0.24	NO		<0.10	<0.10	NO		<0.10	<0.10	NO		0.49	0.48	YES	2.06
Arsenic (As)	0.10	mg/kg	6.8	7.21	YES	5.85	1.55	1.28	YES	19.08	3.92	3.91	YES	0.26	14.3	13.1	YES	8.76
Barium (Ba)	0.50	mg/kg	50.6	54.8	YES	7.97	11.3	10.5	YES	7.34	23.1	24.1	YES	4.24	61.6	65.7	YES	6.44
Beryllium (Be)	0.10	mg/kg	0.26	0.23	NO		<0.10	<0.10	NO		0.14	0.13	NO		0.32	0.3	NO	
Bismuth (Bi)	0.20	mg/kg	<0.30	<0.30	NO		<0.20	<0.20	NO		<0.20	<0.20	NO		<0.20	<0.20	NO	
Boron (B)	5.0	mg/kg	<7.4	<7.5	NO		<5.0	<5.0	NO		<5.0	<5.0	NO		<5.0	<5.0	NO	
Cadmium (Cd)	0.020	mg/kg	0.505	0.506	YES	0.20	0.024	0.022	NO		0.047	0.05	NO		0.153	0.145	YES	5.37
Calcium (Ca)	50	mg/kg	6830	7230	YES	5.69	1720	1870	YES	8.36	3270	3100	YES	5.34	5910	5510	YES	7.01
Chromium (Cr)	0.50	mg/kg	17.5	18.2	YES	3.92	6.5	5.33	YES	19.78	13.8	13.1	YES	5.20	31	30.8	YES	0.65
Cobalt (Co)	0.10	mg/kg	5.2	5.09	YES	2.14	2.92	2.16	YES	29.92	3.54	3.53	YES	0.28	7.51	7.73	YES	2.89
Copper (Cu)	0.50	mg/kg	12.2	13.3	YES	8.63	1.8	2.44	YES	30.19	5.71	6.34	YES	10.46	17.8	18.4	YES	3.31
Iron (Fe)	50	mg/kg	8030	7990	YES	0.50	4010	3110	YES	25.28	7210	6740	YES	6.74	17500	16100	YES	8.33
Lead (Pb)	0.50	mg/kg	5.36	6.31	YES	16.28	1.68	2.39	YES	34.89	2.34	2.32	YES	0.86	6.1	6.13	YES	0.49
Lithium (Li)	2.0	mg/kg	6.8	7.2	YES	5.71	5.8	3.5	NO		7.1	5.9	YES	18.46	16.7	14.7	YES	12.74
Magnesium (Mg)	20	mg/kg	1990	2070	YES	3.94	1360	1000	YES	30.51	2310	2340	YES	1.29	5450	5320	YES	2.41
Manganese (Mn)	1.0	mg/kg	160	129	YES	21.45	130	65.2	YES	66.39	150	152	YES	1.32	458	464	YES	1.30
Mercury (Hg)	0.005	mg/kg	0.0972	0.0963	YES	0.93	0.0084	0.0113	NO		0.0105	0.0099	NO		0.0381	0.036	YES	5.67
Molybdenum (Mo)	0.10	mg/kg	0.62	0.78	YES	22.86	0.13	0.16	NO		0.18	0.17	NO		0.32	0.3	NO	
Nickel (Ni)	0.50	mg/kg	15.4	15.6	YES	1.29	3.94	3.15	YES	22.28	8.5	8.51	YES	0.12	23.4	24	YES	2.53
Phosphorus (P)	50	mg/kg	450	447	YES	0.67	324	327	YES	0.92	573	542	YES	5.56	789	759	YES	3.88
Potassium (K)	100	mg/kg	840	860	YES	2.35	200	190	NO		730	640	YES	13.14	1740	1620	YES	7.14
Selenium (Se)	0.20	mg/kg	1.1	1.21	YES	9.52	<0.20	<0.20	NO		<0.20	<0.20	NO		0.34	0.33	NO	
Silver (Ag)	0.10	mg/kg	<0.17	<0.16	NO		<0.10	<0.10	NO		<0.10	<0.10	NO		<0.10	<0.10	NO	
Sodium (Na)	50	mg/kg	89	103	NO		50	<50	NO		131	113	NO		225	214	YES	5.01
Strontium (Sr)	0.50	mg/kg	20.6	22.9	YES	10.57	7.55	8.3	YES	9.46	13	12.2	YES	6.35	24.4	22.4	YES	8.55
Sulfur (S)	1000	mg/kg	2200	2700	NO		<1000	<1000	NO		<1000	<1000	NO		<1000	<1000	NO	
Thallium (Tl)	0.050	mg/kg	0.096	0.102	NO		<0.050	<0.050	NO		0.059	0.059	NO		0.14	0.14	NO	
Tin (Sn)	2.0	mg/kg	<3.0	<3.0	NO		<2.0	<2.0	NO		<2.0	<2.0	NO		<2.0	<2.0	NO	
Titanium (Ti)	1.0	mg/kg	253	274	YES	7.97	383	429	YES	11.33	595	590	YES	0.84	896	845	YES	5.86
Tungsten (W)	0.5	mg/kg	<0.74	<0.75	NO		<0.50	<0.50	NO		<0.50	<0.50	NO		<0.50	<0.50	NO	
Uranium (U)	0.050	mg/kg	1.36	1.51	YES	10.45	0.738	0.709	YES	4.01	0.787	0.855	YES	8.28	1.65	1.74	YES	5.31
Vanadium (V)	0.20	mg/kg	15	15.3	YES	1.98	7.4	6.26	YES	16.69	14.8	14.5	YES	2.05	30.9	30.3	YES	1.96
Zinc (Zn)	2.0	mg/kg	61.1	67.6	YES	10.10	8.5	6.3	YES	29.73	18.3	18.9	YES	3.23	46.5	47.6	YES	2.34
Zirconium (Zr)	1.0	mg/kg	<1.5	<1.5	NO		<1.0	<1.0	NO		3.9	3.4	YES	13.70	5.6	5.9	YES	5.22

Notes:

1. YES denotes that the average of the two sample concentrations was greater than 5x the requested detection limit (RDL)

2. < denotes values that were less than the RDL

3. Bold values indicate RPD values that were greater than 30%



Table E1-2: 2023 Sediment Quality Assurance and Quality Control Table

Client Sample ID			SED-DUP-01	WB-1-S2	SED-DUP-05	PKS-S2	Meets RPD Detection Limit Trigger?	RPD (%)	SED-DUP-06	DC-01-S3	Meets RPD Detection Limit Trigger?	RPD (%)	SED-DUP-07	WB-6-S3	Meets RPD Detection Limit Trigger?	RPD (%)
Date Sampled			10-Sep-2023	10-Sep-2023	30-Sep-2023	30-Sep-2023			01-Oct-2023	01-Oct-2023			02-Oct-2023	02-Oct-2023		
Time Sampled			00:00	11:45	12:01	16:30			12:01	12:20			12:01	11:32		
Parameter	Lowest Detection Limit	Units	Sediment	Sediment	Sediment	Sediment		Sediment	Sediment				Sediment	Sediment		
Physical Tests																
Moisture Content	0.25	%	88	89.7	58.5	59.9	YES	2.36	49.4	49.7	YES	0.61	87.2	88.7	YES	1.71
Loss on Ignition @ 550 C	1	%	38.9	42.3	6.8	6.8	YES	0.00	7.9	6.2	YES	24.11	40.1	41.4	YES	3.19
pH (1:2 soil:water)	0.10	pH units	5.92	5.97	6.44	6.14	YES	4.77	6.32	6.4	YES	1.26	6.58	6.58	YES	0.00
Ash content @ 550 C	1.00	%	61.1	57.7	93.2	93.2	YES	0.00	92	93.8	YES	1.94	59.9	58.5	YES	2.36
Nutrients & Organics																
Total Kjeldahl Nitrogen	0.02	%	1.56	2.22	0.244	0.245	YES	0.41	0.227	0.158	YES	35.84	1.74	1.73	YES	0.58
Total Organic Carbon	0.10	%	17.8	20	2.92	3.13	YES	6.94	2.06	1.89	YES	8.61	18.4	19.5	YES	5.80
Organic Matter	0.20	%	30.7	34.5	5.03	5.4	YES	7.09	3.55	3.26	YES	8.52	31.7	33.6	YES	5.82
Metals																
Aluminum (Al)	50	mg/kg	8300	8310	10100	9940	YES	1.60	4760	6840	YES	35.86	12000	11600	YES	3.39
Antimony (Sb)	0.10	mg/kg	0.2	0.24	0.65	0.56	YES	14.88	<0.10	<0.10	NO	0.49	0.47	YES	4.17	
Arsenic (As)	0.10	mg/kg	6.8	7.21	13.8	12.5	YES	9.89	2.09	2.4	YES	13.81	11.7	12.3	YES	5.00
Barium (Ba)	0.50	mg/kg	50.6	54.8	58.9	57.2	YES	2.93	27	40.1	YES	39.05	81.2	77.9	YES	4.15
Beryllium (Be)	0.10	mg/kg	0.26	0.23	0.32	0.28	NO		0.12	0.19	NO	0.37	0.34	YES	8.45	
Bismuth (Bi)	0.20	mg/kg	<0.30	<0.30	<0.20	<0.20	NO		<0.20	<0.20	NO	<0.30	<0.20	NO		
Boron (B)	5.0	mg/kg	<7.4	<7.5	<5.0	<5.0	NO		<5.0	<5.0	NO	<7.5	5.8	NO		
Cadmium (Cd)	0.020	mg/kg	0.505	0.506	0.145	0.153	YES	5.37	0.081	0.088	YES	8.28	0.547	0.558	YES	1.99
Calcium (Ca)	50	mg/kg	6830	7230	5900	5470	YES	7.56	3360	4150	YES	21.04	9780	9810	YES	0.31
Chromium (Cr)	0.50	mg/kg	17.5	18.2	28.6	28.6	YES	0.00	13.7	19.4	YES	34.44	27.4	26.4	YES	3.72
Cobalt (Co)	0.10	mg/kg	5.2	5.09	7.14	7	YES	1.98	3.32	5.29	YES	45.76	7.22	7.27	YES	0.69
Copper (Cu)	0.50	mg/kg	12.2	13.3	17.3	17.1	YES	1.16	5.96	7.96	YES	28.74	19.6	19.4	YES	1.03
Iron (Fe)	50	mg/kg	8030	7990	16200	15000	YES	7.69	8080	10600	YES	26.98	12900	13100	YES	1.54
Lead (Pb)	0.50	mg/kg	5.36	6.31	6.14	5.93	YES	3.48	2.8	3.76	YES	29.27	12.1	13.3	YES	9.45
Lithium (Li)	2.0	mg/kg	6.8	7.2	15.5	12.5	YES	21.43	6	8	NO	14.4	14.4	YES	0.00	
Magnesium (Mg)	20	mg/kg	1990	2070	4950	4860	YES	1.83	2060	3070	YES	39.38	4060	4200	YES	3.39
Manganese (Mn)	1.0	mg/kg	160	129	408	402	YES	1.48	151	190	YES	22.87	210	215	YES	2.35
Mercury (Hg)	0.005	mg/kg	0.0972	0.0963	0.0371	0.0343	YES	7.84	0.0263	0.0242	YES	8.32	0.118	0.118	YES	0.00
Molybdenum (Mo)	0.10	mg/kg	0.62	0.78	0.31	0.28	NO		0.14	0.18	NO	0.9	0.94	YES	4.35	
Nickel (Ni)	0.50	mg/kg	15.4	15.6	23.1	22.5	YES	2.63	7.54	11	YES	37.32	26.3	26.5	YES	0.76
Phosphorus (P)	50	mg/kg	450	447	863	844	YES	2.23	599	653	YES	8.63	788	708	YES	10.70
Potassium (K)	100	mg/kg	840	860	1640	1510	YES	8.25	640	980	YES	41.98	1660	1540	YES	7.50
Selenium (Se)	0.20	mg/kg	1.1	1.21	0.28	0.3	NO		<0.20	<0.20	NO	1.04	0.96	YES	8.00	
Silver (Ag)	0.10	mg/kg	<0.17	<0.16	<0.10	<0.10	NO		<0.10	<0.10	NO	<0.15	0.1	NO		
Sodium (Na)	50	mg/kg	89	103	213	208	YES	2.38	116	169	NO	221	212	YES	4.16	
Strontium (Sr)	0.50	mg/kg	20.6	22.9	24.3	22.5	YES	7.69	12	16.2	YES	29.79	29	30.4	YES	4.71
Sulfur (S)	1000	mg/kg	2200	2700	<1000	<1000	NO		<1000	<1000	NO	2500	2800	NO		
Thallium (Tl)	0.050	mg/kg	0.096	0.102	0.134	0.132	NO		0.069	0.096	NO	0.158	0.161	NO		
Tin (Sn)	2.0	mg/kg	<3.0	<3.0	<2.0	<2.0	NO		<2.0	<2.0	NO	<3.0	<2.0	NO		
Titanium (Ti)	1.0	mg/kg	253	274	870	901	YES	3.50	484	678	YES	33.39	470	340	YES	32.10
Tungsten (W)	0.5	mg/kg	<0.74	<0.75	<0.50	<0.50	NO		<0.50	<0.50	NO	<0.75	<0.50	NO		
Uranium (U)	0.050	mg/kg	1.36	1.51	1.45	1.61	YES	10.46	0.861	0.904	YES	4.87	1.56	1.59	YES	1.90
Vanadium (V)	0.20	mg/kg	15	15.3	29.3	28.8	YES	1.72	15.2	22.3	YES	37.87	25.1	23.3	YES	7.44
Zinc (Zn)	2.0	mg/kg	61.1	67.6	45.6	44.5	YES	2.44	19.8	26.7	YES	29.68	73.3	75.3	YES	2.69
Zirconium (Zr)	1.0	mg/kg	<1.5	<1.5	6.3	5.8	YES	8.26	2.5	4.7	NO	31.7	5.5	YES	140.86	

Notes:

1. YES denotes that the average of the two sample concentrations was greater than 5x the requested detection limit (RDL)

2. < denotes values that were less than the RDL

3. Bold values indicate RPD values that were greater than 30%



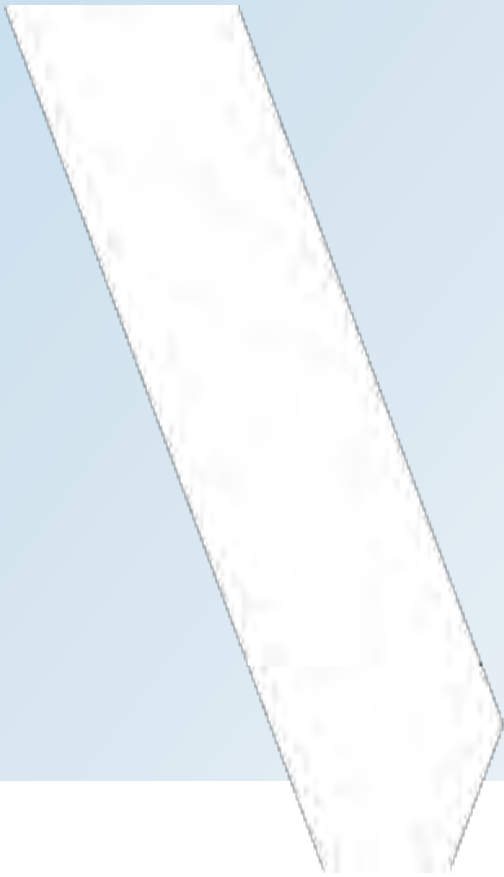
Table E1-3: 2024 Sediment Quality Assurance and Quality Control Table

Parameter	Client Sample ID		CR-DS-S3	SED-DUP-1	Meets RPD Detection Limit Trigger?	RPD (%)	CR-FDP-S1		SED-DUP-2	Meets RPD Detection Limit Trigger?	RPD (%)	PKL-C-S3		SED-DUP-3	Meets RPD Detection Limit Trigger?	RPD (%)	PKL-D-S1		SED-DUP-10	Meets RPD Detection Limit Trigger?	RPD (%)
	Date Sampled		12-Sep-2024	12-Sep-2024			13-Sep-2024	12-Sep-2024	18-Sep-2024			18-Sep-2024	24-Oct-2024	24-Oct-2024							
	Time Sampled		14:30	14:30			09:30	09:30	14:15			14:15	11:00	11:00							
	Lowest Detection Limit	Units	Sediment	Sediment			Sediment	Sediment	Sediment			Sediment	Sediment	Sediment							
Physical Tests																					
Loss on ignition @ 550°C	1	%	4	3.1	YES	25.35	4.3	4.2	YES	2.35	12.2	11.9	YES	2.49	9.9	9.9	YES	0.00			
Moisture	0.25	%	34.8	33.1	YES	5.01	48.7	41.4	YES	16.20	72.5	73.1	YES	0.82	79.4	79.2	YES	0.25			
pH (1:2 soil:water)	0.1	pH units	7.59	7.6	YES	0.13	6.89	7.01	YES	1.73	6.45	6.56	YES	1.69	6.15	6.28	YES	2.09			
Ash content @ 550°C	1	%	96	96.9	YES	0.93	95.7	95.8	YES	0.10	87.8	88.1	YES	0.34	90.1	90.0	YES	0.11			
Nutrients & Organics																					
Carbon, total organic [TOC]	0.1	%	0.76	0.87	YES	13.50	1.57	1.72	YES	9.12	4.15	4.24	YES	2.15	2.94	2.97	YES	1.02			
Organic matter	0.2	%	1.31	1.5	YES	13.52	2.71	2.96	YES	8.82	7.15	7.31	YES	2.21	5.07	5.12	YES	0.98			
Metals																					
Aluminum	50	mg/kg	8540	6810	YES	22.54	8260	8290	YES	0.36	31600	26900	YES	16.07	29800	29200	YES	2.03			
Antimony	0.1	mg/kg	0.21	0.15	NO		0.53	0.47	YES	12.00	1.24	1.08	YES	13.79	1.35	1.38	YES	2.20			
Arsenic	0.1	mg/kg	11.7	7.15	YES	48.28	7.06	6.88	YES	2.58	16.1	13.8	YES	15.38	16.5	18.1	YES	9.25			
Barium	0.5	mg/kg	52.9	38.5	YES	31.51	38.8	44.5	YES	13.69	185	171	YES	7.87	203	211	YES	3.86			
Beryllium	0.1	mg/kg	0.24	0.19	NO		0.22	0.21	NO		0.76	0.72	YES	5.41	0.77	0.86	YES	11.04			
Bismuth	0.2	mg/kg	0.20	0.20	NO		0.20	0.20	NO		0.26	0.24	NO		0.31	0.31	NO				
Boron	5	mg/kg	5	5	NO		5	5	NO		9.4	8.9	NO		10	9.8	NO				
Cadmium	0.02	mg/kg	0.102	0.074	YES	31.82	0.102	0.102	YES	0.00	0.283	0.235	YES	18.53	0.274	0.294	YES	7.04			
Calcium	50	mg/kg	5080	4150	YES	20.15	4860	5000	YES	2.84	8700	8070	YES	7.51	7300	8240	YES	12.10			
Chromium	0.5	mg/kg	23.8	18.5	YES	25.06	23.2	24.1	YES	3.81	75.2	66	YES	13.03	72.7	78.6	YES	7.80			
Cobalt	0.1	mg/kg	6.36	4.95	YES	24.93	5.63	5.68	YES	0.88	15.8	14	YES	12.08	16.6	18.7	YES	11.90			
Copper	0.5	mg/kg	10.2	7.71	YES	27.81	14.3	14.2	YES	0.70	40.8	35.3	YES	14.45	34.4	36.3	YES	5.37			
Iron	50	mg/kg	13400	10800	YES	21.49	12700	13000	YES	2.33	37200	32600	YES	13.18	41700	44700	YES	6.94			
Lead	0.5	mg/kg	5.05	3.49	YES	36.53	4.26	4.45	YES	4.36	13.8	12.6	YES	9.09	15.8	16.4	YES	3.73			
Lithium	2	mg/kg	10.4	8.1	YES	24.86	10.3	10.4	YES	0.97	39.1	32.9	YES	17.22	37	42.8	YES	14.54			
Magnesium	20	mg/kg	4780	3660	YES	26.54	4220	4250	YES	0.71	12600	11000	YES	13.56	13100	13100	YES	0.00			
Manganese	1	mg/kg	323	207	YES	43.77	234	218	YES	7.08	538	466	YES	14.34	757	755	YES	0.26			
Mercury	0.005	mg/kg	0.012	0.0085	NO		0.0217	0.021	YES	3.28	0.0607	0.0639	YES	5.14	0.0814	0.0718	YES	12.53			
Molybdenum	0.1	mg/kg	0.42	0.29	YES	36.62	0.31	0.3	NO		0.71	0.65	YES	8.82	0.44	0.48	YES	8.70			
Nickel	0.5	mg/kg	16.8	12.9	YES	26.26	18.5	17.9	YES	3.30	53.8	47.2	YES	13.07	52.8	56.1	YES	6.06			
Phosphorus	50	mg/kg	626	504	YES	21.59	713	749	YES	4.92	819	698	YES	15.95	837	934	YES	10.95			
Potassium	100	mg/kg	1460	1170	YES	22.05	1160	1250	YES	7.47	5210	4440	YES	15.96	5330	5090	YES	4.61			
Selenium	0.2	mg/kg	0.2	0.2	NO		0.27	0.24	NO		0.74	0.63	YES	16.06	0.47	0.58	NO				
Silver	0.1	mg/kg	0.10	0.10	NO		0.10	0.10	NO		0.15	0.14	NO		0.15	0.15	NO				
Sodium	50	mg/kg	183	157	YES	15.29	178	196	YES	9.63	355	328	YES	7.91	415	425	YES	2.38			
Strontium	0.5	mg/kg	17.8	15.8	YES	11.90	23.5	20.7	YES	12.67	41.6	37.8	YES	9.57	36	39.6	YES	9.52			
Sulfur	1000	mg/kg	1000	1000	NO		1000	1000	NO		1000	1000	NO		1500	1000	NO				
Thallium	0.05	mg/kg	0.104	0.087	NO		0.102	0.106	NO		0.38	0.349	YES	8.50	0.406	0.416	YES	2.43			
Tin	2	mg/kg	2	2	NO		2	2	NO		2	2	NO		3	2	NO				
Titanium	1	mg/kg	790	695	YES	12.79	830	902	YES	8.31	1480	1250	YES	16.85	1530	1580	YES	3.22			
Tungsten	0.5	mg/kg	0.5	0.5	NO		0.5	0.5	NO		0.5	0.5	NO		0.75	0.5	NO				
Uranium	0.05	mg/kg	0.693	0.644	YES	7.33	1.23	1.3	YES	5.53	3.33	3.08	YES	7.80	2.15	2.16	YES	0.46			
Vanadium	0.2	mg/kg	26.2	20.9	YES	22.51	24.8	26.5	YES	6.63	68.2	59.8	YES	13.13	71.2	74.7	YES	4.80			
Zinc	2	mg/kg	31	23.7	YES	26.69	34.3	33.6	YES	2.06	101	88.3	YES	13.42	115	124	YES	7.53			
Zirconium	1	mg/kg	7.5	6.8	YES	9.79	5.8	6.6	YES	12.90	14.4	13.5	YES	6.45	10.7	11.5	YES	7.21			

- Notes:
1. YES denotes that the average of the two sample
 2. < denotes values that were less than the RDL
 3. Bold values indicate RPD values that were greater than 30%

Appendix F

Photographic Record





Backpack electrofishing anode ring (June)



Bankfull measurement within a tributary (June)



Baited minnow trap (October)



Sediment sample collected using a Petite Ponar (October)

Plate F1-1: Various gear types and samples



Gillnet deployed within a waterbody (October 2022)



Adult Sauger caught in a gillnet at CR-FDP (September 2023)



Juvenile Northern Pike capture from DC-04 (June 2023)



Adult Mooneye capture from DC-03 (June 2023)

Plate F1-2: Various gear types and captured fish species



Emergent shoreline graminoids and mixed fine/coarse substrates (June 2023)



Shoreline point at a bay mouth in WC-6, facing southwest (July 2023)



Location overview facing north (July 2022)



Location overview facing north (October 2023)

Plate F1-3: Unnamed Waterbody 6 (WB-6)



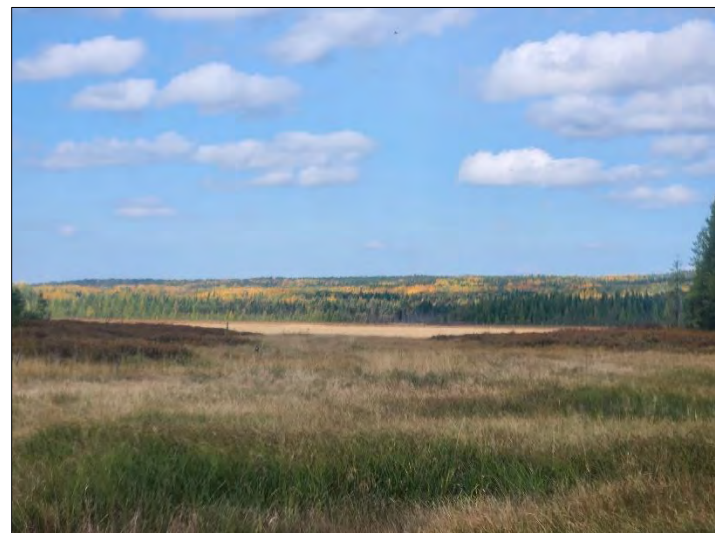
Location overview facing northwest along the west shoreline (June 2023)



Overview of floating peat and shallow spring water levels (June 2023)



Dense emergent vegetation and low water depths in summer (July 2023)



Overview of emergent vegetation choking all open water in fall (October 2023)

Plate F1-4: Unnamed Waterbody 1 (WB-1)



Location overview facing north (July 2022)



Overview of emergent and submergent vegetation in the littoral zone (July 2023)



Location overview (October 2022)



Dense submergent vegetation near shore (October 2022)

Plate F1-5: Genessee Lake (GL)



Location overview facing southeast (July 2023)



Location overview facing southwest (July 2023)



Overview of the south shore with coniferous uplands and steep banks (July 2023)



Emergent vegetation along north shore in fall (October 2023)

Plate F1-6: Unnamed Waterbody 2 (WB-2)



Location overview facing northwest from a drainage inlet (June 2023)



Shoreline and location overview facing northwest (July 2023)



Location overview facing northeast from south shore (July 2023)



Facing east from south shore, showing dense submergent veg. (July 2023)

Plate F1-7: Unnamed Waterbody 5 (WB-5)



Late spring emergent vegetation and beaver lodge along shore (June 2023)



Submerged boulders and low shoreline vegetation (June 2023)



Location overview facing southeast (October 2022)



Overview of shoreline boulders and steep bedrock outcrops (October 2023)

Plate F1-8: Unnamed Waterbody 3 (WB-3)



Downstream overview of unimpeded flows and mixed wood uplands (June 2022)



Downstream view of beaver impoundment and wetland vegetation (June 2023)



Summer growth of wetland vegetation downstream of the beaver dam (July 2023)



Mature wetland vegetation downstream of the beaver dam (October 2023)

Plate F1-9: Dixie Creek-01 (DC-01)



Upstream overview of Dixie Creek from the bridge in spring (June 2023)



Downstream overview of Dixie Creek from the bridge in spring (June 2023)



Upstream overview of Dixie Creek from the bridge in autumn (October 2023)



Downstream overview of Dixie Creek from the bridge in autumn (October 2023)

Plate F1-10: Dixie Creek-02 (DC-02)



Location overview facing southeast (July 2022)



Overhanging vegetation, banks, and submergent vegetation (June 2023)



Location overview in autumn, facing northeast (October 2022)



Location overview facing northeast (October 2023)

Plate F1-11: Dixie Creek-03 (DC-03)



Gillnet deployment through water course (June 2022)



Location overview facing the north bank (June 2022)



Location overview facing northeast (August 2023)



Location overview facing southwest (October 2023)

Plate F1-12: Dixie Creek-04 (DC-04)



Location overview facing north, upstream (October 2024)



Facing east and downstream early morning (October 2024)



Low-relief banks with fine/silt substrates in the downstream reaches (August 2023)



Location overview showing shoreline with forest upland (September 2023)

Plate F1-13: Chukuni River-Reference (CR-REF)



Mixedwood uplands and diverse shoreline/ aquatic vegetation (June 2023)



Overview of powerline crossing, facing north (June 2023)



Location overview facing northeast toward conifer uplands (August 2023)



Example of Burrowing Mayfly captured (October 2022)

Plate F1-14: Chukuni River-Final Discharge Pipe (CR-FDP)



Fallen logs and shrubs provide in-stream cover (June 2022)



Shoreline cover including woody debris and overhanging trees (June 2023)



Summer shoreline overview with emergent vegetation, facing northeast (August 2023)



Location overview facing west (August 2023)

Plate F1-15: Chukuni River-Downstream (CR-DS)



Location overview in spring, facing north (June 2023)



Overview of riparian banks, facing east (June 2023)



Location overview in summer, facing north (August 2023)

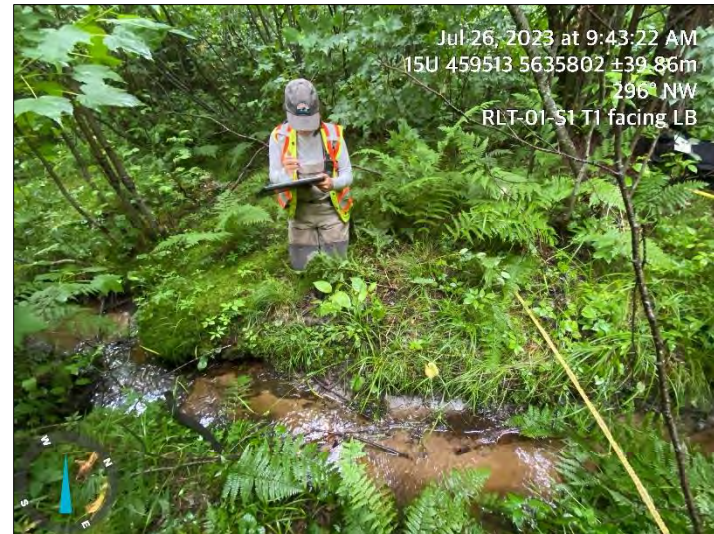


Overview of fall vegetation, facing northeast (September 2023)

Plate F1-16: Unnamed Watercourse 7 (WC-7)



Gravel substrate, undercutting, overhanging vegetation, and woody debris (June 2023)



Shallow run with sand substrate and dense riparian vegetation (July 2023)



Overview of abundant small woody debris and overhanging vegetation (September 2023)



Channel dry in upstream reach of headwater (September 2023)

Plate F1-17: Unnamed Watercourse 6B-01 (WC-6B-01)



Overview of poor surface flow connectivity and beaver dams in series (July 2023)



Larger beaver impoundment along watercourse flow path (July 2023)



Overview of dry channel in fall (September 2023)



Stable, undercut bank and dry channel in fall (September 2023)

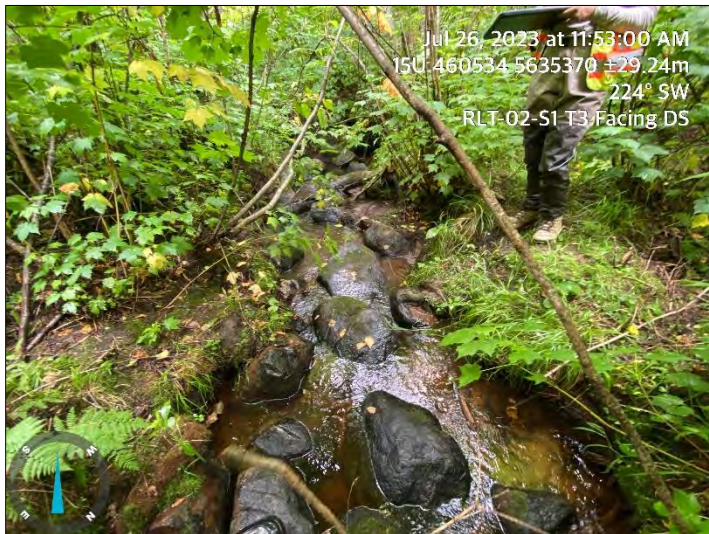
Plate F1-18: Unnamed Watercourse 6B-02 (WC-6B-02)



Small stream with boulders-dominant substrate and overhanging vegetation (June 2023)



Example of a woody debris jam and small vertical drop (June 2023)



Overview of frequent boulders, undercut banks and overhanging vegetation (July 2023)



Absence of surface flow connectivity during the low flow period (September 2023)

Plate F1-19: Unnamed Watercourse 6B (WC-6B)



Beaver impoundment and UTV ford crossing on transmission corridor (June 2023)



Downstream overview from transmission corridor, facing southwest (June 2023)



Minor channel development with poor flow scour/ deposition (July 2023)



Narrow channel with minor scour and alluvial deposition (July 2023)

Plate F1-20: Unnamed Watercourse 6C (WC-6C)



Sinuous reach with undercut banks and dense overhanging alder/willow (June 2023)



Typical shallow run habitat with dense riparian ground cover (September 2023)



Representative pool with woody debris and fine-textured substrates (September 2023)



Narrow stream with overhanging shrubs and banks (October 2022)

Plate F1-21: Unnamed Watercourse 6A (WC-6A)



Poor surface flow connectivity and poor channel development (June 2023)



Low relief banks and shallow bankfull depths near flow cutoff (September 2023)



Stagnant water in headwater drainage with poor channel development (September 2023)



Shallow isolated pool within the watercourse flowpath (September 2023)

Plate F1-22: Unnamed Watercourse 6A-02 (WC-6A-02)



Overview of narrow, shallow channel with fine-textured substrates (September 2023)



Low relief banks and shallow bankfull depths near flow cutoff (September 2023)



Moss/graminoid covered banks with alder/conifer overstory (September 2023)



Overhanging vegetation and woody debris (September 2023)

Plate F1-23: Unnamed Watercourse 6A-US (WC-6A-US)



Outlet to WB-1 (July 2022)



Overhanging riparian vegetation and organic substrate (June 2023)



Alder, marsh marigold and sphagnum within the floodplain (June 2023)



Lack of surface flow connectivity in fall with low precipitation (September 2023)

Plate F1-24: Unnamed Watercourse 1A (WC-1A)



Narrow, shallow stream with grasses, horsetail, and alder (July 2022)



Narrow, shallow stream with grasses, horsetail, and alder (June 2023)



Sections with poor to no channel development, characteristic of wetland (June 2023)



Absence of surface flow connectivity in fall (September 2023)

Plate F1-25: Unnamed Watercourse 1B (WC-1B)



Largest connected pond in an open meadow portion of the watercourse (June 2023)



Narrow, shallow stream with overhanging graminoids (June 2023)



Sinuous reach within a mature mixed wood stand (July 2023)



Steep undercut banks and mixed substrates (July 2023)

Plate F1-26: Unnamed Watercourse 1B-03 (WC-1B-03)



Low relief grassy banks and cobble/gravel dominated substrate (June 2023)



Large woody debris, tannin-stained water, and coniferous uplands (June 2023)



Frequent woody debris and overhanging vegetation cover (June 2023)



Floodplain of graminoids and forbs with shrub and tree uplands at WC-1 (July 2023)

Plate F1-27: Unnamed Watercourse 1 (WC-1)



Narrow, shallow channel with dense overhanging grasses, forbs, and shrubs (June 2023)



Flooding of WC-2 study reach due to recent beaver impoundment (July 2023)



Overview of a large upstream beaver dam impounding flows upstream (July 2023)



Recently flooded reach due to beaver impoundments in series (July 2023)

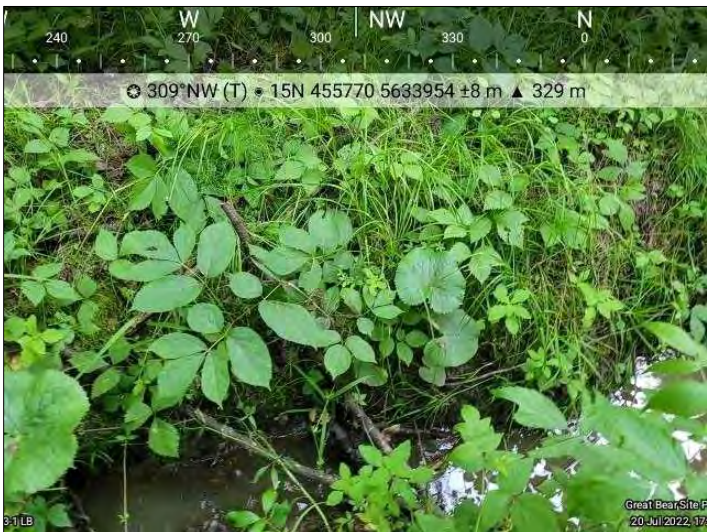
Plate F1-28: Unnamed Watercourse 2 (WC-2)



Shallow stream with dense canopy and undercut banks (June 2023)



Wet meadow stream with woody debris and breached beaver dam (June 2023)



Narrow stream with undercutting and overhanging graminoids/forbs (July 2022)



Low fall flows in the WC-4 narrow channel (October 2022)

Plate F1-29: Unnamed Watercourse 4 (WC-4)



WC-9 Headwater wetland (June 2023)



Groundwater upwell in WC-9 downstream of existing road (June 2023)

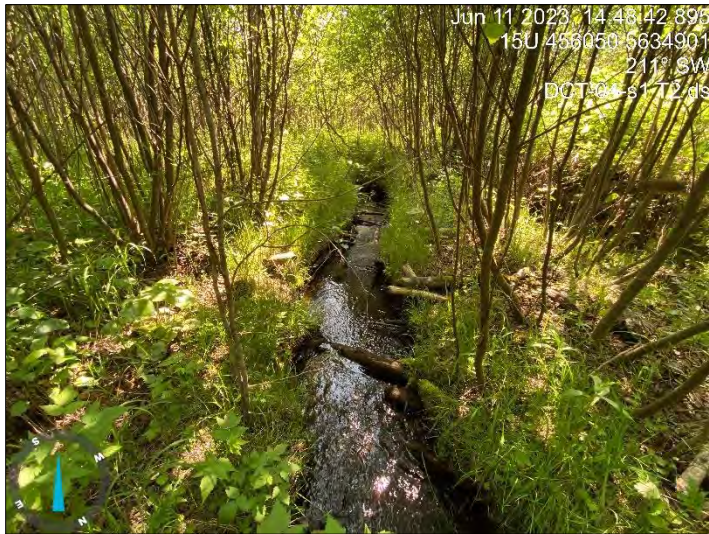


Poorly developed channel choked with dense instream vegetation (July 2023)



Dry channel with fine-textured sediments in the fall (October 2023)

Plate F1-30: Unnamed Watercourse 9 (WC-9)



Shallow stream with dense canopy and undercut banks, facing southwest (June 2023)



Narrow, shallow stream (June 2023)



WC-3 downstream pond with dense horsetail and woody debris (June 2023)



Dry channel with gravel, cobble and fine substrates in summer (July 2023)

Plate F1-31: Unnamed Watercourse 3 (WC-3)



Small meandering stream with undercut banks, dense canopy, and fines (June 2023)



Wet meadow with incised channel, undercut banks and graminoids (June 2023)



WC-3B wetland facing downstream towards beaver dam (July 2023)



Standing water lacking surface flow connectivity in fall (September 2023)

Plate F1-32: Unnamed Watercourse 3B (WC-3B)



Narrow, shallow stream with silt substrate (June 2023)



Narrow, shallow stream with dense alder overstory (July 2023)



Dense overhanging vegetation and instream woody debris (July 2023)



Overview of fine-textured bank materials, moss, forbs, and shrubs (July 2023)

Plate F1-33: Unnamed Watercourse 3A (WC-3A)



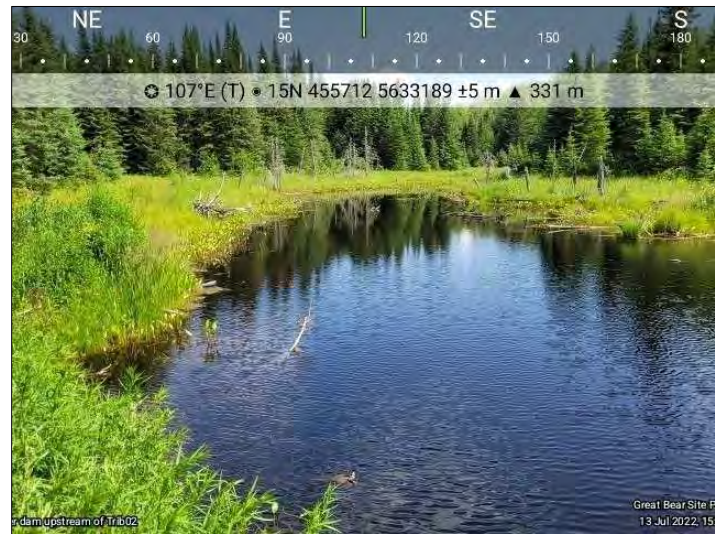
Location overview facing west (June 2022)



Summer overview with dense graminoids and forbs and low flow (July 2023)



Channel bottom overview with shallow standing surface water (July 2023)



Upstream connected wetland with coniferous-dominant uplands (July 2022)

Plate F1-34: Unnamed Watercourse 5 (WC-5)



Shallow stream with dense alder canopy and silt/gravel substrates (June 2023)



Overview of emergent vegetation and instream woody debris (June 2023)



Example of an undercut bank with moss and forb cover (July 2023)



Overview of low-relief banks with fine-textured materials (July 2023)

Plate F1-35: Unnamed Watercourse 7A-03 (WC-7A-03)



Shallow stream with dense canopy and high banks (June 2022)



Narrow, shallow stream within a mixed deciduous/coniferous forest (June 2022)



Sections of flooded stream with algae growth (July 2022)

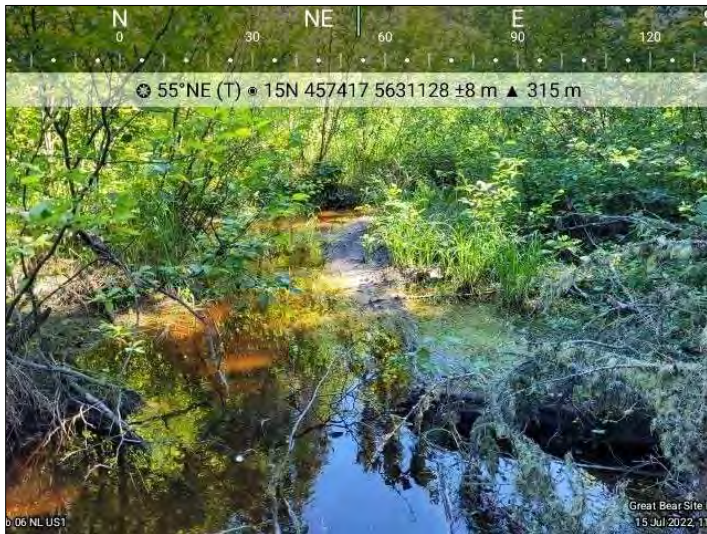


Fallen logs and debris within tributary (October 2022)

Plate F1-36: Unnamed Watercourse 7A-07 (WC-7A-07)



Location overview facing northwest showing mixed coniferous/deciduous forest (May 2022) Shallow stream with tea-stained water and overhanging branches (May 2022)



Location overview showing silty substrate (July 2022)

Narrow stream showing undercut banks and overhanging grasses (July 2022)

Plate F1-37: Unnamed Watercourse 7A-08 (WC-7A-08)



Low relief banks with fine substrates and mixed wood uplands (July 2023)



Overview of narrow channel with dense overhanging vegetation (July 2023)



Steep banks with instream and overhanging woody debris (July 2022)



Low undercut banks with overhanging shrubs, grasses, and forbs (July 2022)

Plate F1-38: Unnamed Watercourse 8 (WC-8)



Facing upstream at the base of the large, steep falls (June 2023)



Overview of boulder and cobble dominant bed and vertical banks (June 2023)



Instream woody debris and overhanging vegetation (June 2023)



Poor surface flow connectivity through dense cobbles (June 2023)

Plate F1-39: Unnamed Watercourse 8B (WC-8B)



PKL-N facing north toward Chukuni River outlet and Snake Falls Camp (October 2024)



PKL-N facing south (October 2024)



Site overview facing west along the shoreline (June 2023)



Shoreline typical of wetland areas along Pakwash Lake (June 2023)

Plate F1-40: Pakwash Lake



Facing south, PKL-C (October 2024)



Facing west, PKL-C (October 2024)



PKL-D facing west, showing the nearby island in the top left (October 2024)

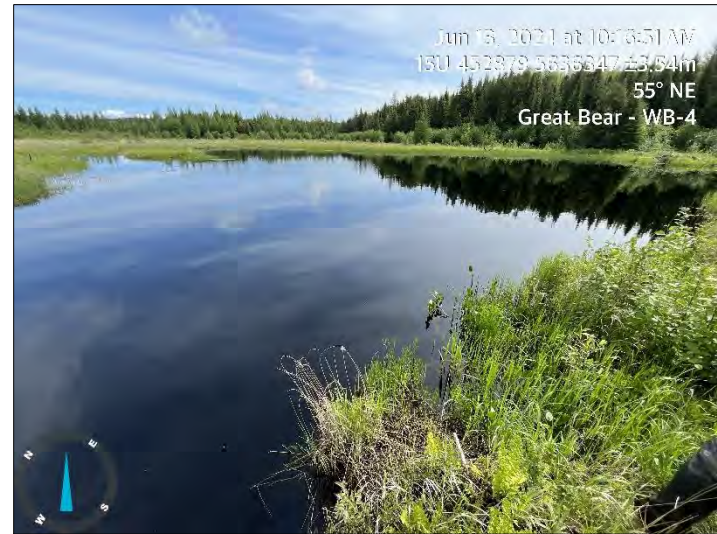


PKL-D facing north toward the top end of the lake (October 2024)

Plate F1-41: Pakwash Lake



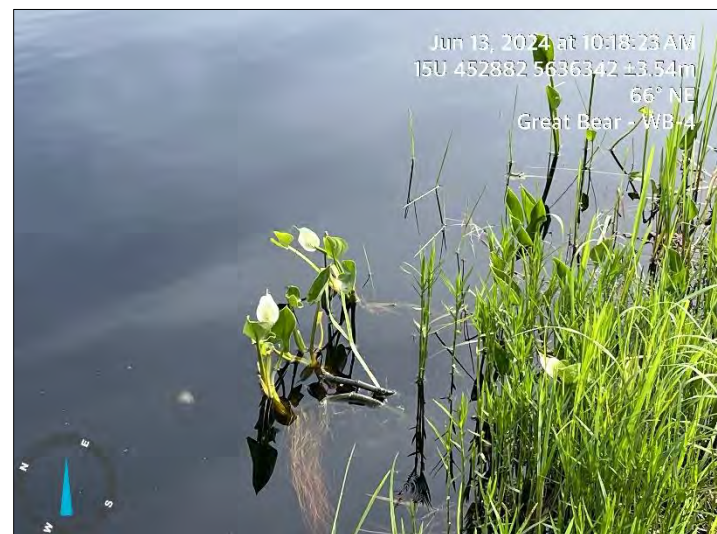
Facing northeast from farthest SW extent, WB-4 (June 2024)



WB-4 waterbody proper (June 2024)



Beaver dam creates southwest shoreline, retaining water (June 2024)



Emergent vegetation along shoreline margins (June 2024)

Plate F1-42: WB-4