Appendix B.8.2

2021-2023 Fish and Fish Habitat Baseline

REPORT

Crawford Nickel Project

2021-2023 Fish and Fish Habitat Baseline

Submitted to:

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Table of Contents

1.0 INTRODUCTION 1

1.1 Purpose and Objective of the Report 1

1.2 Overview of Baseline Studies 2

2.0 METHODOLOGY 4

2.1 Assessment Overview 4

2.2 Fish Habitat 4

2.3 Fish Community 5

2.4 Culturally Significant Fish Species 5

2.5 Fish Community Surveys 5

2.5.1 Conventional Survey Methods 5

2.5.2 Environmental DNA 6

2.6 Contaminants in Fish Tissue 7

2.7 Surface Water Quality 8

2.7.1 Lake Profiles 8

2.7.2 Field Sampling 8

2.7.3 Water Quality Data Analysis 9

2.7.4 Quality Assurance and Control 9

2.8 Lower Trophic and Primary Productivity 9

2.8.1 Phytoplankton 10

2.8.2 Zooplankton 10

2.8.3 Data Analysis 10

2.9 Sediment and Benthic Invertebrate Surveys 10

2.9.1 Data Analysis 10

2.9.2 Laboratory Sampling Processing 11

2.9.3 Sediment Quality Data Analysis 12

2.9.4 Sediment Quality Assurance and Quality Control 12

2.9.5 Benthic Invertebrate Data Analysis 12
3.0 RESULTS 18
3.1 North Driftwood River Watershed 18
3.1.1 Gerry Lake 18
3.1.2 Martin Lake 23
3.1.3 Jack Lake 28
3.1.4 Sutherland Lake 31
3.1.5 Mel Lake 34
3.1.6 Davis Lake 35
3.1.7 Unnamed Tributaries 37
3.1.8 Unnamed Streams 40
3.1.9 Unnamed Ponds 43
3.2 West Buskegau River Watershed 47
3.2.1 Unnamed Streams 47
3.2.2 Unnamed Ponds 49
3.3 Jocko Creek Watershed 52
3.3.1 Surface Water Quality 52
3.3.2 Fish Habitat 53
3.3.3 Fish Community 53
3.3.4 Fish Tissue 53
3.3.5 Sediment Quality 54
3.3.6 Benthic Macroinvertebrate Community 54
3.4 Mattagami River 54
3.4.1 Surface Water Quality 54
3.4.2 Fish Habitat 55
3.4.3 Fish Community 55
3.4.4 Fish Tissue 57
3.4.5 Sediment Quality 57

3.4.6 Benthic Macroinvertebrate Community 57
3.5 Road Alignment Crossings 57
3.5.1 RDAL-01 57
3.5.2 RDAL-02 58
3.5.3 RDAL-03 58
3.5.4 RDAL-04 58
3.5.5 RDAL-05 58
3.5.6 RDAL-06 59
4.0 SUMMARY OF FINDINGS 77
4.1 Surface Water Quality 77
4.2 Fish Habitat 77
4.3 Fish Community 77
4.4 Fish Tissue 78
4.5 Sediment Quality 78
4.6 Benthic Macroinvertebrate Community 78
REFERENCES 80

TABLES

Table 2-1: Fish and Fish Habitat Field Study Locations 15
Table 2-2: Fish Community Gear-Specific Sampling Summary by Location and Season 17
Table 3-1: Fish Species Presence by Location 60
Table 3-2: Benthic Invertebrate Community Descriptors by Location and Year – North Driftwood River Watershed 62
Table 3-3: Benthic Invertebrate Community Descriptors by Location and Year – West Buskegau River Watershed 64

FIGURES

Figure 1-1: Project Location 3
Figure 2-1: Sample Locations 14
Figure 3-1: Surface Water Quality Parameters of Interest – NDR Lakes 65
Figure 3-2: Surface Water Quality Parameters of Interest – NDR Watercourses 66

Figure 3-3: Surface Water Quality Parameters of Interest – NDR Ponds 67
Figure 3-4: Surface Water Quality Parameters of Interest – WBR, Jocko Creek and Mattagami River 68
Figure 3-5: Mean Sediment Quality Parameters of Interest by Year (with standard error) – NDR Lakes 69
Figure 3-6: Mean Sediment Quality Parameters of Interest by Year (with standard error) – NDR Watercourses and Inland Ponds 70
Figure 3-7: Mean Sediment Quality Parameters of Interest by Year (with standard error) – WBR Watercourses and Inland Ponds 71
Figure 3-8: Mean Total Invertebrate Density and Family Richness by Location and Year (with standard error).....72
Figure 3-9: Mean Simpson's Diversity and Evenness by Location and Year (with standard error).....73
Figure 3-10: Mean Percent EPT and Percent Chironomids by Location and Year (with standard error) 74
Figure 3-11: Mean Proportions of Major Benthic Invertebrate Families – NDR Watershed 75
Figure 3-12: Mean Proportions of Major Benthic Invertebrate Families – WBR Watershed and Jocko Creek.....76

APPENDICES

APPENDIX A
Surface Water Quality Data

APPENDIX B
Fish Habitat, Fish Community and Environmental DNA Data

APPENDIX C
Fish Tissue and Age Data

APPENDIX D
Lower Trophic Level Data

APPENDIX E
Sediment Quality Data

APPENDIX F
Benthic Invertebrate Community Data

APPENDIX G
Data Quality Assurance and Control Assessments

APPENDIX H
Photographic Site Record

APPENDIX I
Field Notes

List of Acronyms

Acronym	Definition
°C	Degrees Celsius
CNC	Canada Nickel Company
BIC	Benthic Invertebrate Community
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
CSQG	Canadian Sediment Quality Guidelines
CWQG	Canadian Water Quality Guidelines
DQO	Data Quality Objectives
E	Simpson's Evenness
e.g.	Example
ECCC	Environment and Climate Change Canada
EEM	Environmental Effects Monitoring
FEQG	Federal Environmental Quality Guidelines
g	Gram
GPS	Global Positioning System
HDPE	High Density Polyethylene
LEL	Lowest Effect Level
m	Meter MDMER Metal and Diamond Mining Effluent Regulations
mg/L	Milligrams per Liter
mL	Milliliter
MECP	Ministry of the Environment, Conservation and Parks
MNRF	Ministry of Natural Resources and Forestry
n	Sampling Size
NAD	North American Datum
PEL	Probable Effect Level
PWQO	Provincial Water Quality Objectives
QA/QC	Quality Assurance and Quality Control
RPD	Relative Percent Difference

List of Fish Scientific Names

Common Name(s)	Scientific Name
Blacknose Dace	*Rhinichthys atratulus*
Bluntnose Minnow	*Pimephales notatus*
Brook Stickleback	*Culaea inconstans*
Brook Trout	*Salvelinus fontinalis*
Burbot	*Lota lota*
Common Shiner	*Luxilus cornutus*
Creek Chub	*Semotilus atromaculatus*
Emerald Shiner	*Notropis atherinoides*
Fathead Minnow	*Pimephales promelas*
Finescale Dace	*Chrosomus neogaeus*
Finescale x Northern Redbelly dace hybrid	*Chrosomus hybrid*
Golden Shiner	*Notemigonus crysoleucas*
Iowa Darter	*Etheostoma exile*
Johnny Darter	*Etheostoma nigrum*
Lake Chub	*Couesius plumbeus*
Lake Sturgeon	*Acipenser fulvescens*
Logperch	*Percina caprodes*
Longnose Dace	*Rhinichthys cataractae*
Longnose Sucker	*Catostomus catostomus*
Mottled Sculpin	*Cottus bairdii*
Northern Pearl Dace	*Margariscus nachtriebi*
Northern Pike / Jackfish / Northern	*Esox lucius*
Northern Redbelly Dace	*Chrosomus eos*
Rock Bass	*Ambloplites rupestris*
Spottail Shiner	*Notropis hudsonius*
Trout Perch	*Percopsis omiscomaycus*
Walleye / Pickerel	*Sander vitreus*
White Sucker	*Catostomus commersonii*
Yellow Perch	*Perca flavescens*

1.0 INTRODUCTION

1.1 Purpose and Objective of the Report

Canada Nickel Company (CNC) is proposing to develop the Crawford Nickel Project (the Project), located in northeastern Ontario approximately 40 kilometres (km) north of Timmins, Ontario (Figure 1-1). This report is one of a series of technical support documents prepared by WSP E&I Canada Limited (WSP; formerly Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited), on behalf of CNC to describe the current environmental conditions at the Project. Specifically, the purpose of this report is to characterize baseline fish and fish habitat conditions from survey work carried out at and adjacent to the Project site between 2021 and 2023.

The scope of work to assess baseline fish and fish habitat included multi-season sampling for the below listed parameters:

- Physicochemical surface water quality measurements and laboratory sample collection within riverine environs of the Northern Driftwood and West Buskegau River watersheds, as well as a tributary of Jocko Creek and within the Mattagami River.
- Profile measurements and laboratory water quality sample collection from basins within the Project area lakes.
- Fish community surveys using various gear types to target all species and life stages, with environmental DNA (eDNA) utilized at some locations to assess potential presence of species at risk (SAR) and to provide full species profiles for comparison to the conventional community sampling results.
- Fall small-bodied and large-bodied fish species lethal sampling to assess contaminants in fish tissue and age assessment.
- Primary productivity (phytoplankton and zooplankton) assessment within Project area lakes; and,
- Sediment quality sampling and co-located benthic invertebrate surveys.

A photographic record using consistent vantage points among seasons also provided visual documentation of the seasonal and between-year variability of conditions within the study area. Incidental wildlife observations were communicated to the broader project team and incorporated into other study reports. A list of scientific names has been provided, with the common names of fish used herein for ease of review and interpretation.

The designated scope of the project is being reviewed by the Impact Assessment Agency of Canada and some components of the Project might follow an independent environmental assessment process. This document considers all designated scope options. These baseline reports are intended to support the federal and provincial environmental approvals and permitting.

1.2 Overview of Baseline Studies

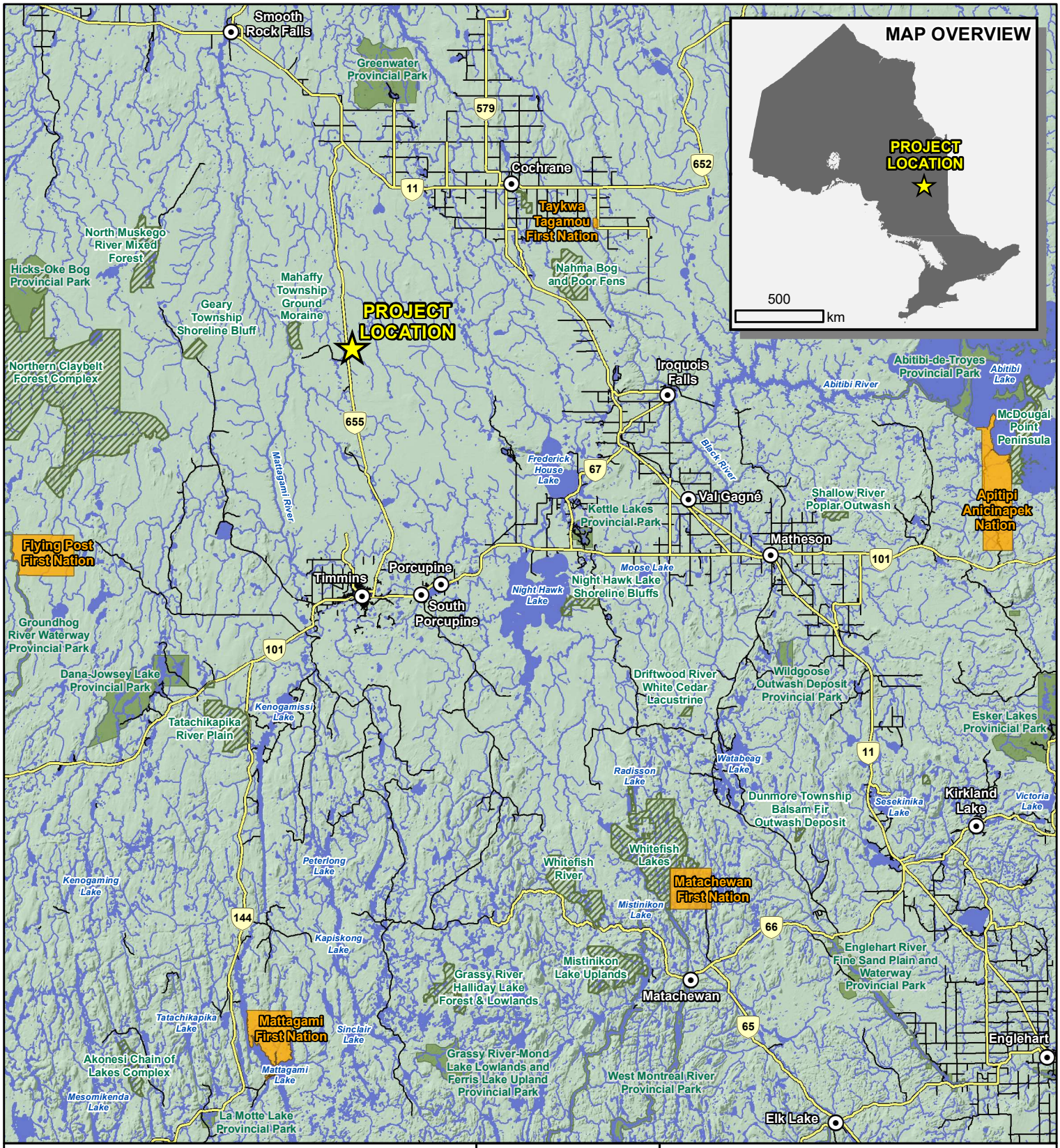
This report has been prepared to summarize the findings of the fish and fish habitat assessments conducted during the 2021 to 2023 periods as follows:

- 2021: summer (August 5 - 11), and fall (October 19 - 28);
- 2022: spring (May 28 - June 9), mid-late summer (August 16 - 17, August 29 - September 2, and September 14 - 18), and fall (October 11 - 26); and,
- 2023: spring (May 14, and May 30 - June 14), and summer (July 11 - 16).

Aquatic baseline studies for this Project were completed in 2021, 2022, and 2023, including various lakes, unnamed inland waterbodies, and tributaries within:

- North Driftwood River watershed;
- West Buskegau River watershed;
- Jocko Creek watershed; and,
- Mattagami River.

Local fish communities generally represent a cool water thermal preference, with upper trophic level panfish and sportfish species present within the named lakes (yellow perch and northern pike). A variety of small-bodied species commonly encountered in Northeastern Ontario, including but not limited to northern redbelly dace, finescale dace, and fathead minnow were found within the Project area watercourses and ponded habitats (mostly created by beaver dams). Detailed fish community and catch results are provided within this report and associated appendices.



X:\CA\CAOAK300-OAK\MS-FS1-Project\P\2023\Projects\OMEMA2304S_WSP_Canada_Inc_Crawford_Impact_Assessment\13_0_GIS\Aquatic\Baseline_2023\MXD\Project_Location_1.mxd

LEGEND

- Project Location
- First Nation Reserve
- Town / Community
- Conservation Reserve
- Provincial Park
- Local Street
- Highway
- Watercourse
- Waterbody

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020.

0 5 10 20 30 40 50 Kilometres

Datum: NAD83
Projection: UTM Zone 17N

CANADA NICKEL COMPANY

WSP

CRAWFORD NICKEL PROJECT

Project Location

PROJECT N°: OMEMA2304

FIGURE: 1-1

SCALE: 1:830,000

DATE: October 2023

2.0 METHODOLOGY

2.1 Assessment Overview

The Crawford Project is subject to a provincial Class Environmental Assessment (EA) which required multi-season surveys of fish and fish habitat within areas proposed to be directly impacted/ overprinted, as well as areas with potential to be indirectly impacted (e.g., by reduced flows). The 2021 to 2023 fish and fish habitat assessment field studies were guided by the initial project description, and adjustments to the study designs were made to account for changes in the proposed project footprint and potential interactions with the aquatic environment throughout this period. Sample sites for fish habitat, fish community and fish tissue were selected to characterize representative habitat within the Project boundary, using a geographic distribution that would sample all habitat types and support delineation of habitat characteristics in unsampled areas by extending the site-specific field study results to the greater landscape. As such, sample sites were selected to represent different lentic and lotic habitats within and downstream of the Project.

Indigenous communities were invited to participate in the field studies, and several community members participated in these studies during 2022 and 2023. Sample locations are presented on Figure 2-1, with detailed year-specific sample locations shown within their respective appendices as discussed in Section 3.0. Figure 2-1 also shows the Project boundary that is generally positioned between the Mattagami River and the West Buskegau River, with Highway 655 positioned north-south bisecting the approximate middle of the Project boundary.

A summary of the 2021 to 2023 fish and fish habitat assessment sampling effort by location and season is provided in Table 2-1, with a summary of the fish community sampling gear-specific efforts by location and season in Table 2-2. Fish habitat types were characterized during the baseline studies and descriptions of the habitat types are summarized herein.

Some access limitations, theft of sampling gear, and safety concerns of field staff due to public interactions, inclement weather (storms) and hunting activities influenced the scope of studies and data collected. For example, access restrictions due to private land affected Davis Lake sampling during the 2021 to 2023 studies as well as some locations along the proposed road alignment during 2023 studies. Additionally, forest fire No.COC009 started June 4, 2023, at the Project site, which affected an approximate 5 hectares (ha) area. This fire interrupted spring field surveys and extended the sampling event further into June 2023 than originally planned. Field crews were evacuated from the sample locations near the fire and interpretation of environmental data herein considers potential atmospheric deposition from this fire, as well as contributions from surrounding forest fire smoke across northern Ontario and Quebec in spring-summer 2023.

2.2 Fish Habitat

Fish habitat assessments were conducted at representative riverine (lotic) and ponded or lake (lentic) stations during the field studies. These assessments characterized the fish habitat types and were completed to support delineation of homogeneous habitats. Habitat criteria measured in field included a combination of the following categories of natural features:

- Watercourse or waterbody type;
- Permanence; and,
- Data collected using the Ontario Ministry of Transportation (MTO 2020) protocol where appropriate.

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 were also collected within the basins of Gerry Lake, Martin Lake, Jack Lake, Sutherland Lake, Mel Lake, and Davis Lake. The water quality instruments were calibrated as needed per the manufacturer's directions and measured the following parameters:

- Temperature;
- pH;
- Conductivity;
- Dissolved oxygen (DO); and
- Depth of parameter measurement (using manual graduation on signal cable or electronic pressure sensor values as available).

2.3 Fish Community

2.4 Culturally Significant Fish Species

Indigenous communities have culturally significant fish species, many related to traditional harvest activities and are important sources of subsistence and country food. These species can vary by community and harvesting activities may vary based on time of year; as such the following list of common names provides a preliminary summary of the species likely to be considered culturally significant and further engagement with the communities will be needed to refine the list:

- Baitfish (includes various minnows and small-bodied species);
- Sportfish: bass (largemouth and smallmouth), brook trout, lake trout, lake whitefish, northern pike/jackfish, pickerel/walleye, yellow perch;
- Coarse fish: burbot, catfish (channel and brown bullhead), sheepshead, sucker (white and redhorse sp.), goldeye and mooneye; and,
- lake sturgeon.

Section 3.0 includes fish community descriptions by sample location and confirms presence (or the likelihood of presence based on habitat connectivity) for the above species.

2.5 Fish Community Surveys

2.5.1 Conventional Survey Methods

Fish community surveys were conducted during summer and fall as per the approved conditions of the Licenses to Collect Fish for Scientific Purposes (LCFSP) issued by the Ministry of Natural Resources and Forestry (MNRF). The following gear types were utilized as able, per site-specific habitat conditions:

- Baited gee-style minnow traps;
- Minnow (small-mesh) fyke nets;
- Dip nets;

- Seine nets;
- Backpack electrofishing; and,
- Gillnets (various stretched mesh sizes).

A summary of the fish sampling gear utilized at each sampling location and by field program is presented in Table 2-2. All fish captured were identified to species by qualified fisheries staff, measured for length (total and fork, as able) and fresh weight, scrutinized for visible malformation, parasites, or evidence of disease, and sex was determined when possible. Additionally, aging structures and whole body individuals (for small-bodied species) were submitted for age assessment, and abundant fish species were collected and submitted for contaminants in fish tissue analysis during the fall assessments.

2.5.2 Environmental DNA

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 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 when appropriate study designs are used. As only a water sample is needed to ascertain the species present in a water body, it is particularly useful for identifying low levels of rare species, invasive species presence (especially during early invasion stages with low total numbers), species difficult to detect or those sensitive to conventional survey methods (e.g., active and passive capture gear), and within locations difficult to sample (i.e., remote or private lands). As such, when non-invasive and/or non-lethal sampling is required, eDNA can be the preferred option, or a complimentary measure to the conventional sampling that can help corroborate historic records and traditional knowledge.

The study design used for this Project included collection of at least three replicate samples per sample type (qPCR or metabarcoding). Each sample was collected using a Kemmerer bottle and comprised a composite filtered sample of approximately 2 litres, which included near-bottom, mid-depth, and near-surface samples, as well as nearshore and offshore grabs as appropriate for the habitat being sampled. This ensured a high likelihood of collecting genetic material from species present during the time of sampling. The eDNA sampling study objective was to identify Lake Sturgeon presence using qPCR (species/taxa-specific) and metabarcoding analysis, that provides a comprehensive species profile (list) of genetic material collected within the sample. Sampling within the Mattagami River utilized the above eDNA methods paired with conventional visual spawning surveys; however, eDNA sampling conducted within the North Driftwood relied on qPCR and metabarcoding analysis, without visual spawning surveys. The qPCR analysis provides quantitative results, amplifying the target Lake Sturgeon eDNA and a score is provided for the number of positive replicates out of 12. Metabarcoding, on the other hand, is a qualitative rather than quantitative process meaning detection quantities cannot be linked between samples and controls and these results provide an indication of species (or higher taxonomic level) present within the sample.

All sampling equipment was decontaminated between sample locations and negative control samples were collected during each sampling event. Avoiding cross-contamination between samples and sample locations is critically important to minimize the likelihood of false positive and false negative eDNA results.

2.6 Contaminants in Fish Tissue

Fish tissue sampling was conducted at Gerry Lake, Martin Lake, Jack Lake, JC-S-01, NDR-S-01, NDR-S-04, NDR-S-05, NDR-Trib-02, WBR-P-03, WBR-P-04, NDR-P-01, NDR-P-06, NDR-P-03. Fish tissue samples for sportfish contaminant analysis were comprised of skinless, boneless left dorsal epaxial muscle tissue for large-bodied species (e.g., northern pike). The species retained for analysis were determined based on presence and abundance of the species within each sample location, and to support future ecological assessment and monitoring programs.

Small-bodied fish species retained for tissue analysis during the field studies included northern pearl dace, finescale dace, northern redbelly dace, brook stickleback, lake chub, and fathead minnow. Whole body composite samples each consisted of enough small-bodied fish for a minimum total mass greater than 20 grams (g) wet weight. The number of fish per composite sample varied based on species and individual fish size, and the "75% rule" was applied for all composite samples (Stahl et al. 2009). Adherence to this rule means the smallest fish in each 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 not greater than 75%, which was intended to include only one age cohort per composite sample. Individuals from the sampled populations representing the full range of total lengths were submitted for age assessment using species appropriate ageing structures.

Large-bodied fish species retained for tissue analysis during the field studies were northern pike. Individual fish were measured for fork (FLEN) and total lengths (TLEN) and total weight (g). Species specific appropriate ageing structures (e.g., cleithra and scales) were submitted for age assessment. Fillet tissue samples were collected from the left side of the body, with each sample having a total mass greater than 10 grams (g) wet weight.

Fish tissue samples collected by WSP during the 2021 and 2022 field studies were submitted to ALS Environmental, Waterloo, Ontario, for total metals including mercury, methylmercury, as well as percent moisture. Metals of interest analyzed for this study 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: arsenic, copper, lead, mercury, selenium, and zinc. Fish tissue metal concentrations were compared among sample areas. Mercury and selenium are often of particular interest when assessing baseline conditions as these metals are known to have negative effects on the health of aquatic life and consumers of aquatic biota, discussed in more detail as follows.

Total mercury concentrations measured in fish tissue were compared to the provincial consumption guidelines (Ministry of the Environment, Conservation and Parks [MECP formerly MOECC] 2015) and federal food and nutrition standards (Health Canada 2011). Methylmercury concentrations were also compared to 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).

Selenium is often considered a metal of concern because it can have negative effects on aquatic life. It can be released into aquatic environments naturally through weathering or anthropogenic sources (United States Environmental Protection Agency [US EPA] 2016). Concentrations of selenium were measured in fish tissue during the studies to determine baseline concentrations and for future reference if needed. The Federal Environmental Quality Guideline (FEQG) established for selenium in whole body fish tissue were compared to the study results.

2.7 Surface Water Quality

2.7.1 Lake Profiles

Lake water column profiles were assessed using temperature (°C) and DO (mg/L) measurements within the three sampling seasons (spring, summer, and fall) in 2022 and two season (spring and summer 2023), as able. Profiles were measured at 1 m intervals within the deepest location of the fish sampling areas and targeting the deepest part of the lakes. Profiles were taken within each lake in the study area; Gerry Lake, Martin Lake, Jack Lake, Mel Lake and Davis Lake.

2.7.2 Field Sampling

In-field and laboratory water quality data were collected by WSP staff during the 2021 to 2023 field surveys (Appendix A; Figures A1-1 to A1-3) and compared to federal and provincial guidelines to assist with interpretation of the water quality data and in assessing habitat quality. In situ water quality measurements were collected at each benthic invertebrate sampling location and at each fish sampling location using a hand-held YSI™ DSS multi-parameter water quality meter. Temperature, DO, pH, and conductivity were recorded at the surface, within the thermocline (if present), and near bottom. Surface water quality samples for laboratory analysis were collected during each sampling event (Figure 2-1) from the waterbodies listed below:

- Martin Lake
- Gerry Lake
- Sutherland Lake
- Mel Lake
- Davis Lake
- Mattagami River
- Jocko Creek
- Unnamed Tributaries (NDR-TRIB-01, NDR-TRIB-02
- Unnamed Ponds (NDR-P-01, NDR-P02A, NDR-P03, NDR-P04, NDR-P05, NDR-P06, NDR-P07, WBR-P-01, WBR-P-02, WBR-P-03, WBR-P-04)
- Unnamed Streams (NDR-S-01, NDR-S-02, NDR-S-04, , NDR-S-06B, WBR-S-01, WBR-S-02, WBR-S-03, WBR-S-04, WBR-S-05)

Quality assurance and quality control measures included the use of laboratory prepared travel blanks, as well as blind, split field duplicate samples collected at a frequency of 10% of the total number of samples (a minimum of one travel blank and one duplicate per trip were collected). In wadable habitat, surface water samples were collected directly into the laboratory provided containers, whereas grab samples were collected using a discrete interval sampler (e.g., Kemmerer) within deep, non-wadable habitats (e.g., lakes). Collected samples were transferred, where needed, directly into clean sampling containers provided by the analytical laboratory (ALS Environmental, Waterloo, ON). Samples were field-filtered (using 0.45 micron [µm] disk filters) and preserved in the field, where required and able, per laboratory instructions. Samples were kept cool and dark and shipped to the lab in coolers with appropriate cooling methods (e.g., wet ice or ice packs). The location of all sampling locations was recorded in Universal Transverse Mercator (UTM) using a handheld Global Positioning System (GPS) unit.

2.7.3 Water Quality Data Analysis

The surface water quality assessment documented existing, baseline conditions within the sampled locations. Water quality standards for the protection of aquatic life were used for comparison to the laboratory results, which identified the occurrence of naturally elevated concentrations under exiting conditions. The water quality results were compared to applicable Federal Environmental Quality Guidelines (FEQG 2022), Canadian Council of Ministers of Environment (CCME) water quality guidelines [WQG] for the Protection of Aquatic life (CCME 2016) and Provincial Guidelines (Ontario Water Quality Standards, Objectives, and Guidelines [PWQO], MOEE 1999). Water quality parameter concentrations that exceeded guidelines in baseline condition were noted to support interpretation of these values within the context of documenting existing conditions unrelated to the proposed Project.

As noted in the assessment overview, forest fire No. COC009 in early June 2023 at the Project site required evacuation of field crews near the fire. As such, interpretation of the June 2023 water quality data analysis considers potential atmospheric deposition from this fire, as well as contributions from surrounding forest fire smoke across northern Ontario and Quebec.

2.7.4 Quality Assurance and Control

A data quality assessment was completed on all surface water quality data. The assessment included a comparison of the field duplicates and travel blanks to data quality objectives (DQOs).

Blind, split field duplicate samples were collected to verify analytical results and laboratory precision by assessing the relative percent difference (RPD) between measured data and the duplicate from the same site. The RPD was calculated by dividing the absolute difference of the two measurements by the average of the measurements and multiplying by 100. The equation for RPD is shown below:

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

Further data evaluation was considered when the RPD between native and duplicate sample results was greater than 30%, for metals (inorganics and mercury), and 40% for PAHs.

The trip blank was not opened in the field and was used to identify contaminants introduced to samples during transport, storage, and analysis from sources such as sample bottles, caps, or preservatives. The DQO for the trip blank was met when the trip blank was less than two times the reported detection limit.

2.8 Lower Trophic and Primary Productivity

The lower trophic and primary productivity assessment evaluated eutrophication indicators, including phytoplankton and zooplankton (first order consumers; animal component of the planktonic community) biomass. These groups are within the lowest trophic levels of an aquatic ecosystem which support the upper-level fish community. These components were sampled during the open-water seasons for:

- 2021 from Martin Lake and Gerry Lake;
- 2022 from Gerry, Martin, Davis, Sutherland, Mel, and Jack lakes; and
- 2023 from Gerry, Martin, Davis, and Sutherland lakes.

2.8.1 Phytoplankton

Phytoplankton sampling in 2021 was conducted at NDR-Mar-08, NDR-Mar-10, NDR-Ger-08, and NDR-Ger-10. An interval water sampler (e.g., Kemmerer) was used to collect phytoplankton samples from the euphotic zone (uppermost layer of a body of water that receives sunlight). At sampling stations with euphotic zones greater than 2 m in depth, water was collected at 2 m intervals and combined into a composite sample in a clean container (e.g., bucket). A sub-sample of the water was poured into a pre-labelled 500 millilitre (mL) opaque plastic bottle and preserved with 2 mL of Lugol's solution. Phytoplankton samples were kept cool and in the dark for shipment to ALS for analyses of taxonomic composition, abundance, and biomass assessment.

2.8.2 Zooplankton

In 2021, zooplankton sampling was conducted at NDR-Ger-LK, NDR-Mar-LK, NDR-P-01, NDR-P-02A, NDR-P-03, NDR-P-04, NDR-S-01, NDR-S-02, NDR-S-04, NDR-TRIB-1, NDR-TRIB-2, WBR-P-01, WBR-P-02, WBR-S-01, WBR-S-02, WBR-S-03, WBR-S-04, MatR-01, MatR-02, NDR-P-02A, WBR-DvsLK and NDR-SutLK. Zooplankton sampling was completed in 2023 at NDR-Dvs-LK, NDR-GerLK, NDR-MarLK, and NDR-SuthLK. Zooplankton sampling methods followed a standardized protocol utilizing a 0.13 m diameter, 63 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 centimeters (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 (although not frozen) for shipment to Salki Consultants, Winnipeg, Manitoba for taxonomic analysis (i.e., species composition, density, and biomass).

2.8.3 Data Analysis

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

2.9 Sediment and Benthic Invertebrate Surveys

2.9.1 Data Analysis

Surficial sediment samples were collected concurrently with benthic invertebrate community (BIC) samples using a Petite Ponar grab sampler during the fall sampling programs (2021 and 2022). Each ponar grab sampled a surface area of 0.023 square metres (m^2). A total of three grab sub-samples were taken at each sample location for each analysis within similar depths and pooled (homogenized) into one composite sample to account for localized habitat heterogeneity and represent the substrates within the sampling location. Collecting three replicate grabs and 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 physicochemical properties at each benthic sampling location (i.e., particle size distribution, metal, and nutrient concentrations) were characterized to further support interpretation of the benthic community between and among sample locations. All surficial sediment sampling followed the protocols as set out by Canadian Association for Laboratory Accreditation (CALA) Guide to Current Sampling Practices (Fowlie 2014) and Environment Canada's technical guidance for environmental effects monitoring (EEM; 2012).

The following quality assurance and control (QA/QC) measures were implemented during sediment quality and benthic invertebrate 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 location;
- Equipment was thoroughly rinsed and cleaned using appropriate cleansers and decontaminant agents prior to use between sampling locations;
- BIC samples were field rinsed in a bucket sieve with 500 µm mesh;
- BIC samples were stored in appropriate containers using appropriate preservatives (10% buffered formalin) as directed by the laboratory;
- BIC samples were preserved within six hours of sample collection, or as soon as practical, to maintain sample integrity and minimize the potential for decomposition or within sample predation;
- 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 (COC) forms;
- All benthic samples were labeled with unique identification numeration;
- An experienced taxonomist was used for identification of freshwater macroinvertebrates; and
- Electronic data received from the taxonomist were checked to ensure correctness by qualified staff.

2.9.2 Laboratory Sampling Processing

Substrate composition was characterized through qualitative visual field assessments and quantitative laboratory grain size analysis. Laboratory chemical analysis was conducted by ALS Environmental, Waterloo, which is accredited by the CALA in accordance with 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 the rivers and creeks was recorded by field staff during habitat assessment.

Taxonomist 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 to the lowest practical level. Sorting included washing samples through 250 and 500 µm sieves, and organism sorting and identification using a stereomicroscope (10x multiplication). All invertebrates were identified to the lowest practical level and generally to the genus level, except for leeches, oligochaetes, stoneflies, mayflies, dragonflies, amphipods, and adult beetles and bugs, which were identified to the species level.

2.9.3 Sediment Quality Data Analysis

The sediment quality assessment documented existing, baseline conditions within the sampled locations. Sediment quality standards for the protection of aquatic life were used for comparison to the laboratory results, which identified the occurrence of naturally elevated parameters under existing conditions. 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 quality parameter concentrations that exceeded guidelines in baseline condition were noted to support interpretation of these values within the context of documenting existing conditions unrelated to the proposed Project. 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.

2.9.4 Sediment Quality Assurance and Quality Control

The precision of the sediment quality data was assessed using blind, split field duplicate samples collected from the composited and homogenized ponar grabs. The relative percent difference (RPD) between measured data and the duplicate from the same location was analyzed using the same approach as the duplicate water samples described above in Section 2.7.4. The sediment sample results did not meet the DQO when the RPD was greater than 30%.

2.9.5 Benthic Invertebrate Data Analysis

The BIC at each sample location were characterized using descriptive indices, including total invertebrate density, Simpson's index of diversity, evenness, and taxon richness. These indices were calculated and summarized using the guidelines for Environmental Effects Monitoring as stipulated by Environment Canada (2002). In addition, the relative percent community contribution of the Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies; EPT) taxa groups and the Chironomid (non-biting midge) taxa were calculated to further characterize the sample station benthic invertebrate communities. 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 but is a measure of how the abundance of individuals is distributed within the taxonomic groups inhabiting the sample location. 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 EPT is the percentage of individual benthic invertebrates within a sample. 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) was also calculated. Some genera of this taxa group are more tolerant of environmental stresses (pollution), consequently Chironomids tend to dominate the benthic invertebrate community in areas with degraded conditions.

462500 465000 467500 470000 472500 475000 477500

5420000 5417500 5415000 5412500 5410000 5407500 5405000 5402500 5400000 5397500

NDR-P-07
NDR-S-06b
NDR-S-05
100 m

WBR-P-04
WBR-P-03
WBR-S-05
WBR-P-01
200 m

NDR-S-06
CAMP 40 RD
WBR-S-07
655
NDR-S-04
WBR-S-04
WBR-S-03
MAT-R-02
Nesbitt Creek
RDAL-06
WBR-P-02
NDR-P-06
NDR-TRIB-02
NDR-P-03
North Driftwood River
WBR-S-06
NDR-S-02
MAT-R-01
Mattagami River
LOWER STURGEON DAM RD
West Buskegau River
NDR-TRIB-01
NDR-P-01
NDR-MARLK
Martin Lake
NDR-S-01
NDR-GERLK
Gerry Lake
NDR-P-04
Jocko Creek
RDAL-04
NDR-JACLK
NDR-P-02
NDR-SUTLK
NDR-P-02C
NDR-MELLK
NDR-DAVLK
50 m
NDR-P-05
Prosser Creek
Prosser Lake
Zed Lake
JC-S-01
RDAL-02
JC-S-03
WBR-S-02
WBR-S-01
RDAL-01
Kidd Creek
50 m

OVERVIEW MAP
NDR-US-TC
Mattagami River
Buskegau River
Enlarged Area
655
5 Km

X:\CA\CAOAK300-OAK\MIS-FS1-ProjectFl2023\Projects\OMEMA2304S_WSP_Canada_Inc_Crawford_Impact_Assessment\13_0_GIS\Aquatic\Baseline_2023\MXD\Sampling_Overview_Locs_2021to2023_1.mxd

LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction
- Sampling Locations
  - Surface Water
  - Habitat Assessment
  - Sediment
  - Benthic
  - Aquatic
  - eDNA
  - Zooplankton

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

0 1 2 4 6 8 10 Kilometres

Datum: NAD83
Projection: UTM Zone 17N

N W E S

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Sample Locations (2021-2023)

PROJECT N°:OMEMA2304	**FIGURE: 2-1**
SCALE: 1:70,000	DATE: October 2023

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

Sample Location	Sample ID	UTM EASTING (M)	UTM NORTHING (M)	Fish Community	EDNA	Fish Tissue	Surface Water, Lower Trophic	Habitat Observations	Sediment And Benthos Sampling
Gerry Lake	NDR-GERLK	471,312	5,405,901	$Fa^{1,2}$ $Su^{2,3}$ $Sp^{2,3}$	—	Fa^{1} Fa^{2}	$Su^{1,2,3}$ $Fa^{1,2}$ $Sp^{2,3}$	Fa^{2} Sp^{3} Su^{3}	$Fa^{1,2}$
Martin Lake	NDR-MARLK	470,800	5,406,674	$Fa^{1,2}$ $Su^{2,3}$ $Sp^{2,3}$	—	Fa^{1} Fa^{2}	$Su^{1,2,3}$ $Fa^{1,2}$ $Sp^{2,3}$	Fa^{2} Sp^{3} Su^{3}	$Fa^{1,2}$
Jack Lake	NDR-JACLK	471,063	5,404,861	Sp^{2} Su^{2} Fa^{2}	—	Fa^{2}	Sp^{2} Su^{2} Fa^{2}	Fa^{2}	Fa^{2}
Sutherland Lake	NDR-SUTLK	471,196	5,404,506	Fa^{2} $Su^{2,3}$ Sp^{3}	—	Fa^{2}	$Sp^{2,3}$ $Su^{2,3}$ Fa^{2}	Fa^{2} Sp^{3} Su^{3}	Fa^{2}
Mel Lake	NDR-MELLK	471,359	5,404,023	Su^{2}	—	—	Su^{2} Fa^{2}	—	—
Davis Lake	NDR-DAVLK	471,641	5,403,926	Sp^{2} $Su^{2,3}$	—	—	Sp^{2} $Su^{2,3}$ Fa^{2}	Su^{3}	—
Jocko Creek (tributary)	JC-S-01	473,298	5,401,501	$Sp^{2,3}$ $Su^{2,3}$ Fa^{2}	—	Fa^{2}	$Sp^{2,3}$ $Su^{2,3}$ Fa^{2}	$Sp^{2,3}$ $Su^{2,3}$ Fa^{2}	Fa^{2}
	JC-S-03	470,637	5,399,897	—	—	—	Sp^{3} Su^{3}	—	—
Mattagami River	MAT-R-01	464,060	5,408,522	—	Sp^{3}	—	$Fa^{1,2}$ Sp^{2} $Su^{2,3}$	Fa^{2} Su^{3}	—
	MAT-R-02	462,924	5,412,397	—	—		$Fa^{1,2}$ Sp^{2} $Su^{2,3}$	Fa^{2} Su^{3}	—
North Driftwood River	NDR-P-01	473,170	5,406,517	$Su^{1,2}$ $Fa^{1,2}$ Sp^{2}	—	Fa^{2}	$Su^{1,2}$ $Fa^{1,2}$ Sp^{2}	Su^{2} Fa^{2}	$Fa^{1,2}$
	NDR-P-02	470,367	5,408,269	$Su^{1,2}$ Sp^{2} Fa^{2}	—	—	Su^{1}, Fa^{1}, Sp^{2}	Su^{2} Fa^{2}	—
	NDR-P-02B/C	470,293	5,408,254	Su^{1}	—	—	Sp^{2}, Su^{2}, Fa^{2}	—	—
	NDR-P-03	469,849	5,409,424	$Su^{1,2}$ $Fa^{1,2}$ Sp^{2}	—	Fa^{2}	$Su^{1,2}$, $Fa^{1,2}$ Sp^{2}	Su^{2} Fa^{2}	$Fa^{1,2}$
	NDR-P-04	470,319	5,408,375	$Su^{1,2}$ Sp^{2} Fa^{2}	—	—	$Su^{1,2}$, $Fa1.^{2}$ Sp^{2}	Su^{2} Fa^{2}	—
	NDR-P-05	476,718	5,403,463	Sp^{2} Su^{2}	—	—	Sp^{2}, Su^{2}	—	—
	NDR-P-06	468,569	5,410,391	Sp^{2} Su^{2} Fa^{2}	—	Fa^{2}	Sp^{2}, Su^{2}, Fa^{2}	Sp^{2} Su^{2} Fa^{2}	—
	NDR-P-07	467,529	5,411,225	Sp^{2} Su^{2} Fa^{2}	—		Sp^{2}, Su^{2}, Fa^{2}	Sp^{2} Su^{2} Fa^{2}	Fa^{2}
	NDR-S-01	475,456	5,406,408	Su^{1} $Fa^{1,2}$ Sp^{2}	—	Fa^{2}	Su^{1}, $Fa^{1,2}$ Sp^{2}	Fa^{2}	$Fa^{1,2}$
	NDR-S-02	472,044	5,408,756	$Su^{1,2}$ $Fa^{1,2}$ Sp^{2} Fa^{2}	—		$Su^{1,2}$, $Fa^{1,2}$ Sp^{2}	$Su^{1,2}$ Sp^{2} Fa^{2}	$Fa^{1,2}$
	NDR-S-04	470,374	5,412,392	$Su^{1,2,3}$ $Fa^{1,2}$ $Sp^{2,3}$	—		$Su^{1,2,3}$ $Fa^{1,2}$ $Sp^{2,3}$	$Su^{1,2,3}$ $Fa^{1,2}$ $Sp^{2,3}$	$Fa^{1,2}$
	NDR-S-05	468,595	5,410,419	Sp^{2} Su^{2} Fa^{2}	—	Fa^{2}	Sp^{2} Su^{2}	Sp^{2} Su^{2} Fa^{2}	Fa^{2}
	NDR-S-06	469,374	5,416,327	—	Sp^{3} Su^{3}	—	$Sp^{2,3}$ Su^{3}	Sp^{3} Su^{3}	—
	NDR-S-06B	469,374	5,416,327	Sp^{3} Su^{3}	—	—	Sp^{3}	Sp^{3} Su^{3}	—
	NDR-TRIB-01	471,523	5,406,902	$Fa^{1,2}$ Su^{2} Sp^{2}	—	—	$Su^{1,2}$ $Fa^{1,2}$ Sp^{2}	Sp^{2} Su^{2} Fa^{2}	$Fa^{1,2}$
	NDR-TRIB-02	471,050	5,409,487	$Fa^{1,2}$ Su^{1} Sp^{2}	—	Fa^{2}	Su^{1} $Fa^{1,2}$ Sp^{2}	Su^{1} Sp^{2} Fa^{2}	—
	NDR-US-TC	469,021	5,430,420	—	Sp^{3} Su^{3}	—	—	—	—
West Buskegau River	WBR-P-01	475,213	5,412,048	Su^{1} Sp^{2}	—	—	Su^{1} Fa^{1} Sp^{2}	—	Fa^{1}
	WBR-P-02	475,882	5,412,178	Su^{1}	—	—	Su^{1} Fa^{1}	—	—
	WBR-P-03	474,907	5,412,151	Su^{2} Fa^{2}	—	Fa^{2}	Su^{2} Fa^{2}	Su^{2} Fa^{2}	Fa^{2}
	WBR-P-04	474,562	5,412,273	$Su^{2,3}$ Fa^{2} Sp^{3}	—	Fa^{2}	$Su^{2,3}$ Fa^{2} Sp^{3}	$Su^{2,3}$ Fa^{2} Su^{3}	Fa^{2}
	WBR-S-01	478,677	5,405,872	Sp^{2} Su^{2}	—	—	$Su^{1,2}$ Fa^{1} Sp^{2}	Su^{1} Sp^{2} Su^{2}	—
	WBR-S-02	478,566	5,405,908	—	—	—	Su^{1} Fa^{1}	Su^{1}	Fa^{1}
	WBR-S-03	476,682	5,412,369	$Su^{1,2}$ Fa^{1} Sp^{2}	—	—	$Su^{1,2}$ Fa^{1} Sp^{2}	Su^{1} Sp^{2} Su^{2}	Fa^{1}
	WBR-S-04	476,574	5,412,898	$Su^{1,2,3}$ Fa^{1} $Sp^{2,3}$	—	—	$Su^{1,2,3}$ Fa^{1} $Sp^{2,3}$	$Su^{1,2,3}$ $Sp^{2,3}$	Fa^{1}
	WBR-S-05	474,726	5,412,113	—	—	—	Su^{2}	Su^{2}, Fa^{2}	—
	WBR-S-06	477,097	5,410,013	—	—	—	Sp^{3} Su^{3}	Sp^{3} Su^{3}	—
	WBR-S-07	477,328	5,416,353	—	—	—	Sp^{3} Su^{3}	Sp^{3} Su^{3}	—

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

Sample Location	Sample ID	UTM EASTING (M)	UTM NORTHING (M)	Fish Community	EDNA	Fish Tissue	Surface Water, Lower Trophic	Habitat Observations	Sediment And Benthos Sampling
Road Alignment Crossings	RDAL-01	472,885	5,398,174	—	—	—	Su[3]	Su[3]	—
	RDAL-02	471,735	5,400,918	—	—	—	Sp[3] Su[3]	Sp[3] Su[3]	—
	RDAL-03	470,651	5,403,484	No watercourse					
	RDAL-04	470,034	5,404,940	—	—	—	Sp[3]	Sp[3]	—
	RDAL-05	469,698	5,406,157	No watercourse					
	RDAL-06	469,654	5,411,715	—	—	—	Sp[3] Su[3]	Sp[3] Su[3]	—

"Su[1]" summer sampling program (August 5 - 11, 2021).
"Fa[1]" fall sampling program (October 19 - 28, 2021).
"Sp[2]" spring sampling program (May 28 - June 8, 2022).
"Su[2]" summer sampling program (August 17, 29 - 31 and September 1 - 2 and 14 - 18, 2022).
"Fa[2]" fall sampling program (October 12 - 25, 2022).
"Sp[3]" spring sampling program (May 12 - 14, May 30 - June 4, June 7 - June 10 and June 12 -14, 2023).
"Su[3]" summer sampling program (July 11 - 16, 2023).

Table 2-2: Fish Community Gear-Specific Sampling Summary by Location and Season

Sample Location	Sample ID	GILL NET	FYKE NET	DIP NET	Minnow Trap	SEINE NET	Electrofishing
Gerry Lake	NDR-GERLK	$Fa^{1,2}$ $Su^{2,3}$ Sp^{3}	—	—	$Fa^{1,2}$ $Su^{2,3}$ $Sp^{2,3}$	—	—
Martin Lake	NDR-MARLK	$Fa^{1,2}$ $Su^{2,3}$ Sp^{3}	—	—	Fa^{1} $Su^{2,3}$ $Sp^{2,3}$	—	—
Jack Lake	NDR-JCKLK	Su^{2} Fa^{2}	—	—	Sp^{2} Su^{2} Fa^{2}	—	—
Sutherland Lake	NDR-SUTLK	Fa^{2} $Su^{2,3}$	—	—	$Su^{2,3}$ Fa^{2} Sp^{3}	—	—
Mel Lake	NDR-MELLK	Su^{2}	—	—	Su^{2}	—	—
Davis Lake	NDR-DVSLK	$Su^{2,3}$	—		Sp^{2} $Su^{2,3}$	—	—
Jocko Creek (tributary)	JC-S01	Sp^{3}	—	—	$Su^{2,3}$ Fa^{2} $Sp^{2,3}$	—	$Su^{2,3}$ Sp^{3}
North Driftwood River	NDR-P-01	Su^{2}	—	Su^{1}	$Su^{1,2}$ $Fa^{1,2}$ Sp^{2}	—	—
	NDR-P-02	Su^{2}	—	—	$Su^{1,2}$ Sp^{2} Fa^{2}	—	—
	NDR-P-02C	—	—	—	Su^{1}	—	—
	NDR-P-03	$Su^{1,2}$	—	—	$Su^{1,2}$ $Fa^{1,2}$ Sp^{2}	—	—
	NDR-P-04	Su^{2}	—	—	$Su^{1,2}$ Sp^{2} Fa^{2}	—	—
	NDR-P-05	—	—	—	Sp^{2} Su^{2}	—	—
	NDR-P-06	Su^{2}	—	—	Sp^{2} Su^{2} Fa^{2}	—	—
	NDR-P-07	Su^{2}	—	—	Sp^{2} Su^{2} Fa^{2}	—	—
	NDR-S-01	—	—	—	Su^{1} $Fa^{1,2}$ Sp^{2}	—	—
	NDR-S-02	Su^{2}	—	Su^{1}	$Fa^{1,2}$ Sp^{2} Su^{2}	Su^{1} Fa^{1}	—
	NDR-S-04	Su^{2}, Sp^{3}	—	—	$Sp^{2,3}$ $Su^{2,3}$ Fa^{2}	$Su^{1,2}$ Fa^{1} Sp^{3}	$Su^{1,3}$
	NDR-S-05	Su^{2}	—	—	Sp^{2} Su^{2} Fa^{2}	—	—
	NDR-S-06B	Sp^{3}	—	—	Sp^{3}	—	Su^{3}
	NDR-TRIB-01	Su^{2}	—	—	$Fa^{1,2}$ Sp^{2} Su^{2}	—	—
	NDR-TRIB-02	—	—	Su^{1}	$Fa^{1,2}$ Sp^{2}	—	—
West Buskegau River	WBR-P-01	—	—	—	Su^{1} Sp^{2}	—	—
	WBR-P-02	—	—	Su^{1}	Su^{1}	—	—
	WBR-P-03	—	—	—	Su^{2} Fa^{2}	—	—
	WBR-P-04	Su^{2}	—	—	$Su^{2,3}$ Fa^{2} Sp^{3}	—	—
	WBR-S-01	—	—	—	Sp^{2} Su^{2}	—	—
	WBR-S-02	—	—	—	—	—	—
	WBR-S-03	—	—	—	Sp^{2} Su^{2}	Su^{1} Fa^{1}	—
	WBR-S-04	Sp^{3}	Su^{1}	—	$Su^{1,2}$ $Sp^{2,3}$	$Su^{1,3}$ Fa^{1}	Sp^{3} Su^{3}

Electrofishing refers to the use of a backpack electrofishing unit to sample an isolated segment of habitat.

"Su^{1}" summer sampling program (August 5 - 11, 2021).

"Fa^{1}" fall sampling program (October 19 - 28, 2021).

"Sp^{2}" spring sampling program (May 28 - June 8, 2022).

"Su^{2}" summer sampling program (August 17, 29 - 31, and September 1 - 2 and 14 – 18, 2022).

"Fa^{2}" fall sampling program (October 12 - 25, 2022).

"Sp^{3}" spring sampling program (May 12 - 14, May 30 - June 4, June 7 - June 10 and June 12 -14, 2023).

"Su^{3}" summer sampling program (July 11 – 16, 2023).

3.0 RESULTS

The following sections provide location-specific assessment results for the 2021 to 2023 fish and fish habitat studies, including as completed and appropriate:

- In situ physicochemical surface water quality sampling locations, parameters and analytical water quality results and water quality profiles in Appendix A (Tables A1-1 to A3-2; Figures A1-1 to A3-6);
- Fish habitat and community sample locations, survey results including gear-specific capture results listing fish species occurrence in each waterbody and the eDNA results in Appendix B (Tables B1-1 to B4-2 and Figures B1-1 to B3-2);
- Concentrations of select contaminants of concern in fish tissue, including total mercury and methylmercury, as well as fish ageing results in Appendix C (Tables C1-1 to C2-2 and Figures C1-1 to C2-3);
- Lower trophic and primary productivity results in Appendix D (Figures D1-1 to D2-7);
- Sediment quality sample locations and laboratory results in Appendix E (Tables E1-1 to E2-1c and Figures E1-1 and E1-2);
- The BIC sample locations and taxonomic results including descriptive community-based metrics are provided in Appendix F (Tables F1-2 to F2-2 and Figures F1-1 and F1-2);
- Data quality assurance and control assessments are in Appendix G (Tables G1-1 to G3-2); and
- A photographic record of site conditions is provided in Appendix H.

The following sections are organized by watershed and present the location-specific findings for the above noted study components, as applicable with reference to the season and year specific data contained in the respective appendices. These report sections are intended to summarize the 2021 to 2023 findings, whereas the field data and laboratory results summaries by year and location are within the appendices.

3.1 North Driftwood River Watershed

3.1.1 Gerry Lake

3.1.1.1 Surface Water Quality

LAKE PROFILES

Gerry Lake profiles were measured twice during both the 2022 and 2023 field programs (Appendix A; Figure A3-1). The maximum measured water depth was between 11 and 14 m when profiles were recorded; however, detailed bathymetry was recorded in 2022 showing the maximum surveyed depth of Gerry Lake as 20 m (Appendix A; Figure A2-1). In 2022, the thermocline was present in August at a depth of 2.5 m and in October at a depth of 7.5 m, which suggests Gerry Lake had not experienced a fall turnover at the time of sampling. In August, DO showed a declining trend with depth, which differs from the October sampling event where DO showed an increasing trend with depth. This increase in DO with depth is expected as cold water can retain higher oxygen concentrations than the near-surface, warmer water.

In 2023, the thermocline was present at 3 m in both June and July, which is slightly deeper than the late summer and fall 2022 measurements, suggesting Gerry Lake had stratified prior to these spring and summer 2023 measurements.

IN-FIELD MEASUREMENTS

In-field water quality measurements were recorded in Gerry Lake (NDR-GERLK) twice in 2021 (summer and fall), once during spring 2022, and twice (spring and summer) in 2023.

- In 2021, in-field water temperature ranged from 8.2 to 23.7°C (Appendix A; Table A1-1). In-field DO measurements near surface were 9.17 mg/L in summer and 6.58 mg/L in fall, and both met the PWQO and the CWQG guidelines for the general protection of coldwater biota (6.5 mg/L). These values did not meet the CWQG guidelines for coldwater species early life stages (9.5 mg/L). In-field pH measurements were 7.8 in summer and 7.71 in fall. Conductivity measurements ranged from 193 to 270 µS/cm during the assessment periods.
- For spring 2022, the temperature of Gerry Lake was 19.0°C (Appendix A; Table A2-1) and the DO was 5.76 mg/L, which met the PWQO guidelines for the general protection of cold and warm water biota (5 mg/L and 4 mg/L, respectively). In field pH was 7.46 and conductivity was 200 µS/cm.
- For 2023, the temperature of the lake was 17.9°C in spring and 21.2°C in summer, with in-field near surface DO measurements of 8.54 mg/L in spring and 7.27 mg/L in summer (Appendix A; Table A3-1). DO measurements met the PWQO and the CWQG guidelines for the general protection of coldwater biota (6.5 mg/L); however, the measurements did not meet the CWQG guidelines for coldwater species early life stages (9.5 mg/L). In field pH ranged from was 7.92 to 8.13 between the seasons and conductivity measurements ranged from 191 to 204 µS/cm during the assessment periods.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from Gerry Lake shows most parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life, with a naturally elevated concentration of total iron that was greater than the respective quality criteria (Figure 3-1). Detailed laboratory results are provided in Appendix A (Tables A1-2a, A2-2a, and A3-2a).

3.1.1.2 Fish Habitat

Gerry Lake has riparian habitat comprised of grasses and sedges, as well as sparse shrubs providing some overhead cover nearshore. The upland vegetation is mostly coniferous species such as Black Spruce (*Picea mariana*). Some aquatic macrophyte growth was observed within the nearshore areas, with a relatively steep littoral zone connection between Martin Lake and Gerry Lake that is shallow with dense emergent vegetation mostly represented by Horsetail (*Equisetum* sp.).

3.1.1.3 Fish Community

Fish community surveys were completed in Gerry Lake across all three sampling years (2021 to 2023). A total of four fish species were detected throughout the study period (Table 3-1, with northern pike and yellow perch being the most frequently caught species. Small-bodied species included golden shiner and Iowa darter. Summer water temperature measurements and the fish species records show the thermal guild classification for Gerry Lake represents cool water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- A total of three fish species were captured from Gerry Lake during the 2021 field program, including Iowa darter, yellow perch, and northern pike (Appendix B; Table B1-1 and B1-2). Baited minnow traps and gillnets were used with gillnets the most effective capture gear, collecting the most specimens. Northern pike were the most frequently caught fish species.

- A total of two fish species, yellow perch and Iowa darter, were captured during the 2022 field program as shown in Appendix B (Table B2-1 and B2-2). Baited minnow traps and gillnets were used, with minnow traps being the only effective capture gear. Yellow perch represented the greatest proportion of fish species caught.
- A total of four fish species were captured during the 2023 field program, including golden shiner, Iowa darter, yellow perch, and northern pike (Appendix B; Table B3-1 and B3-2). Baited minnow traps and gillnets were used, with minnow traps being the most effective gear. Yellow perch represented the greatest proportion of fish species caught.

3.1.1.4 Fish Tissue

Fish tissue samples were collected in Gerry Lake during 2021. A total of eight northern pike samples were submitted for fish tissue analysis. No obvious abnormalities or external parasites were noted for these fish. Skinless, boneless, and dorsal epaxial muscle tissue results are displayed in Table C1-1 (Appendix C) for the following parameters: aluminum, arsenic, cadmium, copper, iron, selenium, mercury, and methylmercury. The analytical results display total metals in mg/kg of wet weight (wwt) as well as total mercury by length and weight (Appendix C; Figures C1-1 to C1-8 and C1-17 to C1-19).

For northern pike, baseline total mercury (mg/kg wwt) showed increasing trends with length and weight, as well as age as expected. Results show northern pike older than 1 year of age having mercury concentrations greater than the recommended consumption guidelines. The average total mercury concentration (1.55 mg/kg wwt) was higher than the Ontario sensitive population (0.5 mg/kg) and Health Canada (0.5 mg/kg) guidelines, but lower than the Ontario consumption guidelines developed for the general population (1.8 mg/kg). Average total methylmercury concentration ranged from 0.31 to 6.23 mg/kg wwt, with an average of 1.74 mg/kg wwt. All baseline samples had methylmercury concentrations greater than the CCME guideline of 0.033 mg/kg. For other metals and metalloids:

- Total aluminum concentrations had an average of 1.02 mg/kg wwt, and total arsenic concentration had an average of 0.05 mg/kg wwt.
- Average total cadmium, copper and iron concentrations were 0.001, 0.15, and 2.98 mg/kg wwt, respectively.
- Selenium concentration in tissue samples ranged from 0.45 to 0.63 mg/kg dwt, with an average of 0.56 mg/kg dwt. All selenium concentrations were less than the FEQG criterion (6.7 ug/g dwt).

Individual northern pike age results are displayed in Appendix C, Tables C1-1 and C2-1 and age at length on Figure C2-1. Very strong trends in northern pike showed that older fish tended to be larger (as length) in size.

3.1.1.5 Lower Trophic and Primary Productivity

PHYTOPLANKTON

Baseline phytoplankton samples were collected from Gerry Lake once during the 2022 field program. Total phytoplankton biovolume and density results are displayed in Appendix D (Figures D2-1 and D2-2). Graphical analyses showed lower total biovolume expressed as cubic micrometres (μm^3) and higher phytoplankton density expressed as the number of cells per litre of sample (cell/L) in Gerry Lake compared to Martin Lake, which is hydrologically connected by a shallow channel. Relative community composition analysis showed Bacillariophyceae (diatoms) and Cyanophyceae (blue-green algae) represented the greatest proportion by biovolume (52% and 26%, respectively). Chrysophyceae (golden algae) and Bacillariophyceae represented the greatest relative community composition by density during the September sampling event (45% and 40%, respectively). Gerry Lake had the highest phytoplankton density of all sites sampled and the lowest species diversity with four classes.

ZOOPLANKTON

Baseline zooplankton data are important to monitor to determine the cause of any long-term changes to the fish community from an ecological perspective, and these results establish baseline condition within Gerry Lake. Zooplankton samples were collected twice (summer and fall) in 2021, 2022, and 2023.

Zooplankton samples were collected from Gerry Lake stations in August and October 2021. Total biomass (mg/m^3), total density ($\#/m^3$), and percent relative zooplankton density from these samples were analyzed graphically to determine trends (Appendix D; Figures D1-1 to D1-3), with the following results:

- Data shows seasonal variability for biomass and density, with August data having more than double the biomass and density as October at all stations.
- Overall, total biomass and density were the highest in August at Gerry Lake.
- A total of five orders of zooplankton were found within Gerry Lake, where Anonopoda (Family Daphniidae) Calanoida, and Bosminidae constituted nearly all zooplankton biomass.
- For total density, Cyclopoida was the most dominant order of zooplankton. Similarly, relative zooplankton density was co-dominated by Cyclopoida, Calanoida, and Anonopoda (Family Daphniidae).

Zooplankton samples were collected from Gerry Lake biota in August and October 2022. Total biomass, expressed as micrograms per litre (µg/L), total density as the number of individuals per litre (#/L) and percent relative zooplankton density were analyzed graphically to determine trends (Appendix D; Figures D1-1 to D1-3). Results are summarized below:

- Data shows seasonal variability for biomass and density, particularly during the August sample event when phytoplankton growth is high and changes in zooplankton communities respond to the availability of food (phytoplankton) within a short timeframe.
- Seven orders of zooplankton were found within Gerry Lake, where Bosminidae, Calanoida, and Cyclopoida represented nearly all zooplankton biomass.
- Seasonal variability shows diverse relative percent zooplankton density, where Bosminidae, Calanoida, and Ploima represent most of the sample in August, compared to October, where Ploima was the dominant order (>80%).

The 2022 results differ from the 2021 relative percent zooplankton density data which shows greater density of Cyclopoida (>70%) in August and Calanoida (<40%) and Daphniidae (<30%) in October. Compared to the other lakes sampled in 2022, Gerry Lake showed the lowest total density and biomass in both seasons sampled.

The 2023 zooplankton results were not available for this draft report and will be provided in the final report or as an addendum to the final report, as appropriate.

3.1.1.6 Sediment Quality

Sediment samples were collected from Gerry Lake during fall 2021 and 2022 with parameters of interest and respective quality criteria shown on Figure 3-5; detailed laboratory results are presented in Appendix E.
A summary of baseline sediment quality results that were greater than their respective quality criteria is provided below to identify naturally elevated concentrations of these parameters:

- Mean cadmium concentrations exceeded the PSQG LEL in both years, with greater concentrations and variability among replicate grabs measured in 2022.
- Mean chromium concentrations exceeded the PSQG LEL in both years; in 2022, sample results also exceeded the CSQG ISQG.
- Mean copper concentrations exceeded the PSQG LEL in both years with greater overall concentrations measured in 2022.
- Mean iron concentrations exceeded the PSQG LEL in 2022; however, one replicate grab in 2021 and all grabs in 2022 exceeded this criterion.
- Mean manganese concentrations exceeded the PSQG LEL in both years, with the range of replicate grabs all greater than this criterion. Concentrations reported in 2021 were greater than reported in 2022.
- Mean nickel concentrations were greater than the PSQG LEL in both years, with greater overall concentrations measured in 2022.
- Mean zinc concentrations were greater than the PSQG LEL in 2022, but less than this criteria in 2021.
- Total Kjeldahl nitrogen was measured in 2022 with concentrations greater than the PSQG LEL and SEL.
- Total organic carbon content was generally at or greater than the PSQG LEL in both years.

Nutrient and organic carbon content enrichment was expected as these commonly measure greater than the quality criterion in depositional lentic environs that receive organic inputs and typically contain high organics content, such as Gerry Lake.

Differences observed between the 2021 and 2022 sediment quality are likely attributable to differences in sample location and water depth within the lake. The 2021 samples were collected within the northern area of Gerry Lake in depths ranging from 1.0 to 1.5 m, whereas the 2022 samples were collected at three locations in the north, middle, and southern areas of the lake in depths ranging from 4.3 to 16.9 m. These data help to establish baseline condition within the lake and identify existing sediment quality concentrations for some parameters that are naturally greater than their respective quality criteria.

3.1.1.7 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from Gerry Lake (NDR-GERLK) in 2021 and 2022 concurrently with the sediment quality sampling. A summary of the benthic invertebrate community descriptors is presented in Table 3-2 and Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area.

Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- Mean total invertebrate density (TID) was considerably higher in 2021 compared to 2022. In 2021, the BIC showed the second highest value of mean TID of all sites sampled. Values obtained in 2022 were among the lowest of all sites sampled;
- Mean family richness was higher in 2021 than in 2022. In 2021, mean richness was the highest at Gerry Lake of all waterbodies within the North Driftwood River watershed, while in 2022, mean richness was among the lowest;

- Mean Simpson's Diversity was higher in 2021 than in 2022. In 2021, mean Simpson's Diversity was among the highest values obtained for waterbodies within the North Driftwood River watershed, while in 2022 the mean Simpson's Diversity was consistent with the midrange;
- Mean Simpson's Evenness was higher in 2022 than in 2021. In both years, evenness tended to be slightly higher than most other waterbodies sampled within the North Driftwood River watershed;
- Mean percent of EPT taxa was zero in 2022, while values obtained in 2021 were the highest of all within the North Driftwood River watershed;
- Mean percent of chironomids was higher in 2021 than in 2022. In both years, the mean percent of chironomids was among the lowest in the North Driftwood River watershed;
- Taxa composition was similar to most other sites in the North Driftwood River watershed, showing a high abundance of Chironomidae. While a high abundance of Chironomidae was observed in both years, composition varied slightly between 2021 and 2002. The taxa with the second highest abundance were Caenidae and Chaoboridae in 2021 and 2022, respectively.

3.1.2 Martin Lake

3.1.2.1 Surface Water Quality

LAKE PROFILES

Martin Lake profiles were measured once in 2022 and in 2023 (Appendix A; Figure A3-2). The maximum measured water depth was 10 when profiles were recorded and detailed bathymetry was measured in 2022 showing a maximum surveyed depth of 10 m (Appendix A, Figure A2-1). In 2021 and 2022 the thermocline was present at a depth of 3 m in August and June, respectively. This suggests Martin Lake was stratified during these sampling event.

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken in Martin Lake (NDR-MARLK), twice in 2021 (summer and fall), once during spring 2022 and twice (spring and summer) 2023.

- In 2021, in-field water temperature ranged from 8.2 to 23.7°C (Appendix A; Table A1-1), and DO measurements ranged from 7.68 mg/L in summer and 6.69 mg/L in fall, and both met the PWQO and the CWQG for the general protection of cold-water biota (6.5 mg/L). These values did not meet the CWQG for cold-water species early life stages (9.5 mg/L). In-field pH measurements was 7.1 in summer and 7.4 in fall. Conductivity measurements ranged from 83 to 119 µS/cm during the assessment periods.
- During the 2022 field investigations, in-field water temperature of the lake was 10.4 °C (Appendix A; Table A2-1). The DO concentration in-field during the spring was 9.25 mg/L and met the PWQO for the general protection of cold-water biota (6 mg/L). In field pH and conductivity were 4.81 and 28.5 µS/cm, respectively, during the spring assessment.
- In 2023, in-field water temperature was 16.8 °C (Appendix A; Table A3-1). The DO concentration was 8.17 mg/L and met the PWQO for the general protection of cold-water biota (6 mg/L). In field pH and conductivity were 7.80 and 67.4 µS/cm, respectively.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from Martin Lake shows most parameters are within the respective range of the acceptable quality criteria values for the protection of aquatic life, with naturally elevated total iron that was greater than the respective quality criteria (Figure 3-1). Detailed laboratory results are provided in Appendix A (Tables A1-2a, A2-2a, and A3-2a).

3.1.2.2 Fish Habitat

Martin Lake has a similar riparian habitat to Gerry Lake, comprised of grasses and sedges, as well as sparse shrubs providing some overhead cover near shore. The upland vegetation is mostly coniferous species such as black spruce. Further upland, there is evidence of recent logging in the area, although a riparian buffer has remained. Some aquatic macrophyte growth was observed within the near shore areas, as well as offshore locations since the lake is relatively shallow. The connecting channel between Martin Lake and Gerry Lake is shallow with dense emergent vegetation mostly represented by Horsetail (*Equisetum sp.*).

3.1.2.3 Fish Community

Fish community surveys were completed in Martin Lake across all three sampling years (2021 to 2023). A total of two fish species were detected throughout the study period (Table 3-1), including northern pike and yellow perch. Summer water temperature measurements and the fish species records show the thermal guild classification for Martin Lake represents cool water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- During the 2021 field program, one fish species was captured from Martin Lake, which was northern pike (Appendix B; Table B1-2). Gillnets were used in October and collected a total of four individuals.
- A total of two fish species were captured from Martin Lake during the 2022 field program, yellow perch, and northern pike (Appendix B; Tables B2-1 and B2-2). Gillnets and baited minnow traps were used, with the most effective capture gear being minnow traps in 2022, capturing 35 individuals.
- Similar to 2022, two fish species were captured from Martin Lake during the 2023 field program, yellow perch and northern pike (Appendix B; Tables B3-1 and B3-2). Gillnets and baited minnow traps were used during both sampling events, with minnow traps being the most effective gear, capturing 21 individuals.

3.1.2.4 Fish Tissue

Fish tissue samples were collected from Martin Lake in 2021 and 2022. A total of four northern pike samples were submitted for fish tissue analysis from Martin Lake in 2021. No obvious abnormalities or external parasites were noted for these fish. Dorsal muscle tissue results are displayed in Tables C1-1 and C2-1 (Appendix C) for the following parameters: aluminum, arsenic, cadmium, copper, iron, selenium, mercury, and methylmercury. The analytical results display total metals in mg/kg of wet weight (wwt) as well as total mercury by length and weight (Appendix C; Figures C1-6, C1-7, C1-18 and C1-19).

For northern pike, total mercury (mg/kg wwt) showed increasing trends with length and weight, as well as age . Results show northern pike older than 3 years of age having mercury concentrations over the recommended consumption guidelines. The average total mercury concentration (0.76 mg/kg wwt) was higher than the Ontario (0.5 mg/kg) and Health Canada (0.5 mg/kg) guidelines, but lower than the Ontario consumption guidelines developed for the general population (1.8 mg/kg). Average total methylmercury concentration ranged from 0.53 to 1.62 mg/kg wwt, with an average of 0.85 mg/kg wwt. All samples had methylmercury concentrations greater than the CCME guideline of 0.033 mg/kg. For other metals and metalloids:

- Total aluminum concentrations had an average of 0.87 mg/kg wwt, and total arsenic concentration had an average of 0.09 mg/kg wwt.
- Average total cadmium, copper and iron concentrations were 0.001, 0.14, and 2.18 mg/kg wwt, respectively.
- Selenium concentration in tissue samples ranged from 0.51 to 0.70 mg/kg dwt, with an average of 0.61 mg/kg dwt. All selenium concentrations were less than the FEQG criterion (6.7 ug/g dwt).

Individual northern pike age results are displayed in Appendix C (Table C1-1) and age at length on Figure C2-1. Very strong trends in northern pike showed that older fish tended to be larger (as length) in size.

One northern pike dorsal muscle tissue sample was submitted for analysis from Martin Lake in 2022. Tissue and aging results are displayed in Appendix C (Table C2-1), as well as total mercury by age, length, and weight (Figures C1-1 to C1-8, C1-17 to C1-19 and C2-1).

The total mercury concentration was 0.25 mg/kg wwt, which is less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg) and those developed for women of child-bearing age and children (0.5 mg/kg), as well as the Health Canada maximum contaminant concentration (0.5 mg/kg). This fish also represented the smallest fish (total length or weight) within the 2021 to 2022 dataset (n=5), with all other tissue samples collected in 2021 containing total mercury concentrations greater than the general population consumption guideline.

Total methylmercury concentration was 0.17 mg/kg wwt, which exceeded the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota and is typically exceeded by large-bodied species. Selenium concentration (0.50 mg/kg dwt) was less than the FEQG for whole body samples (6.7 ug/g dwt).

3.1.2.5 Lower Trophic and Primary Productivity

PHYTOPLANKTON

Phytoplankton samples were collected once from Martin Lake during the 2022 field program. Total phytoplankton biovolume and density results are displayed in Appendix D (Figures D2-1 and D2-2). Analyses of total biovolume (μm^3) and density (cells/L) showed Bacillariophyceae (diatoms) represented the greatest proportion (>75%) during the September sampling event. Compared to Gerry Lake, Martin Lake had a higher biovolume but a lower density of phytoplankton, showing there were less individuals of higher mass within those samples. Similar findings were shown in analysis of relative percent biovolume and relative density (Appendix D; Figures D2-3 and D2-4). Martin Lake had the highest phytoplankton biovolume of all locations sampled.

ZOOPLANKTON

Zooplankton samples were collected from Martin Lake stations in August and October 2021 and 2022 and June 2023. At the time of preparation of this report, laboratory results had not been received for the 2023 sampling event.

In 2021, total biomass (mg/m^3), total density ($\#/m^3$) and percent relative zooplankton density were analyzed graphically to determine trends (Appendix D; Figures D1-1 to D1-3), with the following results:

- Data shows seasonal variability for biomass and density, with August data having higher biomass and density than October at all stations.
- Five orders of zooplankton were found within Martin Lake, where Daphniidae, Calanoida, and Bosminidae constituted nearly all zooplankton biomass.

- For total density, Cyclopoida was the most dominant order of zooplankton. Similarly, relative zooplankton density was co-dominated by Cyclopoida, Calanoida, and Daphniidae.

Martin Lake results in August and October were like those of Gerry Lake in October, although August biomass and density data from Gerry Lake was three times higher than the other sampling months. Similar studies in Northern oligotrophic lakes showed zooplankton total biomass and taxa richness results that closely resembled those of Gerry Lake and Martin Lake, with a mean zooplankton biomass of 79 mg/m^3 and range of 13 to 152 mg/m^3 (Golder 2015; Golder 2021a). Seasonal variability of total zooplankton abundance also followed the same trends, which peaked in the summer at both lake stations.

Zooplankton samples were collected from the Martin Lake in August and October 2022. Total biomass (µg/L), total density (#/L) and percent relative zooplankton density were analyzed graphically to determine trends Appendix D (Appendix D Figures D2-5 to D2-7), with the following results:

- Data shows seasonal variability for biomass and density. Seven zooplankton orders were found in Martin Lake, where Ploima, and Cylopoida represented nearly all the zooplankton biomass.
- Both biomass and density were higher in October compared to August, where Ploima showed the highest density of all species across all sampling events.
- October zooplankton in Martin Lake had the highest density compared to all lakes sampled across all seasons.
- Similar to Gerry Lake, seasonal variability shows diverse relative percent zooplankton density, where Bosminidae, Calanoida and Ploima represent the majority of the taxa in August, compared to mostly Ploima (>95%) representation in October.
- These results differ from 2021 relative percent zooplankton density data which shows the community consisted mostly of Cyclopoida (>40%) and Bosminidae (>25%) in August and Cyclopoida (>45%) and Calanoida (>30%) in October.

The 2023 zooplankton results were not available for this draft report and will be provided in the final report or as an addendum to the final report, as appropriate.

3.1.2.6 Sediment Quality

Sediment samples were collected from Martin Lake during fall 2021 and 2022 with parameters of interest and respective quality criteria shown on Figure 3-5, as well as detailed laboratory results presented in Appendix E. A summary of baseline sediment quality results that were greater than their respective quality criteria is provided below to identify naturally elevated concentrations of these parameters:

- Mean cadmium concentrations exceeded the PSQG LEL in both years, with greater concentration in 2021 but greater variability among replicate grabs in 2022.
- Mean chromium concentrations exceeded the PSQG LEL in both years; whereas the 2022 sample results also exceeded the CSQG ISQG.
- Mean copper concentrations exceeded the PSQG LEL in both years with greater overall concentrations measured in 2022.

- Mean iron concentrations exceeded the PSQG LEL in 2022 with all replicate grabs exceeded this criterion.
- Mean manganese concentrations exceeded the PSQG LEL in both years, with the range of replicate grabs all greater than this criterion and the 2021 mean results were greater than in 2022; however, a broader range of concentrations was observed in 2022.
- Mean nickel concentrations were greater than the PSQG LEL in both years, with greater overall concentrations measured in 2022.
- Mean zinc concentrations were greater than the PSQG LEL in both year, but the range of concentrations in 2021 was less than this criterion.
- Total Kjeldahl nitrogen was measured in 2022 with concentrations greater than the PSQG LEL.
- Total organic carbon content was greater than the PSQG SEL in 2021, but less than this value in 2022.

Nutrient and organic carbon content enrichment was expected since the 2021 samples were collected in shallow, organic-rich habitat compared to the deeper sample locations in 2022. Total organic carbon is commonly measured greater than the PSQG LEL and SEL quality criteria in depositional lentic environs that receive organic inputs and typically contain high organics content, such as Martin Lake.

Differences observed between the 2021 and 2022 sediment quality may be attributable to difference in sample location within the lake. The 2021 samples were collected within the northern area of Martin Lake in depths ranging from 1 to 1.5 m, whereas the 2022 samples were collected at three locations: one in the north and two within the middle two deep basins of the lake in depths ranging from 1 to 2 m. These data help to establish baseline condition within the lake and identify preexisting sediment quality concentrations that are naturally greater than their respective quality criteria.

3.1.2.7 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from Martin Lake in 2021 and 2022. A summary of the benthic invertebrate community descriptors are presented in Table 3-2 and Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area.

Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- Mean Martin Lake TID was considerably higher in 2021 than it was in 2022. The value obtained in 2021 was the highest of all sites sampled, while the 2022 value was among the lowest;
- Mean family richness was considerably higher in 2021 than it was in 2022. The value obtained in 2021 was among the highest in the North Driftwood River watershed, while the 2022 value was among the lowest;
- Mean Simpson's Diversity was considerably higher in 2021 than it was in 2022. The value obtained in 2021 was among the highest of all sites sampled, while the 2022 value represented the midrange;
- Mean Simpson's Evenness was considerably higher in 2022 than it was in 2021. Values obtained in 2021 were generally similar to other sites within the North Driftwood River watershed, while the 2022 value was among the highest;
- Mean percent of EPT taxa was considerably higher in 2021 than it was in 2022. The value obtained in 2021 was among the highest in the North Driftwood River watershed, while the 2022 value was among the lowest;

- Mean percent of chironomids was higher in 2021 than it was in 2022. These values were generally lower than most in the North Driftwood River watershed over both years;
- Taxa composition was similar to most other sites in the North Driftwood River watershed, showing a high abundance of Chironomidae. Composition was very similar to that of Gerry Lake.

3.1.3 Jack Lake

3.1.3.1 Surface Water Quality

LAKE PROFILES

Jack Lake profiles were measured twice during the 2022 field program (Appendix A; Figure A3-3). The maximum measured water depth was 15 m. A thermocline was present in September and October at a depth of 8 m which suggests Jack Lake was not well mixed during the fall months. Temperature generally shows a declining trend with depth, as expected. During the September sampling event, DO showed a declining trend with depth which differs from the October sampling event, in which DO showed a generally increasing trend with depth. This increase is expected during fall turnover as cold water can retain higher concentrations of DO than warm water.

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken at one location in Jack Lake (NDR-JACLK) during the spring 2022, The temperature of the lake was 19.2 °C, DO was 10.35 mg/L, pH was 7.64 and conductivity was 232.1 µS/cm (Appendix A Table A2-1). DO met both the PWQO for the general protection of cold and warm water biota.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis during the three seasonal sampling events in 2022 from Jack Lake shows all parameters are within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-1). Detailed laboratory results are provided in Appendix A (Table A2-2a).

3.1.3.2 Fish Habitat

Jack Lake has a riparian habitat comprised of fen sedges and grasses, as well as sparse shrubs and trees providing some overhead cover nearshore. The upland vegetation is mostly coniferous species (e.g., black spruce and tamarack (*Larix laricina*)). Some aquatic macrophyte growth was observed within the nearshore areas (e.g., cattails). There is a small bay adjacent to Jack Lake connected by a few small channels. The north end of the lake is a relatively shallow bay (less than 2 m total depth) and the max depth of the lake measured during the 2022 field studies was 15 m.

3.1.3.3 Fish Community

Fish community surveys were completed in Jack Lake in 2022. A total of 11 fish species were detected throughout the study period (Table 3-1), with brook stickleback being the most frequently caught species. Summer water temperature measurements and the fish species records show the thermal guild classification for Jack Lake represents cool water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A total of 190 individuals were captured by minnow traps and gillnets across all sampling seasons, with minnow traps being the most effective method of capture.

3.1.3.4 Fish Tissue

One brook stickleback composite sample was submitted for fish tissue analysis from Jack Lake and consisted of 13 individuals to meet minimum mass requirements. Additionally, one northern pike dorsal muscle tissue sample was submitted for analysis. Tissue results are displayed in Appendix C, Tables C2-1 and C2-2, as well as total mercury by length and weight on Figures C1-20 and C1-21.

Total mercury concentration was 0.07 and 0.33 mg/kg wwt for brook stickleback and northern pike, respectively. Total mercury concentration for northern pike was less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg), those developed for women of child-bearing age and children (0.5 mg/kg), as well as the Health Canada maximum contaminant concentration (0.5 mg/kg).

Total methylmercury concentration was 0.055 and 0.24 mg/kg wwt for brook stickleback and northern pike, respectively, both of which exceeded the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.

Selenium concentration was 0.43 and 1.06 mg/kg dwt for northern pike and brook stickleback, respectively and was less than the FEQG for whole body samples (6.7 ug/g dwt) for both species.

Individual northern pike age results are displayed in Appendix C, Table C2-1.

3.1.3.5 Lower Trophic and Primary Productivity

PHYTOPLANKTON

Phytoplankton samples were collected once from Jack Lake during the 2022 field program. Total phytoplankton biovolume and density results are displayed in Appendix D (Figures D2-1 and D2-2). Six classes of phytoplankton were found in Jack Lake, with Chrysophyceae (golden algae) and Cyanophyceae (blue-green algae) constituting most of the phytoplankton biovolume ($\mu m^{3;}$ Appendix D; Figure D2-1). Similarly, relative community composition analysis showed Cryptophyceae, Chrysophyceae and Cyanophyceae dominated the water column by density (>30%, >25% and >25% respectively; Appendix D; Figure D2-4).

ZOOPLANKTON

Zooplankton samples were collected from Jack Lake in September and October. Total biomass (µg/L), total density (#/L) and percent relative zooplankton density were analyzed graphically to determine trends (Appendix D, Figures D2-5 and D2-5). Data shows seasonal variability for biomass and density. Seven orders of zooplankton were found in Jack Lake, where Daphniidae represented nearly all the zooplankton biomass. Seasonal variability shows diverse relative percent zooplankton density, where Cyclopoida, Daphniidae, and Flosculariaceae constitute most of the community in September, compared to dominance of Ploima (>90%) in October. This trend is also seen in Martin Lake, Gerry Lake, and Sutherland Lake.

3.1.3.6 Sediment Quality

Sediment samples were collected from Jack Lake during fall 2022 with parameters of interest and respective quality criteria shown on Figure 3-5, as well as detailed laboratory results presented in Appendix E. A summary of baseline sediment quality results that were greater than their respective quality criteria is provided below to identify naturally elevated concentrations of these parameters:

- Mean arsenic concentration exceeded the PSQG LEL with a range of values above and below this criterion.
- Mean cadmium concentration exceeded the PSQG LEL, showing minimal variability in concentration.

- Mean chromium concentration exceeded the PSQG LEL, with concentration variability showing exceedance of the CSQG ISQG.
- Mean copper concentration exceeded the PSQG LEL, showing minimal variability in concentration.
- Mean lead concentration exceeded the PSQG LEL and CSQG ISQG, showing minimal variability in concentration.
- Mean nickel concentration exceeded the PSQG LEL, showing minimal variability in concentration.
- Mean zinc concentrations was less than PSQG LEL; however, concentration variability showed the upper concentration was slightly greater than this criterion.
- Total Kjeldahl nitrogen was greater than the PSQG SEL in all grab samples.
- Total organic carbon content was greater than the PSQG SEL in all grab samples.

Nutrient and organic carbon content are commonly measured greater than the PSQG LEL and SEL quality criteria in depositional lentic environs that receive organic inputs and typically contain high organics content, such as Jack Lake. These data help to establish baseline condition within the lake and identify existing sediment quality concentrations for some parameters that are naturally greater than their respective quality criteria.

3.1.3.7 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from Jack Lake in 2022. A summary of the benthic invertebrate community descriptors are presented in Table 3-2 and Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area.

Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- Jack Lake showed the highest value of mean TID of all lakes sampled in 2022, however this value is among the lowest within the North Driftwood River watershed;
- Jacke Lake showed the highest value of mean family richness of all lakes sampled in 2022. This value represents the approximate midrange of all sites sampled;
- Mean Simpson's Diversity represents the midrange value of all sites sampled;
- Mean Simpson's Evenness was the lowest of all lakes sampled in 2022;
- Mean percent EPT taxa was the highest of all lakes sampled in 2022 and represented the midrange of all sites sampled;
- Mean percent of chironomids was the highest of all lakes sampled in 2022 and was the second highest within the North Driftwood River watershed;
- Taxa composition was similar to most other sites in the North Driftwood River watershed, showing a high abundance of Chironomidae. A small percentage of Ceratopogonidae was observed in Jack Lake and was not observed in any other lake sampled in 2022.

3.1.4 Sutherland Lake

3.1.4.1 Surface Water Quality

LAKE PROFILES

Sutherland Lake profiles were measured three times during 2022 and twice during the spring and summer 2023 field programs (Appendix A; Figure A3-4). The maximum measured water depth ranged between 6.5 m and 20 m. A thermocline was not present during the spring 2022 sampling event but was present in September at a depth of 4.5 m and in October at a depth of 8 m which suggests Sutherland Lake was not well mixed during the fall sampling months. Temperature and DO readings remained generally stable with depth in June and show a declining trend during the September sampling event. DO concentrations generally showed an increasing trend with depth during October.

In 2023, the thermocline was present at 3.5 m in June and 4 m in July which suggests Sunderland Lake was not well mixed during these sampling events.

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken at one Location in Sutherland Lake (NDR-SUTLK) three times in 2022 (spring, summer, and fall) and twice (spring and summer) 2023.

- In 2022, in-field water temperature ranged from 6.7°C to 19.9°C, DO ranged from 4.5 to 9.2 mg/L and pH ranged from 7.8 to 8.8. DO in spring and summer met both the PWQO for the general protection of cold and warm water biota; however, the fall measurement and lake profile (Appendix A; Figure A3-4) show lower oxygen concentrations in the upper five metres. This may be attributable to low flow conditions which allowed the upper layer to warm resulting in reduced oxygen conditions.
- For 2023, in-field water temperature ranged from 17.4°C to 22.8°C, DO ranged from 7.97 to 9.34 mg/L and pH ranged from 8.1 to 8.13. DO in spring and summer met both the PWQO for the general protection of cold and warm water biota.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from Sutherland Lake shows all parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-1). Detailed laboratory results are provided in Appendix A (Tables A2-2a and A3-2a).

3.1.4.2 Fish Habitat

Sutherland Lake has a riparian habitat comprised of fen mats, sedges, grasses, as well as sparse shrubs providing overhead cover nearshore. The upland vegetation is mostly coniferous species, including Black Spruce, Eastern White Cedar (*Thuja occidentalis*), and Tamarack. Sutherland Lake has two large bays connected through a channel defined by floating fen mats on both shorelines. Some aquatic macrophyte growth was observed within the nearshore areas (e.g., cattails [*Typha sp.*]). Submergent macrophytes (e.g., pondweed [*Potamogeton sp.*]) were also observed. The maximum water depth measured during the 2022 field season was 20 m, with the channel depth between both bays being approximately 3 m. Sutherland Lake has an inflow from Mel Lake with an outlet at the northwest shoreline that proceeds to flow through a stream that ultimately reports to Gerry Lake (MNRF 2022).

3.1.4.3 Fish Community

Fish community surveys were completed in Sutherland Lake in 2022 and 2023. A total of six fish species were detected throughout the study period (Table 3-1), with brook stickleback and Iowa darter being the most frequently caught species. Northern pike and yellow perch were the large bodied species caught during the surveys. Summer water temperature measurements and the fish species records show the thermal guild classification for Sutherland Lake represents cool to warm water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- A total of six fish species were captured from Sutherland Lake during the 2022 field program. Gillnets and minnow traps were used in summer and fall, collecting total of 31 individuals, and minnow traps were the most effective method of capture.
- A total of eight fish species were captured from Sutherland Lake during the 2023 field program. Gillnets and minnow traps were used during both spring and summer, collecting total of 129 individuals, with minnow traps being the most effective method of capture.

3.1.4.4 Fish Tissue

Fish tissue samples were collected in Sutherland Lake during 2022 field investigations. Two northern pike dorsal muscle tissue samples were submitted for analysis from Sutherland Lake. Tissue results are displayed in Table C2-1 (Appendix C) and the analytical results display total metals in mg/kg wwt (Appendix C; Figures C1-1 to C1-8).

Total mercury concentration for these fish averaged 0.25 mg/kg wwt, which is less than the Ontario consumption guidelines developed for the general population (1.8 mg/kg) and those developed for women of child-bearing age and children (0.5 mg/kg), as well as the Health Canada maximum contaminant concentration (0.5 mg/kg). Total methylmercury concentration averaged 0.16 mg/kg wwt, where both samples exceeded the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Selenium concentrations averaged 0.43 mg/kg dwt and were less than the FEQG for whole body samples (6.7 ug/g dwt). Individual northern pike age results are displayed in Table C2-1 (Appendix C).

3.1.4.5 Lower Trophic and Primary Productivity

PHYTOPLANKTON

Phytoplankton samples were collected once from Sutherland Lake during the 2022 field program. Total phytoplankton biovolume and density results are displayed in Appendix D Figures D2-1 to D2-4. Seven classes of phytoplankton were found in Sutherland Lake, with Bacillariophyceae (diatoms) and Dinophyceae (dinoflagellates) constituting most of the phytoplankton biovolume (μm^3; Appendix D, Figure D2-1). Conversely, relative community composition analysis showed Bacillariophyceae, Chlorophyceae (green algae) and Chrysophyceae (golden algae) dominated the water column by density (>20%, >20% and >35% respectively; Figure D2-4). Sutherland lake was found to have the greatest class diversity of all locations sampled (n=7).

ZOOPLANKTON

Zooplankton samples were collected from the Sutherland Lake biota station in September and October 2022. Total biomass (µg/L), total density (#/L) and percent relative zooplankton density were analyzed graphically to determine trends (Appendix D, Figures D2-5 to D2-7). Data shows seasonal variability for biomass and density. Seven zooplankton orders were found in Sutherland Lake, where Daphniidae constituted nearly all the zooplankton biomass. Seasonal variability shows diverse relative percent zooplankton density, where Bosminidae, Cyclopoida, Daphniidae, and Ploima constitute most of the community in September, compared to the domination of Ploima (>75%) in October. This trend is also seen in Martin Lake, Gerry Lake, and Jack Lake.

The 2023 zooplankton results were not available for this draft report and will be provided in the final report or as an addendum to the final report, as appropriate.

3.1.4.6 Sediment Quality

Sediment samples were collected from Sutherland Lake during fall 2022 with parameters of interest and respective quality criteria shown on Figure 3-5, as well as detailed laboratory results presented in Appendix E. A summary of baseline sediment quality results that were greater than their respective quality criteria is provided below to identify naturally elevated concentrations of these parameters:

- Mean arsenic concentration exceeded the PSQG LEL with a wide range of concentrations above and below this criterion.
- Mean cadmium concentration exceeded the PSQG LEL, showing broad variability in concentration.
- Mean chromium was less than PSQG LEL; however, concentration variability showed the upper concentration was slightly greater than this criterion.
- Mean copper concentration exceeded the PSQG LEL, showing broad variability in concentration.
- Mean lead concentration exceeded the PSQG LEL and CSQG ISQG, showing broad variability in concentration, with the lower concentration less than both criteria.
- Mean nickel concentration exceeded the PSQG LEL, showing minimal variability in concentration.
- Mean zinc concentration was greater than the PSQG LEL; however, concentration variability showed the lower concentration was less than this criterion.
- Total Kjeldahl nitrogen was greater than the PSQG SEL in all grab samples.
- Total organic carbon content was greater than the PSQG SEL in all grab samples.

Nutrient and organic carbon content are commonly measured greater than the PSQG LEL and SEL quality criteria in depositional lentic environs that receive organic inputs and typically contain high organics content, such as Sutherland Lake. These data help to establish baseline condition within the lake and identify existing sediment quality concentrations for some parameters that are naturally greater than their respective quality criteria.

3.1.4.7 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from Sutherland Lake in 2022. A summary of the benthic invertebrate community descriptors are presented in Table 3-2 and Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area.

Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- Mean TID was the lowest of all sites sampled;
- Mean family richness was similar to Gerry Lake, but lower than Jack and Martin lakes in 2022. This value was among the lowest of sites sampled within the North Driftwood River watershed;
- Mean Simpson's diversity was the highest of all lakes sampled in 2022 and was among the highest of all sites sampled;
- Mean Simpson's evenness was considerably higher than all sites sampled;
- Zero EPT taxa were observed in Sutherland Lake in 2022;
- Mean percent chironomids were similar to values obtained at Martin Lake, but lower than Gerry Lake and higher than Jack Lake in 2022. This value is among the lowest of sites sampled within the North Driftwood River watershed.

3.1.5 Mel Lake

3.1.5.1 Surface Water Quality

LAKE PROFILES

Mel Lake profiles were measured once during the 2022 field program (Appendix A; Figure A3-5). The maximum measured water depth was 18 m. A thermocline was present in September at a depth of 6 m. This suggests Mel Lake was not well mixed during the sampling event. Temperature and DO generally show a declining trend with depth, as expected.

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken at one location in Mel Lake (NDR-MELLK) during the summer field campaign. The surface water temperature of the lake was 16.5°C, DO was 9.1 mg/L and pH was 8.37. All parameters met the PWQO.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from Mel Lake shows all parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-1). Detailed laboratory results are provided in Appendix A (Table A2-2a).

3.1.5.2 Fish Habitat

Mel Lake has a riparian habitat comprised of sedges and grasses, as well as sparse shrubs providing overhead cover nearshore. The upland vegetation is mostly coniferous species (e.g., Black Spruce, Tamarack, and Eastern White Cedar [*Thuja occidentalis*]). Some aquatic macrophyte growth was observed within the nearshore areas. Mel Lake is relatively small in comparison to the other lakes as it is located in between Davis Lake and

Sutherland Lake. There is evidence of beaver activity throughout the lake as there is a dam and signs of foraging. Submergent macrophytes (e.g., pondweed) is found throughout the lake.

3.1.5.3 Fish Community

Fish community surveys were completed in Mel Lake in 2022. A total of nine fish species were detected throughout the study period (Table 3-1), with yellow perch being the most frequently caught species. Summer water temperature measurements and the fish species records show the thermal guild classification for Mel Lake generally represents cool to warm water fish habitat (Coker et al. 2001; Hasnain et al. 2010). Gillnets and minnow traps were used in summer and collected a total of 132 individuals, where minnow traps were the most effective method of capture.

3.1.5.4 Lower Trophic and Primary Productivity

PHYTOPLANKTON

Phytoplankton samples were collected once from Mel Lake during the 2022 field program. Total phytoplankton biovolume and density results are displayed in Appendix D (Figures D2-1 and D2-2). A total of five classes of phytoplankton were identified in Mel Lake, with Chlorophyceae (green algae) and Cyanophycae (blue-green algae) constituting most of the phytoplankton biovolume (μm^3; Appendix D, Figure D2-1). Conversely, relative community composition analysis showed Chrysophyceae (golden algae) dominated the water column by density (>50%) with some Chlorophyceae and Cyanophyceae (>20% and >20%, respectively; Appendix D, Figure D2-4).

ZOOPLANKTON

Zooplankton samples were collected from the Mel Lake in September. Total biomass (µg/L), total density (#/L) and percent relative zooplankton density were analyzed graphically to determine trends (Appendix D, Figures D2-5 to D2-7). Seven zooplankton orders were found in Mel Lake, where Daphniidae and Cyclopoida constituted nearly all the zooplankton biomass. Data shows diverse relative percent zooplankton density, where Bosminidae, Cyclopoida and Daphniidae constitute most of the community in September. Mel Lake showed the highest biomass (1,100 µg/L wwt) in September compared to any other sampling event or lake sampled in 2022.

3.1.6 Davis Lake

3.1.6.1 Surface Water Quality

LAKE PROFILES

Davis Lake profiles were measured once during both the 2022 and 2023 field programs (Appendix A; Figure A3-6). The maximum measured water depth was between 20 and 22 m. In 2022, a thermocline was present in September at a depth of 4.5 m and in 2023 the thermocline was present in July at 3.5 m. This suggests Davis Lake was not well mixed during the sampling events. Temperature and DO generally show a declining trend with depth, as expected during both sampling events.

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken at one location in Davis Lake (NDR-DAVLK), once during spring 2022 and once (summer) 2023 (Appendix A; Table A3-1).

- In 2022, the in-field temperature of the lake was 18.2 °C and DO was 7.17 mg/L and met both the PWQO . The pH was 7.57 and conductivity was 228.2 µS/cm during the spring assessment.
- For 2023, the temperature of the lake was 23.4°C with in-field DO measurements near surface was 9.28 mg/L and met the PWQO and the CWQG for the general protection of coldwater biota (6.5 mg/L); however, did not

meet the CWQG for coldwater species early life stages (9.5 mg/L). In field pH from was 8.46 and conductivity 219 µS/cm.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from Davis Lake shows all parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-1). Detailed laboratory results are provided in Appendix A (Tables A2-2a and A3-2a).

3.1.6.2 Fish Habitat

Davis Lake has a riparian habitat comprised of sedges and grasses, as well as sparse shrubs providing overhead cover nearshore. Along the south and east shoreline there are floating fen mats providing additional overhead cover. The upland vegetation is mostly coniferous species (e.g., Black Spruce, White Pine [*Pinus strobus*], and Eastern White Cedar). Some aquatic macrophyte growth was observed within the nearshore areas. Connectivity between Davis Lake and Mel Lake is poor due to a narrow section of land which is likely submerged during periods of extended precipitation or spring freshet. The water was mostly colourless and provided high visibility allowing for clear observations of bottom substrate.

3.1.6.3 Fish Community

Fish community surveys were completed in Davis Lake in 2022 and 2023 field investigations. A total of eight fish species were detected throughout the study period (Table 3-1), with finescale dace and Iowa darter being the most frequently caught species. Summer water temperature measurements and the fish species records show the thermal guild classification for Davis Lake generally represents cool to warm water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- In 2022, a total of eight fish species were captured from Davis Lake. Minnow traps were the most effective capture gear collecting a total of 438 individuals, and no fish caught in the gill nets.
- In 2023, a total of three fish species were captured from Davis Lake. Minnow traps were the only effective capture gear collecting a total of 34 individuals, with no fish caught in the gill nets.

3.1.6.4 Lower Trophic and Primary Productivity

PHYTOPLANKTON

Phytoplankton samples were collected once from Davis Lake during the 2022 field program and once during 2023. Total phytoplankton biovolume and density results are displayed on Figures D2-1 and D2-2 (Appendix D). A total of five classes of phytoplankton were identified in Davis Lake, with Cyanophyceae (blue-green algae) and Chlorophyceae (green algae) constituting most of the phytoplankton biovolume (µm^3; Appendix D, Figure D2-1). Conversely, relative community composition analysis showed Chrysophyceae (golden algae) dominated the water column by density (>55%) with some Chlorophyceae and Cyanophyceae (>20% and >10%, respectively). Similar community composition is found in Mel Lake. Davis Lake also showed the lowest total biovolume and density of all locations sampled in 2022.

ZOOPLANKTON

Baseline zooplankton data are important to monitor to determine the cause of any long-term changes to the fish community from an ecological perspective, independent of future mine-related effects. Zooplankton samples were collected from Davis Lake stations once in 2022 and once in 2023.

Zooplankton samples were collected from the Davis Lake in September. Total biomass (µg/L), total density (#/L) and percent relative zooplankton density were analyzed graphically to determine trends (Appendix D, Figures D2-5 to D2-7). Seven orders of zooplankton were found in Sutherland Lake, where Calanoida, Cyclopoida, and Daphniidae constituted nearly all the zooplankton biomass. Conversely, Cyclopoida and Flosculariaceae constitute most of the community by relative percent zooplankton density.

The 2023 zooplankton results were not available for this draft report and will be provided in the final report or as an addendum to the final report, as appropriate.

3.1.7 Unnamed Tributaries

3.1.7.1 Surface Water Quality

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken at the two unnamed tributaries (NDR-TRIB-01 and NDR-TRIB-02), twice in 2021(summer and fall) and three times in 2022 (spring, summer, and fall).

- In 2021, in-field water temperature was measured ranging from 7.5°C to 21.65°C (Appendix A; Table A1-1), with in-field DO measurements ranging from 0.66 to 6.94 mg/L. Both NDR-TRIB-01 and NDR-TRIB-02 (2.3 and 0.66 mg/L, respectively) in summer did not meet the PWQO, the CWQG for the general protection of coldwater biota and did not meet the CWQG for coldwater species early life stages (9.5 mg/L). In-field pH measurements ranged from 5.53 to 6.39 in summer and 5.46 to 6.87 in fall, having pH values at NDR-TRIB-01 and NDR-TRIB-02 in summer less than the PWQO and CWQG . Conductivity measurements ranged from 35 to 130 µS/cm during the assessment periods.
- In 2022, in-field water temperature ranged from 6.1°C to 17.2°C across all sampling events (Appendix A; Table A2-1). NDR-TRIB-02 did not meet the DO PWQO, and NDR-TRIB-01 did not meet the PWQO for the protection of cold water and warm water biota. The pH values ranged from 4.82 to 6.95 and was less than the PWQG in the spring and fall at NDR-TRIB-02. Conductivity ranged from 19.2 to 88.25 µS/cm throughout the three seasons of sampling.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from the unnamed tributaries shows most parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-2). Detailed laboratory results are provided in Appendix A (Tables A1-2a and A2-2c). Analytical results of note include:

- Laboratory pH was consistently less than the PWQO at NDR-Trib-02;
- Both locations had elevated total iron concentrations; and,
- Aluminum concentrations were greater than the CCME at NDR-Trib-02.

3.1.7.2 Fish Habitat

The two unnamed tributary study areas contained wide floodplain habitat dominated by sedges and grasses, as well as emergent macrophytes (i.e., cattail and horsetail). Woody shrubs were also abundant which transitioned to a mostly coniferous forest further upland. Submergent (i.e., milfoil [*Myriophyllum sp.*]) and floating macrophytes (i.e., yellow pond lily [*Nuphar sp.*]) were also observed, as well as submerged woody debris providing in-stream cover. Chanel widths ranged from 1.4 to 6.0 m, and total depths ranged from 1.1 to 1.5 m. Beaver dams and lodges were frequently observed within these areas and may create seasonal limitations to fish passage.

3.1.7.3 Fish Community

Fish community surveys were completed in the two unnamed tributaries (NDR-Trib-01 and NDR-Trib-02) in 2021 and 2022. A total of six fish species were detected throughout the study period (Table 3-1), with brook stickleback being the most frequently caught species. Summer water temperature measurements and the fish species records show the thermal guild classification for these locations represent cold to cool water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- A total of two fish species were captured in 2021. Baited minnow traps and dipnets were used in August and October and collected a total of two individuals overall.
- In 2022, a total of six fish species were captured from the two unnamed tributaries. Baited minnow traps and gillnets were used, with minnow traps being the only effective capture gear. Brook stickleback represented the greatest proportion of fish species caught.

3.1.7.4 Fish Tissue

Fish tissue samples were not submitted from these unnamed tributaries in 2021. In 2022, one brook stickleback and one northern pearl dace whole body composite samples were submitted for fish tissue analysis from NDR-TRIB-02. Brook stickleback and northern pearl dace composite samples consisted of 5 and 21 individuals, respectively. Tissue results are displayed in Appendix C, Table C2-2, Figures C1-9 to C1-16 as well as average total mercury by length and weight on Figures C1-20 to C1-27.

The brook stickleback and northern pearl dace total mercury and methylmercury concentrations were 0.036 and 0.029 mg/kg wwt (total mercury) and 0.062 and 0.049 mg/kg wwt (methylmercury), respectively. Northern pearl dace had a higher methylmercury concentration in tissues (Appendix C, Table C2-2) and exceeded the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota.

3.1.7.5 Sediment Quality

Sediment samples were collected from NDR-TRIB-01 during fall 2021 and 2022 with parameters of interest and respective quality criteria shown on Figure 3-6, as well as detailed laboratory results presented in Appendix E. Of note, only one of the three samples collected in 2022 was analyzed for total organic carbon since some of the sample containers were not available for analysis due to laboratory handling error. A summary of baseline sediment quality results that were greater than their respective quality criteria is provided below to identify naturally elevated concentrations of these parameters:

- Mean cadmium concentration exceeded the PSQG LEL in 2021, with greater variability among replicate grabs measured in 2022.
- Mean chromium concentrations exceeded the PSQG LEL in both years.

- Mean copper concentrations exceeded the PSQG LEL in 2021, with broad concentration variability; whereas less variability in concentrations was observed in 2022 and these values were less than the criterion.
- Mean manganese concentrations exceeded the PSQG LEL in both years.
- Mean nickel concentrations were at or less than the PSQG LEL in both years, with greater overall concentration variability in 2021.
- Total Kjeldahl nitrogen was measured in 2022 with concentrations greater than the PSQG LEL.
- Total organic carbon content was greater than the PSQG LEL in both years and less than the SEL.

Nutrient and organic carbon content enrichment was expected as these commonly measure greater than the respective quality criteria in depositional lentic environs, as well as flat gradient watercourses that receive organic inputs and typically contain high organics content, such as these tributaries. These data help to establish baseline condition within the watercourse and identify existing sediment quality concentrations for some parameters that are naturally greater than their respective quality criteria.

3.1.7.6 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from NDR-TRIB-01 in 2021 and 2022. A summary of the benthic invertebrate community descriptors are presented in Table 3-2 and Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area.

Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- Mean TID at NDR-TRIB-01 was higher in 2022 than 2021. These values were among the highest obtained within the North Driftwood River watershed;
- Mean family richness at NDR-TRIB-01 was higher in 2022 than 2021. The value obtained in 2022 was among the highest in the North Driftwood River watershed, while 2021 value was generally similar to the North Driftwood River watershed;
- Mean Simpson's Diversity at NDR-TRIB-01 was higher in 2022 than 2021. These values were slightly higher than most obtained from the North Driftwood River watershed;
- Mean Simpson's Evenness was higher in 2021 than 2022. Values obtained in 2021 were generally similar to those within the North Driftwood River watershed, while values obtained in 2022 were generally lower than those within the North Driftwood River watershed;
- Mean percent of EPT taxa at NDR-TRIB-01 was among the lowest of all sites sampled in 2022, while no EPT taxa were identified in 2021;
- Mean percent of chironomids at NDR-TRIB-01 was higher in 2021 than 2022 and was among the highest within the North Driftwood River watershed; and,
- Taxa composition at NDR-TRIB-01 was similar in 2021 and 2022 and was similar to other sites in the North Driftwood River watershed, showing a high abundance of Chironomidae.

3.1.8 Unnamed Streams

3.1.8.1 Surface Water Quality

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken at three sites (NDR-S-01, NDR-S-02 and NDR-S-04) in 2021, five sites (NDR-S-01, NDR-S-02, NDR-S-04, NDR-S-05 and NDR-S-06) in 2022, and three sites (NDR-S-04, NDR-S-06 and NDR-S-06b) in 2023.

- In 2021, in-field water temperature ranged from 19.7°C to 20.7°C in summer and 4.5°C to 7.0°C in fall (Appendix A; Table A1-1). In-field DO measurements ranged from 3.92 to 9.49 mg/L, and station NDR-S-04 (3.92 mg/L) in summer did not meet the PWQO. No stations met the CWQG for the general protection of coldwater biota (6.5 mg/L) during the summer and no stations met the CWQG for coldwater species early life stages (9.5 mg/L) in summer or fall. In-field pH measurements ranged from 4.54 to 6.7 in summer and 6.79 to 6.91 in fall, with measured pH at station NDR-S-01 in summer less than the PWQO and CWQG . Conductivity measurements ranged from 35.4 to 147 µS/cm during the assessment periods.
- In 2022, in-field temperature ranged from 14.7°C to 21.4°C in spring, 12.27°C to 19.3 °C and 5.5°C to 6.5 °C in the fall. The DO measurements ranged from 3.42 to 6.58 mg/L (Appendix A; Table A2-1).
  Station NDR-S-01 (3.42 mg/L) in the fall and NDR-S-02 (3.48 mg/L) in the summer did not meet the PWQO .
  The pH ranged from 4.64 to 6.93 and conductivity ranged from 25.4 to 107 µS/cm across all seasons.
- In 2023, in-field temperature ranged from 16.2°C to 23°C in spring, and 18.7°C to 22.5 °C in the summer. The DO measurements ranged from 6.25 to 8.74 mg/L (Appendix A; Table A3-1). The DO measurements at NDR-S-01 (3.42 mg/L) in the fall and NDR-S-02 (3.48 mg/L) in the summer did not meet the PWQO . The pH ranged from 6.11 to 7.98 and conductivity ranged from 21.1 to 89.3 µS/cm across all seasons.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from the unnamed streams shows most parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-2). Detailed laboratory results are provided in Appendix A (Tables A1-2c, A2-2c, and A3-2b). Analytical results of note include:

- pH was less than the PWQO during the spring sampling events at NDR-S-01, NDR-S-05 and NDR-S-06;
- Total copper concentrations were greater than the PWQO at NDR-S-04;
- Total iron concentrations were mostly greater than the PWQO for all locations; and
- Aluminum concentrations were greater than the CCME for more than half the samples.

3.1.8.2 Fish Habitat

These channelized study areas contained wide flood plain habitat dominated by sedges and grasses, floating vegetation mats as well as emergent macrophytes (i.e., cattail and horsetail). Woody shrubs were also abundant near the edge of water and on remnant beaver dams/ lodges. The vegetation transitioned to a mostly coniferous forest further upland. Submergent (i.e., milfoil) and floating macrophytes (i.e., yellow pond lily) were also observed near the bank, with submerged woody debris providing in-stream cover. The wetted channel width ranged from 8.2 to 11.6 m, and total water depth ranging from 0.8 to 1.6 m.

3.1.8.3 Fish Community

Fish community surveys were completed in the four unnamed streams (NDR-S-01, NDR-S-02, NDR-S-03 and NDR-S-04) in 2021 and four unnamed streams (NDR-S-01, NDR-S-02, NDR-S-04, and NDR-S-05) in 2022. A total of 19 fish species were detected throughout the study period (Table 3-1). Summer water temperature measurements and the fish species records show the thermal guild classification for these locations represent a range of cold to warm water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- In 2021, a total of eleven fish species were captured from several unnamed streams (NDR-S-01, S-02, S-03 and S-04) within the North Driftwood River watershed (Appendix B, Tables B1-1, B1-3, B1-4 and B1-6). Baited minnow traps, fyke nets, seine nets, electrofishing, and dip netting were used in August and October and collected a total of 282 and 42 individuals, respectively. Minnow traps were the most effective capture gear, collecting the most specimens. Northern pike were the most frequently caught fish species.
- In 2022, a total of fourteen fish species were captured from several unnamed streams (NDR-S-01, -S-02, -S-04, and -S-05) within the North Driftwood River watershed (Appendix B, Tables B2-1 to B2-4). Minnow traps, gillnets, seine nets, and backpack electrofishing were all utilized as methods to assess fish community. Brook stickleback was the most frequently caught fish species, with minnow traps being the most effective capture gear.
- In 2023, a total of nine fish species were captured from two unnamed streams (NDR-S-06b and NDR-S-04) within the watershed (Appendix B, Tables B3-1 to B3-4). Minnow Traps, gillnets, seine nets and backpack electrofishing were all utilized as methods to assess fish community. Finescale dace was the most frequently caught fish species, with minnow traps being the most effective capture gear.

3.1.8.4 Fish Tissue

A total of three northern pearl dace composite samples were submitted for fish tissue analysis in 2021 from NDR-S-01. Composite samples included four to five individuals based on minimum sample mass target. No obvious abnormalities or external parasites were noted for these fish. Whole body northern pearl dace composite tissue results are provided in Appendix C, Table C1-2 for the following parameters: aluminum, arsenic, cadmium, copper, iron, selenium, mercury, and methylmercury.

Total mercury (mg/kg wwt) did not show any obvious trends with length or weight. Average total methylmercury concentration ranged from 0.07 to 0.13 mg/kg wwt, with an average of 0.11 mg/kg wwt. All composites showed methylmercury concentrations greater than the CCME guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. For other metals and metalloids:

- Total aluminum concentrations had an average of 1.60 mg/kg wwt, and total arsenic concentration had an average of 0.03 mg/kg wwt.
- Average total cadmium, copper and iron concentrations were 0.02, 1.66, and 20.30 mg/kg wwt, respectively.
- Selenium concentration in tissue samples ranged from 1.05 to 1.24 mg/kg dwt, with an average of 1.15 mg/kg dwt. All selenium concentrations were less than the Federal Environmental Quality Guideline (FEQG 2021) criterion for whole body samples (6.7 ug/g dwt).

Individual northern pearl dace age results and age at length are displayed in Appendix C, Table C1-2.

Two finescale dace, two northern redbelly dace and three brook stickleback whole body composite samples were submitted from NDR-S-01 and NDR-S-05 in 2022. Composite samples ranged from 5 to 23 individuals depending on the species. Tissue results are displayed in Appendix C, Table C2-2, as well as plots of metal concentrations, lengths and age on Figures C1-9 to C1-16 and C1-20 to C1-23.

The average total mercury and methylmercury concentration for all species ranged from 0.01 to 0.05 mg/kg wwt and 0.006 to 0.0419 mg/kg wwt, respectively. One finescale dace and one northern redbelly dace composite sample exceeded the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. Finescale dace and northern redbelly dace had similar concentrations of methylmercury in tissues, while brook stickleback had lower concentrations than these species (Appendix C, Table C2-2).

3.1.8.5 Sediment Quality

Sediment samples were collected from the unnamed streams with the North Driftwood River watershed (NDR-S-01, NDR-S-02 and NDR-S-04) during fall 2021 and 2022 with parameters of interest and respective quality criteria shown on Figure 3-6; detailed laboratory results are presented in Appendix E. A summary of baseline sediment quality results that were greater than their respective quality criteria is provided below to identify naturally elevated concentrations of these parameters:

- Mean cadmium concentration exceeded the PSQG LEL in both years at NDR-S-01 only.
- Mean chromium concentrations exceeded the PSQG LEL and CSQG ISQG at NDR-S-04, with broad concentration variability.
- Mean copper concentrations exceeded the PSQG LEL in 2022 at NDR-S-01, with all remaining location concentrations approximately half the NDR-S-01 mean value.
- Mean manganese concentrations exceeded the PSQG LEL in both years at NDR-S-02 and the NDR-S-04 concentration exceeded the PSQG SEL.
- Mean nickel concentrations were greater than the PSQG LEL at NDR-S-04.
- Mean zinc concentrations were less than the PSQG LEL; however, the 2022 NDR-S-01 concentration range was broad, and the upper limit was greater than the LEL criterion.
- Total Kjeldahl nitrogen was measured in 2022 with all concentrations greater than the PSQG SEL.
- Total organic carbon content was greater than the PSQG LEL in both years and generally greater than the SEL at NDR-S-01.

Nutrient and organic carbon content enrichment was expected as these commonly measure greater than the respective quality criteria in depositional lentic environs, as well as flat gradient watercourses that receive organic inputs, such as these streams, and typically contain high organics content. These data help to establish baseline condition within the watercourse and identify existing sediment quality concentrations for some parameters that are naturally greater than their respective quality criteria.

3.1.8.6 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from NDR-S-01, NDR-S-02 and NDR-S-04 in 2021 and NDR-S-01, NDR-S-02, NDR-S-04 and NDR-S-05 in 2022, concurrent with sediment quality sampling. A summary of the benthic invertebrate community descriptors are presented in Table 3-2 and on Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area.

Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- In 2021, mean TID was higher at NDR-S-01 and NDR-S-02 but lower at NDR-S-04 in comparison to 2022. NDR-S-01 had the lowest mean TID overall while NDR-S-05 had the highest of all sites sampled;
- Mean family richness was higher in 2022 than 2021 across all North Driftwood River Unnamed Streams. NDR-S-04 had the highest mean family richness of all sites sampled in 2022;
- Mean Simpson's Diversity was lower at all North Driftwood River stream sites in 2021 than values obtained in 2022. NDR-S-01 had the lowest mean Simpson's Diversity overall, while NDR-S-04 had the highest;
- In 2021, Simpson's Evenness was higher at NDR-S-02 and NDR-S-04, but lower at NDR-S-01 in comparison to 2022;
- Mean percent of EPT taxa in 2021 was lower than 2022 at NDR-S-02, whereas NDR-S-04 showed a higher value in 2021. No EPT taxa were observed at NDR-S-01 or NDR-S-05, while the highest mean value of EPT taxa was obtained at NDR-S-02 in 2022;
- Mean percent of chironomids was consistently higher in 2021 in comparison to 2022 across all streams sampled in the North Driftwood River watershed. NDR-S-01 had the highest mean percent chironomids followed by NDR-S-02, NDR-S-04 and NDR-S-05; and,
- Taxa composition was generally similar among all North Driftwood River Unnamed Streams in both 2021 and 2022 and showed a high abundance of Chironomidae.

3.1.9 Unnamed Ponds

3.1.9.1 Surface Water Quality

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken from five locations (NDR-P-01, NDR-P-02A, NDR-P-02B, NDR-P03 and NDR-P-04) in 2021 and seven sites (NDR-P-01 to NDR-P-07) in 2022.

- In-field water temperature was measured in summer and fall 2021 from the five unnamed ponds in the North Driftwood River subwatershed, ranging from 20.8°C to 23.1°C in summer and 4.7°C to 12.9°C in fall (Appendix A; Table A1-1). In-field DO measurements ranged from 6.45 to 8.59 mg/L in summer and 5.73 to 11.07 mg/L in fall, where NDR-P-04 in summer and fall (6.45 and 5.73 mg/L, respectively), did not meet the CWQG for the general protection of coldwater biota (6.5 mg/L). Only one station in fall, NDR-P-02B (11.07 mg/L), met the CWQG for coldwater species early life stages (9.5 mg/L). In-field pH measurements ranged from 5.64 to 7.93 in summer and 6.02 to 7.96 in fall, with pH values at stations NDR-P-01 (summer and fall) and NDR-P-04 (summer)) less than the PWQO and CWQG. Conductivity measurements ranged from 30.7 to 150 µS/cm during the assessment periods.

- In 2022, in-field water quality measurements were recorded in the spring, summer and fall from the seven unnamed ponds in the North Driftwood River watershed (NDR-P-01 to NDR-P-07; Appendix A; Table A2-1). Temperatures ranged from 13.0°C to 23.3°C in the spring, 16.2°C to 21°C in the summer, and 6.4°C to 9.5°C in the fall. DO ranged from 3.34 to 11.0 mg/L across all seasons. Most locations met the PWQO for the protection of cold and warm water biota across all seasons. In-field pH measurements ranged from 4.46 to 7.45 and conductivity ranged from 39.0 to 221.6 µS/cm.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from the unnamed ponds shows most parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-3). Detailed laboratory results are provided in Appendix A (Tables A1-2, A2-2, and A3-2). Analytical results of note include:

- pH was generally less than the PWQO at NDR-P-07;
- Total iron concentrations were generally greater that the PWQO at NDR-P-01, NDR-P-05, NDR-P-06 and NDR-P-07; and,
- Aluminum concentrations were greater than the CCME at NDR-P-01, NDR-P-05 and NDR-P-06.

3.1.9.2 Fish Habitat

Ponded habitats were characterized by broad floodplains and evidence of recent and remnant beaver actively was commonly observed. As described above, wide floodplain habitat around these water features was dominated by sedges and grasses as well as emergent macrophytes (i.e., cattail). Woody shrubs were also abundant near the edge of water transitioning to a mostly coniferous forest further upland. Submergent (i.e., milfoil) and floating macrophytes (i.e., yellow pond lily) were also observed, with dead standing trees and submerged woody debris providing in-stream cover.

3.1.9.3 Fish Community

Fish community surveys were completed in the unnamed ponds (NDR-P-01 and NDR-P-03) in 2021 and (NDR-P-01 to P-07) in 2022. A total of 10 fish species were detected throughout the study period (Table 3-1). Summer water temperature measurements and the fish species records show the thermal guild classification for these locations represent a range of cold to warm water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- A total of eight fish species were captured from NDR-P-01 and NDR-P-03 during the 2021 field program (Appendix B, Table B1-1). Baited minnow traps and dip nets were used in August and October and collected a total of 289 and 416 individuals, respectively. Minnow traps were the most effective capture gear, collecting the most specimens. Northern redbelly dace were the most frequently caught fish species.
- A total of eleven fish species were captured from ponds (NDR-P-01 to P-07) during the 2022 filed program (Appendix B, Tables B2-1 and B2-2). Baited minnow traps were used in spring summer and fall, and gillnets in the summer. Minnow traps were the most effective capture gear, and fathead minnow were the most frequently caught fish species.

3.1.9.4 Fish Tissue

Fish tissue samples were collected from the unnamed pods within the North Driftwood River subwatershed in 2021 and 2022. In 2021, a total of three Northern redbelly dace composite samples were submitted for fish tissue analysis from NDR-P-03. Composite samples included 23 to 28 individuals based on minimum sample mass target. No obvious abnormalities or external parasites were noted for these fish. Whole body Northern redbelly dace composite tissue results are displayed in Appendix C, Table C1-2 for the following parameters: aluminum, arsenic, cadmium, copper, iron, selenium, mercury, and methylmercury. The analytical results display total metals in mg/kg wwt as well as total mercury by length and weight (Appendix C, Figures C1-9 to C1-16 and C1-22 to C1-29).

Total mercury (mg/kg wwt) did not show any obvious trends with length or weight. The average total mercury concentration (0.04 mg/kg wwt) was lower than the Ontario consumption guidelines developed for the general population (1.8 mg/kg) and those developed for women of child-bearing age and children (0.5 mg/kg), as well as the Health Canada maximum contaminant concentration (0.5 mg/kg). Average total methylmercury concentration ranged from 0.04 to 0.05 mg/kg wwt, with an average of 0.04 mg/kg wwt. All composites had methylmercury concentrations greater than the CCME guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota in all samples. For other metals and metalloids:

- Total aluminum concentrations had an average of 3.25 mg/kg wwt, and total arsenic concentration had an average of 0.02 mg/kg wwt.
- Average total cadmium, copper and iron concentrations were 0.02, 4.35, and 36.97 mg/kg wwt, respectively.
- Selenium concentration in tissue samples ranged from 1.08 to 1.52 mg/kg dwt, with an average of 1.23 mg/kg dwt. All selenium concentrations were less than the federal environmental quality guideline (FEQG 2021) criterion for whole body samples (6.7 ug/g dwt).

Individual northern redbelly dace age results are displayed in Appendix C, Table C1-2.

In 2022, a total of ten finescale dace, five northern redbelly dace and two fathead minnow whole body composite samples were submitted from NDR-P-01, NDR-P-03, and NDR-P-06, with sample size ranging from 5 to 18 individuals. Tissue results are displayed in Appendix C, Table C2-2, Figures C1-9 to C1-16 as well as average total mercury by length and weight on Figures C1-22, C1-23, C1-28 and C1-29.

Total mercury and methylmercury concentrations for all species ranged from 0.02 to 0.06 mg/kg wwt and 0.012 to 0.066 µg/kg wwt, respectively. One Northern redbelly dace and five finescale dace composite samples exceeded 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 0.63 to 2.00 mg/kg dwt. All samples were less than the FEQG (6.7 ug/g dwt), however finescale dace showed the lowest concentrations. Individual finescale dace age results are displayed in Appendix C, Table C2-2 and age at length on Figure C2-2.

3.1.9.5 Sediment Quality

Sediment samples were collected from the unnamed ponds with the North Driftwood River watershed (NDR-P-01, NDR-P-03 and NDR-P-04) during either fall 2021 or 2022 with parameters of interest and respective quality criteria shown on Figure 3-6; detailed laboratory results are presented in Appendix E. Of note, only one of the three samples collected at NDR-P-04 in 2022 was analyzed since the sample containers for the other replicate grab samples were not available for analysis due to shipment and laboratory handling error. A summary of baseline sediment quality results that were greater than their respective quality criteria is provided below to identify naturally elevated concentrations of these parameters:

- Mean cadmium concentration exceeded the PSQG LEL at NDR-P-01 and NDR-P-03.
- Mean copper concentrations exceeded the PSQG LEL at NDR-P-03.
- Mean lead concentrations exceeded the PSQG LEL at NDR-P-03, and the upper range of variability was greater than the CQSG ISQG.
- Mean manganese concentrations were less than the PSQG LEL; however, the upper range of concentrations at NDR-P-01 was slightly greater than this criterion.
- Mean nickel concentrations were greater than the PSQG LEL at NDR-P-03, with the upper range of concentrations at NDR-P-01 slightly greater than this criterion.
- Total Kjeldahl nitrogen was measured in 2022 at NDR-P-03, with a concentration greater than the PSQG SEL.
- Total organic carbon content was greater than the PSQG SEL at all locations.

Nutrient and organic carbon content enrichment was expected as these commonly measure greater than the respective quality criteria in depositional lentic environs that receive organic inputs and typically contain high organics content, such as these ponds. These data help to establish baseline condition within the waterbodies and identify existing sediment quality concentrations for some parameters that are naturally greater than their respective quality criteria.

3.1.9.6 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from NDR-P-01, NDR-P-03 and NDR-S-04 in 2021 and 2022 as well as NDR-P-07 in 2022, concurrently with sediment sampling. A summary of the benthic invertebrate community descriptors are presented in Table 3-2 and Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area. Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- Mean TID at both NDR-P-01 and NDR-P-03 was higher in 2021 than 2022. NDR-P-07 in 2022 had the highest mean TID of all North Driftwood River Unnamed Ponds;
- Mean family richness was higher in 2021 at both NDR-P-01 and NDR-P-03 in comparison to 2022. All North Driftwood River Unnamed Ponds had similar values in 2021 and again in 2022;
- Mean Simpson's Diversity was higher in 2021 in comparison to 2022 at NDR-P-01 and NDR-P-03 and both sites had similar values in 2021 and again in 2022. NDR-P-07 had the highest mean diversity of all North Driftwood River Unnamed Ponds in 2022;

- Mean Simpson's Evenness was higher in 2022 in comparison to 2021 at NDR-P-01 and NDR-P-03 and both sites had similar values in 2021 and again in 2022;
- NDR-P-03 had the highest value of mean percent of EPT tax of the North Driftwood River Unnamed Ponds. No EPT taxa were found in 2022, while 2021 values were among the lowest obtained at all sites sampled;
- Mean percent of chironomids was higher in 2021 at NDR-P-01, but lower at NDR-P-03 in comparison to 2022. Values obtained in 2021 and 2022 are among the highest obtained of all sites sampled;
- Taxa composition was generally similar among all North Driftwood River Unnamed Ponds and showed a high abundance of Chironomidae.

3.2 West Buskegau River Watershed

3.2.1 Unnamed Streams

3.2.1.1 Surface Water Quality

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken from the West Buskegau River subwatershed unnamed streams during summer and fall 2021 (WBR-S-01 – WBR-S-04), spring, summer and fall (WBR-S-01 to WBR-S-05) in 2022 and spring and summer (WBR-S-04, WBR-S-06 and WBR-S-07) in 2023.

- In 2021, in-field water temperature ranged from 20.62 to 21.32°C in summer and recorded at 4.9 to 5.4°C in fall (Appendix A; Table A1-1). In-field DO measurements ranged from 5.87 to 11.68, which met the PWQO. All stations except for WBR-S-02 (in summer) met the CWQG for the general protection of coldwater biota (6.5 mg/L) and only the fall stations met the CWQG for coldwater species early life stages (9.5 mg/L). In-field pH measurements ranged from 5.55 to 7.1 in summer and 6.38 to 6.68 in fall, with stations WBR-S-01 and WBR-S-02 in summer and WBR-S-03 in fall within the PWQO and CWQG ranges. Conductivity measurements ranged from 40 to 131 µS/cm during summer and 34.3 to 35.1 µS/cm during fall.
- In 2022, in-field water temperatures ranged from 11.0 to 15.9 °C, DO from 0.33 to 8.92 mg/L, pH from 5.79 to 6.85, and conductivity from 42.1 to 49 µS/cm across all sampling seasons (Appendix A; Table A2-1). A few measurements did not meet the PWQO for the protection of cold water and warm water biota.
- In 2023, in-field water temperatures ranged from 19 to 21.8°C, DO from 7.66 to 8.56 mg/L, pH from 6.37 to 7.59, and conductivity from 55.4 to 81.2 µS/cm across all sampling seasons (Appendix A; Table A3-1). A few measurements did not meet the PWQO for the protection of cold water and warm water biota.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from the unnamed streams shows most parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-4. Detailed laboratory results are provided in Appendix A (Tables A1-2d, A2-2d, and A3-2b). Analytical results of note include:

- Total copper concentrations were generally greater than the PWQO;
- Total iron concentrations were greater than the PWQO for all locations; and
- Aluminum concentrations were generally greater than the CCME.

3.2.1.2 Fish Habitat

These channelized study areas contained wide floodplain habitat dominated by sedges and grasses, floating vegetation mats as well as emergent macrophytes (e.g., cattail and horsetail). Woody shrubs were also abundant near the edge of water and growing on remnant beaver dams/lodges. The vegetation transitioned to a mostly coniferous forest further upland. Submergent (e.g., milfoil) and floating macrophytes (e.g., yellow pond lily) were also observed near the bank, with submerged woody debris providing in-stream cover. The wetted channel width ranged from 3.2 to 14.9 m, and total water depth ranging from 0.7 to 1.3 m.

3.2.1.3 Fish Community

Fish community surveys were completed in unnamed streams in the West Buskegau River subwatershed across all three sampling years (2021 to 2023). A total of 16 fish species were detected throughout the study period using conventional methods, as well as one additional species (northern redbelly dace) considered present within the watercourse due to the species presence in connected sample locations (Table 3-1). Summer water temperature measurements and the fish species records show the thermal guild classification for these locations represent a range of cold to cool water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- A total of nine fish species were captured from WBRS-03 and WBR-S-04 during the 2021 field program. Baited minnow traps, seine nets, and minnow fyke nets were used, with minnow fyke nets being the most effective capture gear. Northern pearl dace was the most frequently caught fish species.
- A total of seven fish species were captured from three stream reaches (WBR-S-01 WBR-S-03 and WBR-S-04) during the 2022 field program. Baited minnow traps, seine nets, and gillnets were used, with minnow traps being the most effective capture gear. Trout-perch were the most frequently caught fish species.
- A total of 12 fish species were captured from WBR-S-04 during the 2023 field program. Electrofishing was used with trout-perch representing the most frequently caught fish species.

3.2.1.4 Sediment Quality

Sediment samples were collected from the unnamed streams with the West Buskegau River watershed (WBR-S-02, WBR-S-03 and WBR-S-04) during fall 2021 with parameters of interest and respective quality criteria shown on Figure 3-7; detailed laboratory results are presented in Appendix E. A summary of baseline sediment quality results that were greater than their respective quality criteria is provided below to identify naturally elevated concentrations of these parameters:

- Mean chromium concentrations exceeded the PSQG LEL at WBR-S-02 and WBR-S-03, with the mean WBR-S-04 concentration nearly half of these values and less than the criterion.
- Mean nickel concentrations exceeded the PSQG LEL at WBR-S-02 and WBR-S-03, with the mean WBR-S-04 concentration nearly half of these values and less than the criterion.
- Total organic carbon content was greater than the PSQG LEL at all locations.

Organic carbon content enrichment was expected as this commonly measures greater than the respective quality criteria in depositional lentic environs, as well as flat gradient watercourses that receive organic inputs (such as these streams) and typically contain high organics content. These data help to establish baseline condition within the watercourse and identify existing sediment quality concentrations for some parameters that are naturally greater than their respective quality criteria.

3.2.1.5 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from WBR-S-02, WBR-S-03 and WBR-S-04 in 2021, concurrent with sediment quality sampling. A summary of the benthic invertebrate community descriptors are presented in Table 3-3 and Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area.

Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- WBR-S-03 had the highest mean TID of all West Buskegau River Unnamed Streams. Values obtained at WBR-S-02 and WBR-S-04 were similar;
- Mean family richness was similar at all West Buskegau River Unnamed Streams, with WBR-S-04 being slightly higher;
- Mean Simpson's Diversity was similar at all West Buskegau River Unnamed Streams, with WBR-S-03 being slightly lower. Values obtained at the West Buskegau River Unnamed Streams were among the highest within the West Buskegau River watershed;
- Mean Simpson's Evenness was lowest at WBR-S-03, while values obtained at WBR-S-02 and WBR-S-04 were similar;
- Mean percent of EPT taxa was lowest at WBR-S-04 and highest at WBR-S-02. The West Buskegau River Unnamed Streams showed the highest mean percent of EPT taxa within the West Buskegau River watershed;
- Mean percent of chironomids showed similar values between the West Buskegau River Unnamed Streams and were among the lowest of all sites sampled;
- Taxa composition was similar among the West Buskegau River Unnamed Streams.

3.2.2 Unnamed Ponds

3.2.2.1 Surface Water Quality

IN-FIELD MEASUREMENTS

In-field water quality measurements were taken at two unnamed ponds (WBR-P-01 and WBR-P-02) during summer and fall 2021, three unnamed ponds (WBR-P-01, WBR-P-03, and WBR-P-04) during summer and fall in 2022 and one unnamed pond (WBR-P-04) in spring and summer 2023.

- In 2021, in-field water temperature ranged from 19.72 to 21.41°C in summer and recorded at 4.4 and 5.2°C in fall (Appendix A; Table A1-1). In-field DO measurements ranged from 5.47 to 6.32 mg/L in summer and 4.12 to 6.86 in fall. Stations WBR-P-01 and WBR-P-02 did not meet the CWQG for the general protection of coldwater biota (6.5 mg/L) or the CWQG for coldwater species early life stages (9.5 mg/L). In-field pH measurements ranged from 5.89 to 6.21. Conductivity measurements ranged from 23.9 to 52 µS/cm.
- In 2022, in-field water temperatures ranged from 20 to 21 °C, DO from 2.3 to 9.1 mg/L, pH from 4.90 to 6.46, and conductivity from 20.9 to 22.3 µS/cm across all sampling seasons (Appendix A; Table A2-1). A few measurements did not meet the PWQO for the protection of cold water and warm water biota.

- In 2023, in-field water temperatures ranged from 8.2 to 12.7 °C, DO from 6.51 to 9.03 mg/L, pH from 5.14 to 7.13, and conductivity from 27 to 34.3 µS/cm across all sampling seasons (Appendix A; Table A3-1). A few measurements did not meet the PWQO for the protection of cold water and warm water biota.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from the West Buskegau River unnamed ponds shows most parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-4). Detailed laboratory results are provided in Appendix A (Tables A1-2d, A2-2d, and A3-2b). Analytical results of note include:

- The pH values were less than the PWQO for some seasonal sampling;
- Total iron concentrations were greater than the PWQO for all locations; and
- Aluminum concentrations were generally greater than the CCME in spring and fall, but less than this criteria in summer.

3.2.2.2 Fish Habitat

The ponded habitats were characterized by broad floodplains and evidence of recent and remnant beaver activity was commonly observed. As described above, wide floodplain habitat around these water features was dominated by sedges and grasses as well as emergent macrophytes (e.g., cattail). Woody shrubs were also abundant near the edge of water transitioning to a mostly coniferous forest further upland. Submergent (e.g., milfoil) and floating (e.g., yellow pond lily) macrophytes were also observed, with dead standing trees and submerged woody debris providing in-stream cover. The depths of the ponds ranged from 0.5 to 1.5 m.

3.2.2.3 Fish Community

Fish community surveys were completed in unnamed ponds in the West Buskegau River subwatershed across all three sampling years (2021 to 2023). A total of 16 fish species were detected throughout the study period using conventional methods, as well as one additional species (northern redbelly dace) considered present within the watercourse due to the species presence in connected sample locations (Table 3-1). Summer water temperature measurements and the fish species records show the thermal guild classification for these locations represent a range of cold to warm water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- A total of five fish species were captured from ponded habitat (WBR-P-01) during the 2021 field program. Baited minnow traps were used, collecting 166 individuals. Finescale dace, northern redbelly dace and northern pearl dace were the most frequently caught fish species.
- A total of seven fish species were captured from ponded habitat during the 2022 field program. Baited minnow traps and gillnets were used, and minnow traps were the most effective capture gear, collecting 1,388 individuals. The Chrosomus genus (finescale dace and northern redbelly dace) were the most frequently caught fish.
- In 2023, a total of five fish species were captured from ponded habitat (WBR-P-04). Baited minnow traps were used, collecting 1741 individuals. Northern redbelly dace were the most frequently caught fish species.

3.2.2.4 Fish Tissue

In 2022, nine finescale dace and four brook stickleback whole body composite samples were submitted for fish tissue analysis from WBR-P-03 and WBR-P-04, sample size ranged from 2 to 34 individuals. Tissue results are displayed in Appendix C, Table C2-2, as well as average total mercury by length and weight on Figures C1-17 to C1-29.

Total mercury and methylmercury concentrations for all species ranged from 0.027 to 0.064 mg/kg wwt and 0.013 to 0.051 mg/kg wwt, respectively. A single finescale dace composite sample exceeded the CCME (2000) guideline of 0.033 mg/kg methylmercury for the protection of wildlife consumers of aquatic biota. For other metals and metalloids:

- Total aluminum concentrations ranged from 1.27 to 21.20 mg/kg wwt and total arsenic concentration ranged from 0.02 to 0.05 mg/kg wwt.
- Total cadmium, copper and iron concentrations ranged from 0.01 to 0.02, 0.64 to 1.52 and 33.9 to 66 mg/kg wwt, respectively.
- Selenium concentration in tissue samples ranged from 0.64 to 1.05 mg/kg dwt and were less than the FEQG for whole body samples (6.7 ug/g dwt).

3.2.2.5 Sediment Quality

Sediment samples were collected from the unnamed ponds with the West Buskegau River watershed (WBR-P-01, WBR-P-03 and WBR-P-04) during either fall 2021 or 2022 with parameters of interest and respective quality criteria shown on Figure 3-7; detailed laboratory results are presented in Appendix E. A summary of baseline sediment quality results that were greater than their respective quality criteria is provided below to identify naturally elevated concentrations of these parameters:

- Mean cadmium concentration exceeded the PSQG LEL at WBR-P-01, as well as the upper limit of concentration variability at WBR-P-04.
- Mean chromium concentrations exceeded the PSQG LEL at WBR-P-03 and WBR-P-04, with the upper limit of concentration variability at this location exceeding the CSQG ISQG.
- Mean manganese concentrations were greater than the PSQG LEL at WBR-P-01 and WBR-P-03, with the WBR-P-01 mean concentration greater than the PSWG SEL.
- Mean nickel concentrations were greater than the PSQG LEL at WBR-P-03 and WBR-P-04.
- Mean zinc concentrations were greater than the PSQG LEL at WBR-P-01.
- Total Kjeldahl nitrogen was measured in 2022 at WBR-P-03 and WBR-P-04, with all concentrations greater than the PSQG LEL and half of the concentrations greater than the PSQG SEL.
- Total organic carbon content was greater than the PSQG SEL at all locations except one sample within WBR-P-04, with a concentration between the LEL and SEL criteria.

Nutrient and organic carbon content enrichment was expected as these commonly measure greater than the respective quality criteria in depositional lentic environs that receive organic inputs and typically contain high organics content, such as these ponds. These data help to establish baseline condition within the waterbodies and identify existing sediment quality concentrations for some parameters that are naturally greater than their respective quality criteria.

3.2.2.6 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from WBR-P-01 IN 2021 and WBR-P-03 and WBR-P-04 in 2022, concurrent with sediment quality sampling. A summary of the benthic invertebrate community descriptors are presented in Table 3-3 and Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area.

Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- WBR-P-03 showed the highest mean TID among all West Buskegau River Unnamed Ponds. Values obtained at the Unnamed Ponds are similar to those of the West Buskegau River Unnamed Streams.
- WBR-P-03 showed the highest mean family richness among all West Buskegau River Unnamed Ponds. Values obtained at the Unnamed Ponds were lower than those obtained at the West Buskegau River Unnamed Streams.
- Mean Simpson's Diversity was similar at WBR-P-01 and WBR-P-04, while WBR-P-03 showed the lowest value of all sites sampled.
- Mean Simpson's Evenness was similar at WBR-P-01 and WBR-P-03, while WBR-P-04 showed the highest value within the West Buskegau River watershed.
- WBR-P-04 showed the highest mean percent of EPT taxa of all West Buskegau River Unnamed Ponds, while WBR-P-03 showed the lowest value. Mean percent of EPT taxa at the West Buskegau River Unnamed Ponds was lower than values obtained at the West Buskegau River Unnamed Streams.
- Mean percent of chironomids was highest at WBR-P-03 and lowest at WBR-P-04. Values were higher at the West Buskegau River Unnamed Ponds than those obtained the at West Buskegau River Unnamed Streams.
- The West Buskegau River Unnamed Ponds showed a similar taxa composition with a high abundance of Chironomidae.

3.3 Jocko Creek Watershed

3.3.1 Surface Water Quality

3.3.1.1 In Field Measurements

In-field water quality measurements were taken at one location in Jocko Creek (JC-S-01) three times in 2022 (spring, summer and fall), and at two locations (JC-S-01 and JC-S-03) twice in 2023 (spring and summer).

- In 2022, in-field temperatures ranged from 6.0°C to 16.7°C (Appendix A; Table A2-1). In field DO measurements ranged from 5.58 mg/L to 85.37 mg/L and met the PWQO for warm water species in the spring (5 mg/L), and both cold and warm water species during the summer. In the fall, DO did not meet the PWQO for both cold and warm water species. pH measurements ranged from 3.74 in the spring to 5.35 in the summer, and conductivity measurements ranged from 46.5 to 58.0 µS/cm.
- In 2023, in-field temperatures ranged from 17.4°C to 18.4°C (Appendix A; Table A3-1). In field DO measurements ranged from 7.36 mg/L to 10.38 mg/L and met the PWQO for warm water species in the spring (5 mg/L), and both cold and warm water species during the summer. pH measurements ranged from 4.85 to 7.23, and conductivity measurements ranged from 51.1 to 128.9 µS/cm.

ANALYTICAL MEASUREMENTS

Laboratory surface water quality analysis from the Jocko Creek shows most parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-4). Detailed laboratory results are provided in Appendix A (Table A2-2a). Analytical results of note include:

- The pH values were less than the PWQO for some seasonal sampling;
- Total iron concentrations were greater than the PWQO for all locations; and
- Aluminum concentrations were generally greater than the CCME in spring and fall, but less than this criteria in summer.

3.3.2 Fish Habitat

The Jocko Creek sample location is within a reach characterized as a narrow watercourse that flows south near Highway 655 underneath power lines. The near shore habitat is comprised of grasses, short shrubs, and floating fen mats. Further upland vegetation is a mostly coniferous forest with Black Spruce and Tamarack. The tributary meanders throughout the wetland habitat with instream cover made up of grasses, undercut banks, and some woody debris. The bottom substrate of Jocko Creek ranges from small granular material to gravel sized rock with some pockets of fine grain sediment. The measured wetted width of the stream ranged from 1.6 to 1.8 m with depths of the channel ranging from 0.6 to 0.9 m.

3.3.3 Fish Community

Fish community surveys were completed in Jocko Creek in 2022 and 2023. A total of seven fish species were detected throughout the study period (Table 3-1). Summer water temperature measurements and the fish species records show the thermal guild classification represent a range of cold to warm water fish habitat (Coker et al. 2001; Hasnain et al. 2010). A summary of the fish community survey results by year is provided below:

- A total of seven fish species were captured during the 2022 field program. Minnow traps and backpack electrofishing were the two main methods of fishing for Jocko Creek. The most frequently caught species was northern pearl dace.
- A total of seven fish species were captured during the 2023 field program. Minnow traps and backpack electrofishing were the two main methods of fishing for Jocko Creek. The most frequently caught species were finescale dace.

3.3.4 Fish Tissue

Five lake chub and two brook stickleback whole body composite samples were submitted for fish tissue analysis from Jocko Creek (JC-S-01), sample size ranged from 5 to 19 individuals. Tissue results are displayed in Appendix C, Table C2-2 and Figures C1-9 to C1-16, C1-20, C1-21, C1-24 and C1-25.

Total mercury and methylmercury concentrations for all species ranged from 0.06 to 0.13 mg/kg wwt and 0.050 to 0.152 mg/kg wwt, respectively. All samples exceeded 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 0.80 to 1.03 mg/kg dwt and were less than the FEQG for whole body samples (6.7 ug/g dwt).

3.3.5 Sediment Quality

Collection of sediment quality samples occurred in fall 2022; however, due to sample shipping and handling, the samples containers were broken, and laboratory analysis was not possible.

3.3.6 Benthic Macroinvertebrate Community

Benthic invertebrate samples were collected from JC-S-01 in 2022. A summary of the benthic invertebrate community descriptors is presented in Table 3-3and on Figure 3-8 to Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area.

Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12, with detailed results provided in Appendix F (Tables F1-1 and F3-2). A summary of these findings is provided below:

- JC-S-01 showed the highest mean TID within the West Buskegau River watershed;
- Mean family richness at JC-S-01 was similar to values obtained at the West Buskegau River Unnamed Ponds, but lower than values obtained the Unnamed Streams;
- Mean Simpson's Diversity at JC-S-01 was among the lowest of all sites sampled;
- Mean Simpson's Evenness at JC-S-01 was among the lowest of all sites sampled;
- Mean percent of EPT taxa at JC-S-01 was among the lowest of all sites sampled;
- Mean percent of chironomids at JC-S-01 was among the highest of all sites sampled;
- Taxa composition at JC-S-01 was similar to other sites within the West Buskegau River watershed and showed a high abundance of Chironomidae.

3.4 Mattagami River

3.4.1 Surface Water Quality

3.4.1.1 In Field Measurements

In-field water quality measurements were taken once at two locations (MAT-R-01 and MAT-R02) during fall 2021, twice (summer and fall), at two locations (MAT-R-01 and MAT-R02) and once (spring) at one location (MAT-R-01) in 2023.

- In 2021, in-field water temperature was 9.4°C and 8.9°C at stations MatR-01 and MatR-02 respectively (Appendix A; Table A1-1). In-field DO measurements were 9.59 and 9.83 mg/L which met the PWQO. These measurements met the CWQG for the general protection of coldwater biota (6.5 mg/L) and the CWQG for coldwater species early life stages (9.5 mg/L). In-field pH measurements ranged were 7.75 and 7.7 which met the PWQO and CWQG. Conductivity was measured at 96.6 and 95.7 µS/cm during the assessment period.
- In 2022, in-field temperatures ranged from 6.7°C to 17.4°C and DO ranged from 2.36 to 8.49 mg/L (Appendix A; Table A2-1). The measured pH ranged from 6.62 to 7.28 and conductivity ranged from 50.1 to 84.1 mS/cm during the field investigations.
- In 2023, in-field temperatures were 21.5°C and 21.7°C, DO was 7.39 and 7.71 mg/L, pH was 7.53 and 7.62 and conductivity was 114 and 115 mS/cm (Appendix A; Table A3-1) during the field investigations.

3.4.1.2 Analytical Measurements

Laboratory surface water quality analysis from the Mattagami River shows most parameters were within the respective range of the acceptable quality criteria values for the protection of aquatic life (Figure 3-4). Detailed laboratory results are provided in Appendix A (Table A2-2e). Analytical results of note include:

- Total iron concentrations were greater than the PWQO.

3.4.2 Fish Habitat

The Mattagami River is approximately 443 km long, generally flows from south to north orientating from Mattagami Lake positioned south of the city of Timmins and is one nine major rivers in the Moose River drainage basin in Northeastern Ontario. There are many hydroelectric generating stations (dams) within the river that have been producing electricity for more than 100 years, many of which pose barriers to fish passage, and the Lower Sturgeon Generating Station is located east of the Project, downstream of the river's confluence with Jocko Creek.

3.4.3 Fish Community

3.4.3.1 Secondary Source Data

Fish community sampling has been conducted by others under scientific collection licenses issued by the Timmins and/or Cochrane District MNRF (Chenier 2022, pers. comm.); however, fish community sampling was not conducted within the Mattagami River during the 2021 to 2023 studies. The MNRF data show a total of 17 fish species were previously detected in the Mattagami River. These fish species include small-bodied forage fish and culturally important sportfish such as northern pike and walleye, smallmouth bass, and coarse fish species (e.g., white sucker). These MNRF data do not include the presence of lake sturgeon within the river reach near the Project. However, Lake Sturgeon were being commercially harvested in the Mattagami River since 1927 (MacRitchie 1983), and harvest continued between Loon Rapids and the Lower Sturgeon Generating Station in the 1950s (Golder 2008). Lake Sturgeon are presumed to be present within the river system near the project, albeit in very low abundance, as discussed below.

The Island Falls Hydroelectric Project (ISHP) aquatic assessment assessed several reaches of the Mattagami River to characterize the distribution and habitat uses of aquatic biota in the vicinity of the proposed ISHP (Stantec 2009). Three study areas were assessed, most notable with respect to the Crawford Project was Area C defined as the approximately seven-kilometre stretch of river between Yellow Falls (downstream extent) and Loon Rapids (upstream extent), including Davis Rapids and the confluence of Rat Creek with the Mattagami River. The upstream extent of Area C (Loon Rapids) is approximately 35 km downstream of the Lower Sturgeon Generating Station.

Various fish capture methods were used during these studies including gill nets, hoop nets and artificial substrate egg collection mats. Surveys were conducted during the anticipated spawning timing of several species including lake sturgeon, northern pike, walleye and white sucker. Walleye and northern pike were caught in nets at Loon Rapids, and egg mat survey results showed white sucker eggs. Lake sturgeon or their eggs were not recorded at Loon Rapids and were not recorded within Area B further downstream. Significant netting effort was completed during this assessment which shows lake Sturgeon are not abundantly present within the sampled reaches and by extension, within the reach of river between Loon Rapids and the Lower Sturgeon Generating Station.

3.4.3.2 Lake Sturgeon Visual Spawning Survey and eDNA Results

The spring 2023 field study included visual assessment surveys, as well as collection of eDNA samples to assess lake sturgeon presence and fish community within the Mattagami River. The survey and sampling was completed on Sunday, May 14, 2023, with the results summarized below.

The field team surveyed the nearshore areas within the Mattagami River downstream of the Lower Sturgeon Generating Station; however, the area immediately downstream of the station was guarded by floating barricade and warning signs. The crew assessed the possibility of shoreline access, but fences and warning signs did not allow access closer to the station. River flow was high, as expected; however, the high turbidity limited visual observations near shore and no lake sturgeon were observed. The water temperature was 11.7°C, which is within the ideal spawning range for lake sturgeon. As discussed with CNC and a local community member who is an active member of the Ontario Rivers Alliance and has monitored lake sturgeon spawning within the Groundhog River west of Timmins also noted the Mattagami River water was in the ideal range and temperature can fluctuate quickly to trigger lake sturgeon staging and spawning.

A total of nine samples were collected: three metabarcoding, three qPCR and three negative controls. The high turbulence provided well mixed conditions at the grab locations downstream of the generating station and laboratory protocols were followed to minimize the likelihood of cross contamination from field staff or sampling equipment.

The three qPCR samples were positive for detection of lake sturgeon eDNA, with 35 of 36 positive replicates. This corroborates the MNRF data show lake sturgeon are within the Mattagami River; however, due to the limited visibility during the spawning surveys, these results may also reflect Lake Sturgeon presence upstream of the generating station. Considering the conventional sampling results presented above (Section 3.4.3.1), lake sturgeon may be present with the river reach between the Lower Sturgeon Generating Station and Loon Rapids albeit in low abundance.

The three Mattagami River metabarcoding samples contained eDNA from 22 fish taxa including 14 species-level identifications: burbot, emerald shiner, finescale dace, Iowa darter, lake chub, lake sturgeon, longnose sucker, northern pike, rock bass, spottail shiner, trout-perch, walleye, white sucker, and yellow perch. Other detections included: sunfish, sculpin, shiner, pearl dace (likely northern pearl dace), perch, and riffle dace (e.g., likely blacknose or longnose dace).

The three qPCR negative controls were blank and did not contain any genetic material. Conversely, two of the three metabarcoding negative controls showed Salmonidae eDNA (i.e., whitefish, grayling, trout/salmon), as did the three native metabarcoding samples. Since all negative controls were collected concurrently with the native samples, the Salmonidae results are likely attributable to laboratory contamination. However, the secondary source MNRF data shows cisco and lake whitefish have been caught within the Mattagami River, and publicly reported catch results also include brook trout (MNRF 2022b), all of which can be classified within the family Salmonidae. Therefore, it is possible these species may be found within the sampled reach, or genetic material from all of the detected taxa could have travelled from upstream of the generating station. Regardless, these data provide a corroborating list of fish species within the Mattagami River.

3.4.4 Fish Tissue

Contaminants in fish tissue of the Mattagami River have been sampled in support of the Ministry of the Environment, Conservation and Parks (MECP) sportfish monitoring program. Data collected between 2005 and 2018 nearest to the Project include fish caught near Sandy Falls (approximately 38 km upstream of the Lower Sturgeon Generating Station) and fish caught within a sample reach downstream of Cypress Falls (approximately 65 km downstream of Smooth Rock Falls). These data provide total mercury concentration in fish tissue from five species: lake sturgeon, lake whitefish, northern pike, walleye and white sucker. Northern pike and walleye mercury concentrations were reported for both study locations and these results show average total mercury concentrations in the Sandy Falls reach were less than the MNRF consumption advisories. In general, the fish collected between Cypress Falls and the Little Long Generating Station contained higher concentrations of total mercury and the average walleye tissue concentration was greater than the consumption advisory level for the sensitive population; women of child-bearing age and children under 15 (0.5 mg/kg wwt; MECP 2020).

3.4.5 Sediment Quality

Sediment quality sampling was attempted within the Mattagami River; however, the substrate is hardpacked with abundant boulders and rock. Field staff encountered some localized areas of coarse sand; however, depositional sediment was not present within the sampled locations. As such, sediment quality data are not available.

3.4.6 Benthic Macroinvertebrate Community

As noted above, depositional sediments were not present and as such, benthic invertebrate samples were not collected within the Mattagami River sample locations.

3.5 Road Alignment Crossings

3.5.1 RDAL-01

3.5.1.1 Surface Water Quality

In-field water quality measurements were taken at one location at RDAL-02 during the summer 2023 field investigations (Appendix A; Table A3-1). The water temperature was 16.8 °C and DO was 4.29 mg/L and did not meet PWQO or the CWQG for the general protection of coldwater biota (6.5 mg/L). The pH was 6.54 and conductivity was 120.36 µS/cm during the spring assessment.

3.5.1.2 Fish Habitat

The assessed 20 m upstream and 50 m downstream reaches of RDAL-01 flow in a north to south direction and had a morphology consisting of sequences of runs (40%), pools (30%), riffles (10%) and flats (20%). The mean wetted width of the channel was approximately 10 m and mean wetted depth was approximately 0.8 m. The mean bankfull width was approximately 15 m and mean bankfull depth was approximately 1 m. Substrate was comprised of clay, silt, sand and boulder in order of dominance. Banks were slightly unstable stabilized with signs of erosion and undercutting. Riparian cover was moderate (50%) and provided by adjacent trees, shrubs and grasses. Instream cover (60% total cover) was provided by woody debris and very limited aquatic vegetation. A relic man made wood bridge was present within the assessed area. No fish were observed at the time of assessment.

3.5.2 RDAL-02

3.5.2.1 Surface Water Quality

In-field water quality measurements were taken at one location at RDAL-02 during the spring and summer 2023 field investigations (Appendix A; Table A3-1). The water temperature was 16.8 °C in spring and 17.7°C during the summer. DO was 4.29 mg/L and did not meet PWQO and the CWQG for the general protection of coldwater biota (6.5 mg/L). The pH was 6.54 and conductivity was 120.36 µS/cm during the spring assessment.

3.5.2.2 Fish Habitat

The assessed 20 m upstream and 50 m downstream reaches of RDAL-02 were assessed twice during the 2023 field investigations and had a morphology consisting of sequences of flats (100%). The mean wetted width of the channel was approximately 3.4 m and mean wetted depth was approximately 0.8 m. The mean bankfull width was not assessed as the water had topped the banks to a depth of approximately 0.45 m. Substrate was not assessed as depth made wading the creek limiting during both occasions. Banks were stable, with signs of undercutting. Riparian cover was low (30%) and provided by grasses and sedges. Instream cover (10% total cover) was provided by organic debris and undercut banks.

3.5.3 RDAL-03

Field reconnaissance was conducted during spring 2023, and no watercourse was present. No further assessments were undertaken.

3.5.4 RDAL-04

3.5.4.1 Surface Water Quality

In-field water quality measurements were taken at one location at RDAL-04 during the spring 2023 field investigations (Appendix A; Table A3-1). The water temperature was 15.4°C and DO was 2.29 mg/L and did not meet PWQO and the CWQG for the general protection of coldwater biota (6.5 mg/L). The pH was 5.73 and conductivity was 18.5 µS/cm during the spring assessment.

3.5.4.2 Fish Habitat

During the spring 2023 assessment, a small channel was present in an open wet area surrounded by tamarack, alders (*Alnus sp.*), ferns (*Filicophyta sp.*) and peat, flowing north from a small beaver dam south of the assessed reach. At the time of assessment, the channel had an approximate wetted width of 0.8 m and wetted depth of 0.45 m with the substrate consisting of fines and detritus. During the summer assessment, the watercourse was not present.

3.5.5 RDAL-05

Field reconnaissance was conducted during spring 2023, and no watercourse was present. No further assessments were undertaken.

3.5.6 RDAL-06

3.5.6.1 Surface Water Quality

In-field water temperature was measured at one location during both the spring and summer 2023 field investigations at RDAL-06, ranging from 16.3°C in spring and 17.9°C in summer (Appendix A; Table A3-1). In-field DO measurements ranged from 1.24 to 2.24, which does not meet the PWQO or the CWQG for the general protection of coldwater biota (6.5 mg/L). In-field pH measurements ranged from 6.09 in spring to 4.96 in summer. Conductivity measurements ranged from 34.7 during spring assessments and 36.2 µS/cm during summer.

3.5.6.2 Fish Habitat

The assessed 20 m upstream and 50 m downstream reaches of RDAL-06 were assessed twice during the 2023 field investigations and had a morphology consisting of sequences of flats (100%). The mean wetted width of the channel was approximately 2.7 m and mean wetted depth was approximately 1.3 m. The mean bankfull width was approximately 3 m and mean bankfull depth was approximately 1.1 m. Substrate was comprised of 100% detritus. Banks were observed to be stable with grasses and sedges providing the majority of the riparian cover (25%). Instream cover (60% total cover) was provided by woody debris and very limited aquatic vegetation.

Table 3-1: Fish Species Presence by Location

Waterbody / Watercourse	Location ID	Species Richness	Blacknose Dace	Blacknose Shiner	Bluntnose Minnow	Brook Stickleback	Burbot	Common Shiner	Creek Chub	Emerald Shiner	Fathead Minnow	Finescale Dace	Golden Shiner	Iowa Darter	Johnny Darter	Lake Chub	Lake Sturgeon	Logperch	Longnose Dace	Longnose Sucker	Mottled Sculpin	Northern Pearl Dace	Northern Pike	Northern Redbelly Dace	Rock Bass	Spottail Shiner	Trout Perch	Walleye	White Sucker	Yellow Perch
Gerry Lake	NDR-GERLK	4											X	X								X								X
Martin Lake	NDR-MARLK	2																					X							X
Jack Lake	NDR-JACLK	11		X		X		X			X	X	X	X									X	X			X			X
Sutherland Lake	NDR-SUTLK	11		X	X	X		X			X	X	X	X									X	X						X
Mel Lake	NDR-MELLK	9				X		X			X	X	X	X								X		X						X
Davis Lake	NDR-DAVLK	8				X		X			X	X	X	X								X								X
Jocko Creek (tributary)	JC-S-01	7				X					X	X				X						X		X					X	
	JC-S-03	7				Xi					Xi	Xi				Xi						Xi		Xi					Xi	
Mattagami River	MAT-R-01	15 (21)					Xx			Xx		Xx		Xx		Xx	Xx			Xx		Xx	Xx		Xx	Xx	Xx	Xx	Xx	Xx
	MAT-R-02	15					Xi			Xi		Xi		Xi		Xi	Xi			Xi		Xi	Xi		Xi	Xi	Xi	Xi	Xi	Xi
North Driftwood River	NDR-P-01	8			X	X		X			X	X				X						X							X	
	NDR-P-02	0																												
	NDR-P-02B	0																												
	NDR-P-02C	0																												
	NDR-P-03	5				X					X			X								X		X						
	NDR-P-04	4				X					X	X										X								
	NDR-P-05	5				X					X	X				X						X								
	NDR-P-06	4				X					X	X												X						
	NDR-P-07	6				X						X				X						X		X					X	
	NDR-S-01	11		X		X					X	X	X			X						X	X	X					X	X
	NDR-S-02	7				X				X		X	X		X							X	X							
	NDR-S-04	17	X	X	X	X		X		X	X		X		X			X				X	X	X		X	X		X	X
	NDR-S-05	5				X					X	X				X								X						
	NDR-S-06	10 (14)							Xx		Xx	Xx		Xx	Xx								Xx			Xx	Xx		Xx	Xx
	NDR-S-06B	6				X					X	X										X		X					X	
	NDR-TRIB-01	3				X																	X							X
	NDR-TRIB-02	3										X				X						X								
	NDR-US-TC	8 (12)										Xx		Xx	Xx								Xx	Xx		Xx	Xx		Xx	

Table 3-1: Fish Species Presence by Location

Waterbody / Watercourse	Location ID	Species Richness	Blacknose Dace	Blacknose Shiner	Bluntnose Minnow	Brook Stickleback	Burbot	Common Shiner	Creek Chub	Emerald Shiner	Fathead Minnow	Finescale Dace	Golden Shiner	Iowa Darter	Johnny Darter	Lake Chub	Lake Sturgeon	Logperch	Longnose Dace	Longnose Sucker	Mottled Sculpin	Northern Pearl Dace	Northern Pike	Northern Redbelly Dace	Rock Bass	Spottail Shiner	Trout Perch	Walleye	White Sucker	Yellow Perch
West Buskegau River	WBR-P-01	7				X					X	X				X						X		X					X	
	WBR-P-02	4				X						X										X		X						
	WBR-P-03	5				X					X	X										X		X						
	WBR-P-04	6				X					X	X										X	X	X						
	WBR-S-01	4				X	X														X						X			
	WBR-S-02	4				Xi	Xi														Xi						Xi			
	WBR-S-03	8					X	X		X					X						X	X				X	X			
	WBR-S-04	15	X			X	X	X			X	X			X			X	X		X	X	X				X		X	
	WBR-S-05	5				Xi					Xi	Xi										Xi		Xi						
	WBR-S-06	8					Xi	Xi		Xi					Xi						Xi	Xi				Xi	Xi			
	WBR-S-07	15	Xi			Xi	Xi	Xi			Xi	Xi			Xi			Xi	Xi		Xi	Xi	Xi				Xi		Xi	

Species caught during the conventional fish community surveys within the sample locations are denoted with an X.

Species inferred to be present within a sample location due to connectivity and proximity to sampled locations are denoted with an Xi.

Species detected by eDNA sample analysis are denoted with an Xx, these results do not include high-level taxa detections (e.g., genus or family-level) which are discussed within the text; however, the total number of taxa are shown within brackets in the richness column.

Sample locations NDR-P-02, NDR-P-02B and NDR-P-02C did not contain fish.

Table 3-2: Benthic Invertebrate Community Descriptors by Location and Year – North Driftwood River Watershed

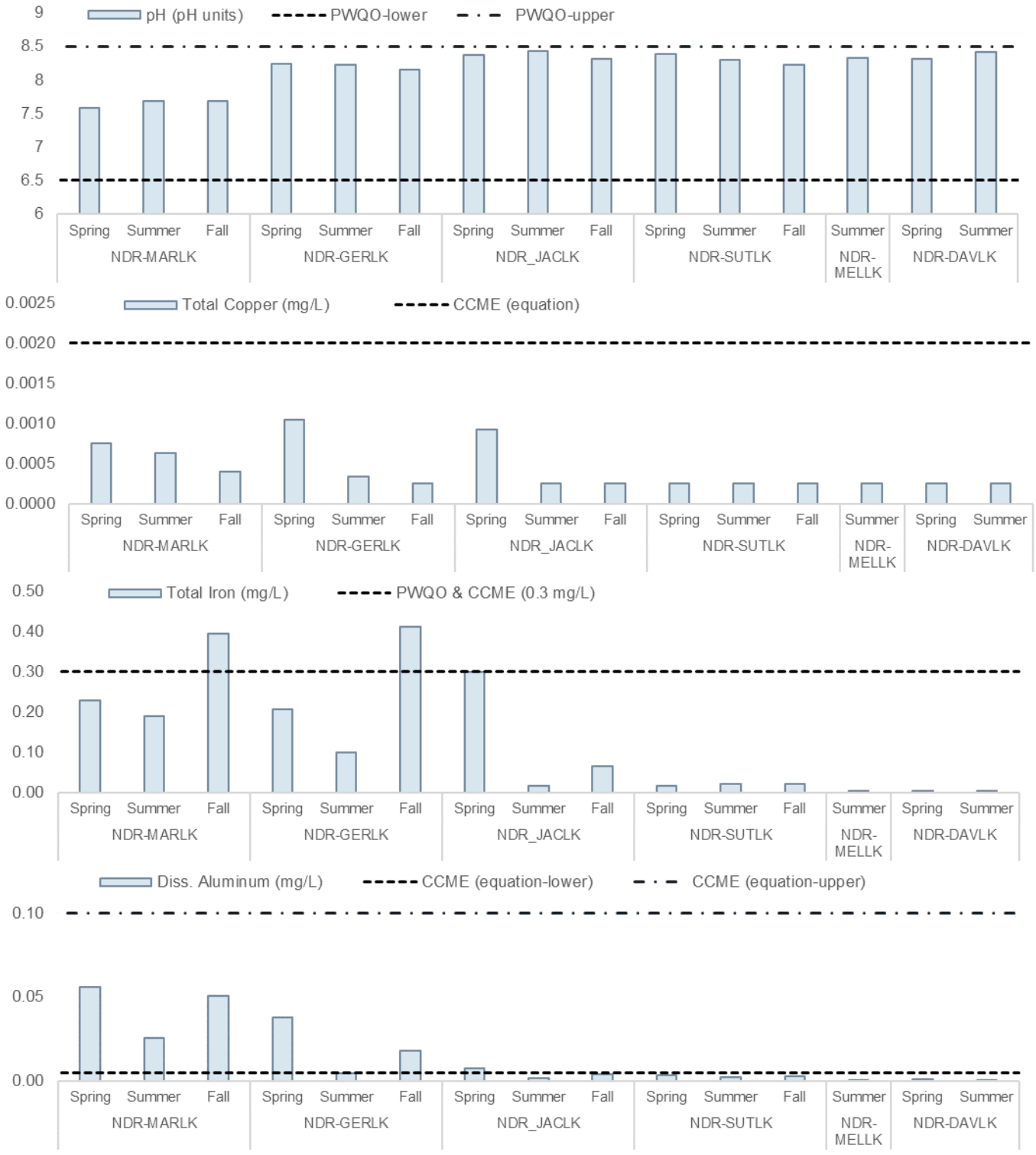
Habitat Type	Location	Year	Statistic	Count	TID (#/m²)	Richness	Diversity	Evenness	% EPT	% Chiron.
Lake	NDR-GER-LK	2021	Average	866	12,546	12.3	0.76	0.25	28.60	38.31
			Standard Error	329	4,767	2.6	0.03	0.04	3.03	5.05
		2022	Average	91	1,314	3.7	0.42	0.34	0.00	28.69
			Standard Error	52	749	0.7	0.11	0.06	0.00	10.91
	NDR-MAR-LK	2021	Average	1147	16,623	11.3	0.70	0.17	20.62	50.04
			Standard Error	419	6,069	2.0	0.03	0.03	2.37	4.15
		2022	Average	88	1,271	5.7	0.48	0.34	3.09	36.05
			Standard Error	15	213	1.2	0.17	0.03	2.57	15.91
	NDR-JAC-LK	2022	Average	131	1,899	8.3	0.46	0.20	9.50	68.00
			Standard Error	43	624	3.0	0.14	0.03	9.14	11.25
	NDR-SUT-LK	2022	Average	34	498	3.7	0.60	0.50	0.00	35.16
			Standard Error	17	245	0.9	0.06	0.20	0.00	17.93
Pond	NDR-P-01	2021	Average	163	2,367	6.0	0.64	0.24	0.28	66.33
			Standard Error	54	786	1.5	0.05	0.12	0.28	6.09
		2022	Average	256	3,715	2.0	0.25	0.30	0.00	61.39
			Standard Error	80	1,162	0.6	0.13	0.09	0.00	23.73
	NDR-P-03	2021	Average	328	4,759	6.7	0.55	0.15	3.47	63.11
			Standard Error	84	1,211	0.7	0.05	0.02	2.01	4.82
		2022	Average	84	1,217	3.0	0.30	0.27	0.00	80.31
			Standard Error	48	691	1.2	0.16	0.05	0.00	11.02
	NDR-P-07	2022	Average	667	9,662	3.3	0.53	0.24	0.00	59.53
			Standard Error	150	2,168	1.3	0.07	0.03	0.00	5.77

Table 3-2: Benthic Invertebrate Community Descriptors by Location and Year – North Driftwood River Watershed

Habitat Type	Location	Year	Statistic	Count	TID (#/m²)	Richness	Diversity	Evenness	% EPT	% Chiron.
Stream/Tributary	NDR-S-01	2021	Average	309	4,483	3.0	0.25	0.15	0.00	85.24
			Standard Error	86	1,244	0.6	0.10	0.02	0.00	6.53
		2022	Average	219	3,169	4.0	0.45	0.27	0.00	66.69
			Standard Error	74	1,074	0.6	0.15	0.08	0.00	12.49
	NDR-S-02	2021	Average	673	9,754	13.0	0.70	0.15	12.75	50.55
			Standard Error	90	1,298	1.2	0.07	0.04	5.89	8.36
		2022	Average	448	6,493	14.7	0.73	0.13	25.32	42.60
			Standard Error	124	1,803	2.4	0.02	0.02	7.80	3.36
	NDR-S-04	2021	Average	269	3,904	12.7	0.77	0.29	17.91	42.74
			Standard Error	3	50	0.9	0.05	0.13	6.44	6.94
		2022	Average	643	9,319	27.3	0.79	0.15	14.40	34.12
			Standard Error	252	3,651	4.1	0.02	0.01	5.36	2.14
	NDR-S-05	2022	Average	2309	33,469	5.7	0.43	0.16	0.00	27.07
			Standard Error	243	3,518	0.3	0.11	0.03	0.00	11.99
	NDR-TRIB-01	2021	Average	795	11,522	7.0	0.56	0.16	0.00	62.16
			Standard Error	123	1,788	1.2	0.08	0.01	0.00	8.10
		2022	Average	1249	18,097	15.7	0.62	0.11	0.93	58.33
			Standard Error	331	4,804	4.7	0.01	0.01	0.38	1.52

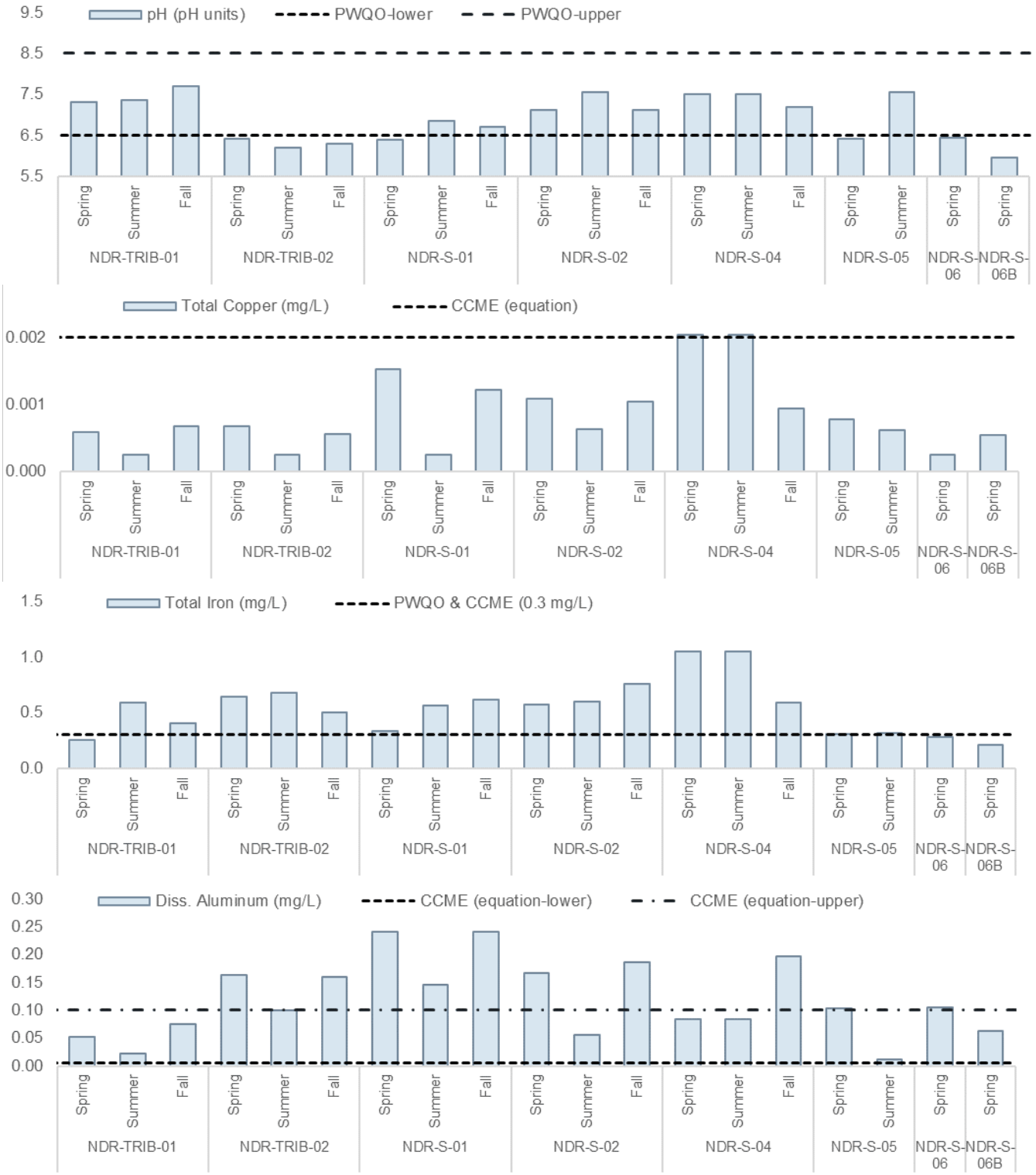
Table 3-3: Benthic Invertebrate Community Descriptors by Location and Year – West Buskegau River Watershed

Habitat Type	Location	Year	Statistic	Count	TID (#/m²)	Richness	Diversity	Evenness	% EPT	% Chiron.
Pond	WBR-P-01	2021	Average	624.00	9,043.33	5.33	0.45	0.14	2.65	70.85
			Standard Error	157.85	2,287.68	0.33	0.07	0.03	1.52	5.81
	WBR-P-03	2022	Average	1,118.67	16,212.56	11.33	0.12	0.09	0.53	93.52
			Standard Error	70.82	1,026.34	7.42	0.05	0.03	0.53	2.54
	WBR-P-04	2022	Average	445.33	6,454.11	6.33	0.49	0.32	5.13	48.50
			Standard Error	265.83	3,852.54	1.33	0.07	0.08	5.13	22.18
Stream	WBR-S-02	2021	Average	339.67	12,454.33	13.67	0.75	0.18	8.58	25.05
			Standard Error	104.13	5,849.63	1.45	0.03	0.03	1.81	10.18
	WBR-S-03	2021	Average	859.33	12,454.33	13.67	0.75	0.18	8.58	25.05
			Standard Error	403.63	5,849.63	1.45	0.03	0.03	1.81	10.18
	WBR-S-04	2021	Average	304.67	4,415.67	14.33	0.83	0.23	17.97	30.15
			Standard Error	93.43	1,354.23	3.93	0.01	0.06	5.75	1.07
	JC-S-01	2022	Average	2,390.00	34,637.68	9.00	0.15	0.06	0.56	92.21



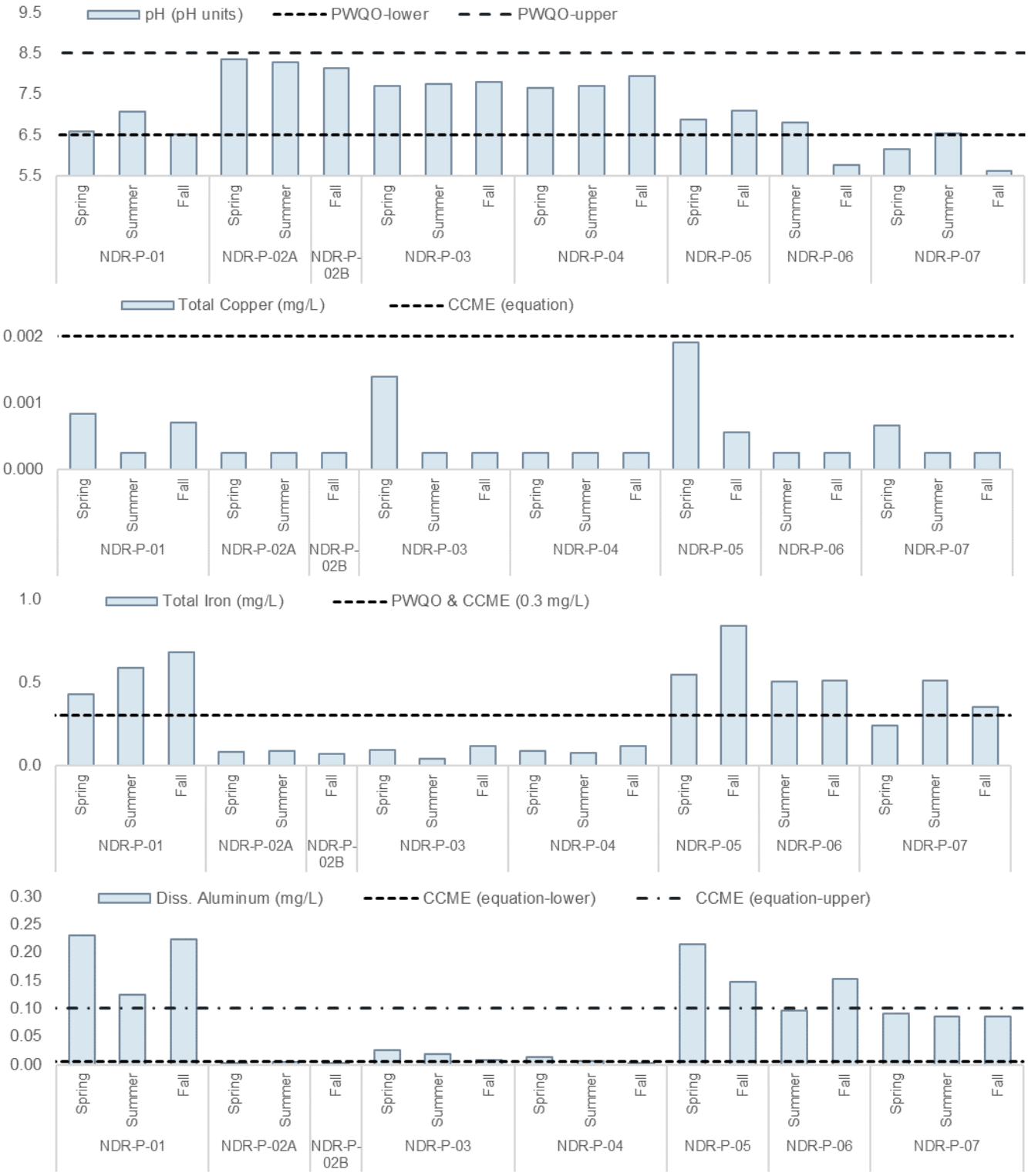
Concentrations reported less than laboratory detection limit were divided in half for calculation of mean and plotting purposes.
Individual concentration values are presented in Appendix A by location and year, the above plots represent mean values where available.

Figure 3-1: Surface Water Quality Parameters of Interest – NDR Lakes



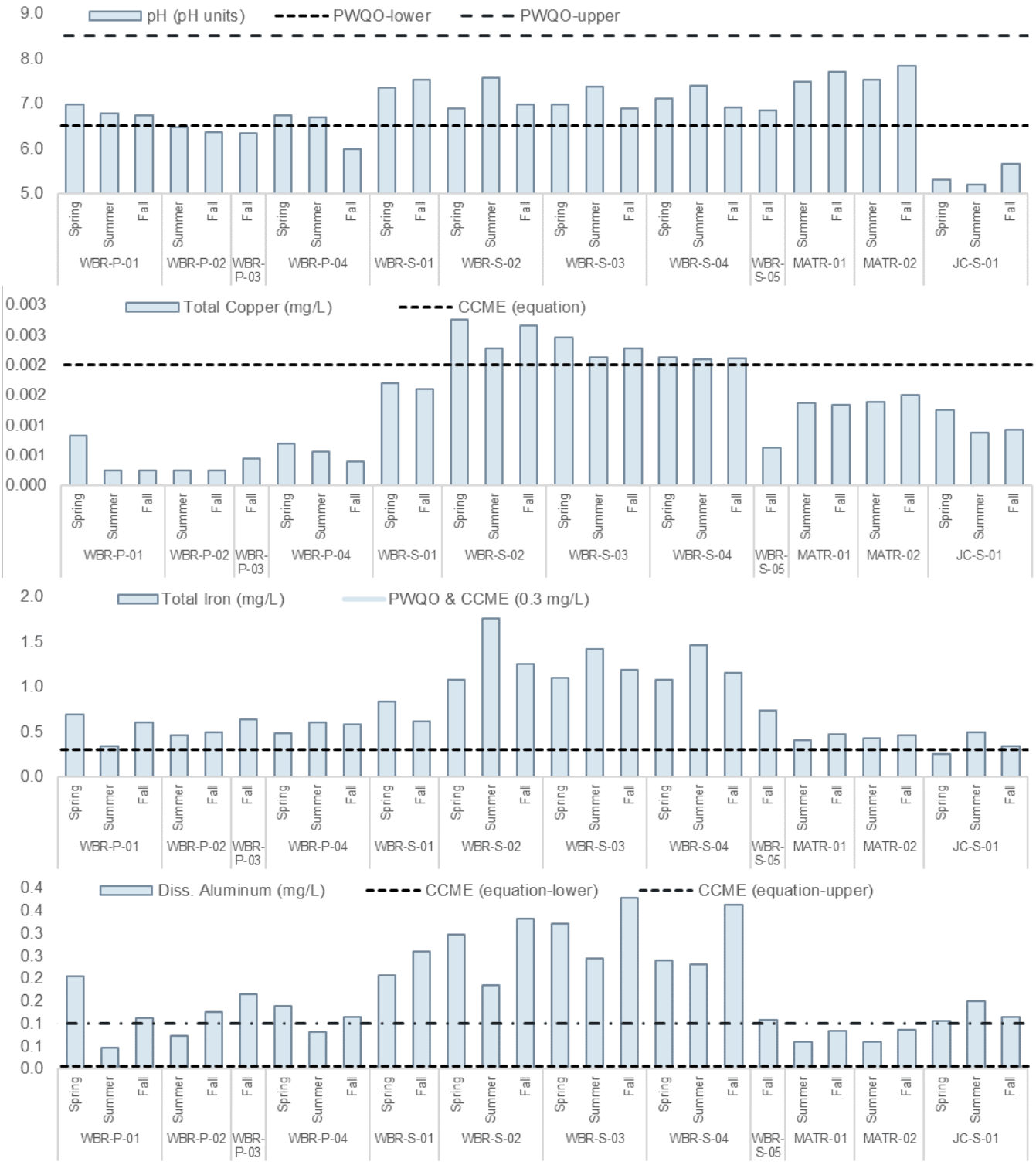
Concentrations reported less than laboratory detection limit were divided in half for calculation of mean and plotting purposes.
Individual concentration values are presented in Appendix A by location and year, the above plots represent mean values where available.

Figure 3-2: Surface Water Quality Parameters of Interest – NDR Watercourses



Concentrations reported less than laboratory detection limit were divided in half for calculation of mean and plotting purposes.
Individual concentration values are presented in Appendix A by location and year, the above plots represent mean values where available.

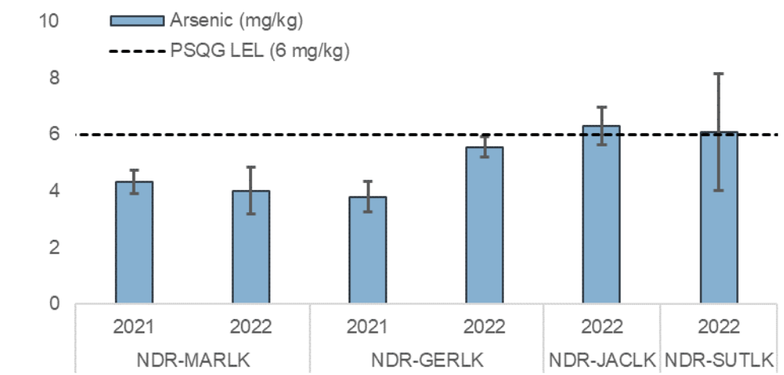
Figure 3-3: Surface Water Quality Parameters of Interest – NDR Ponds

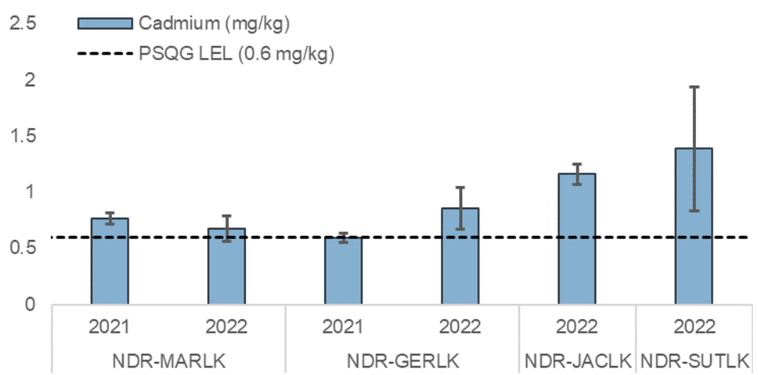


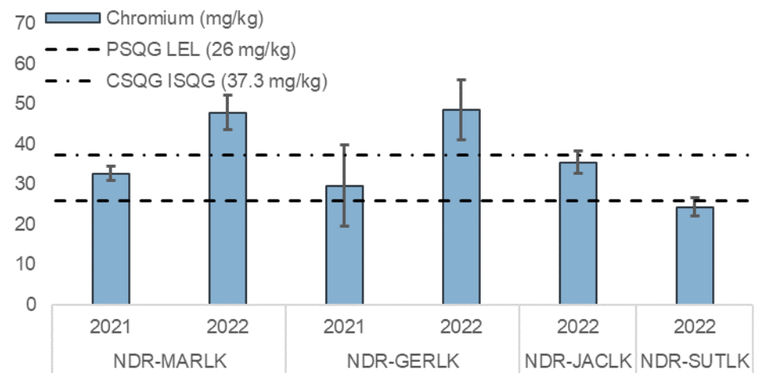
Concentrations reported less than laboratory detection limit were divided in half for calculation of mean and plotting purposes.

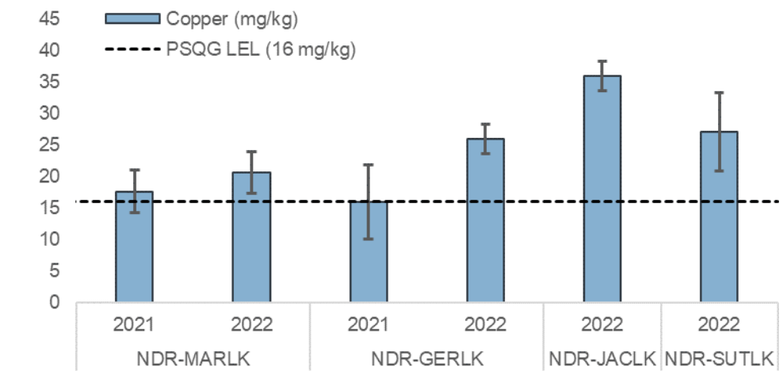
Individual concentration values are presented in Appendix A by location and year, the above plots represent mean values where available.

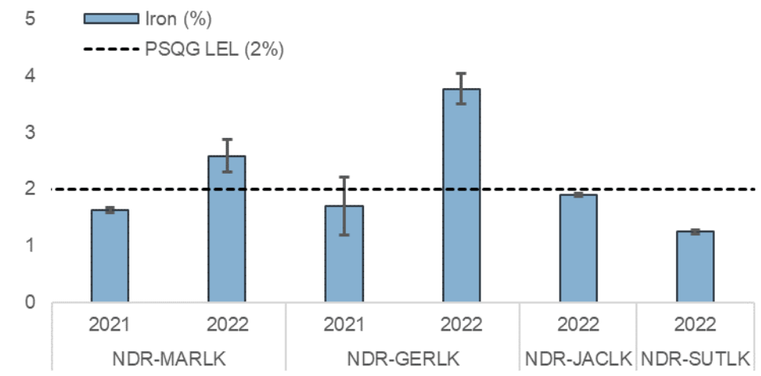
Figure 3-4: Surface Water Quality Parameters of Interest – WBR, Jocko Creek and Mattagami River

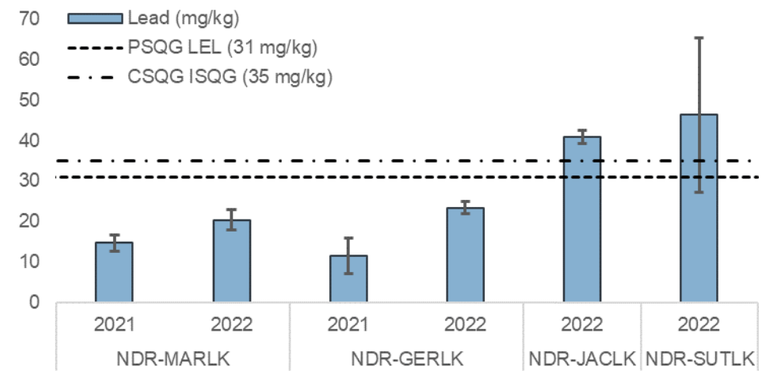


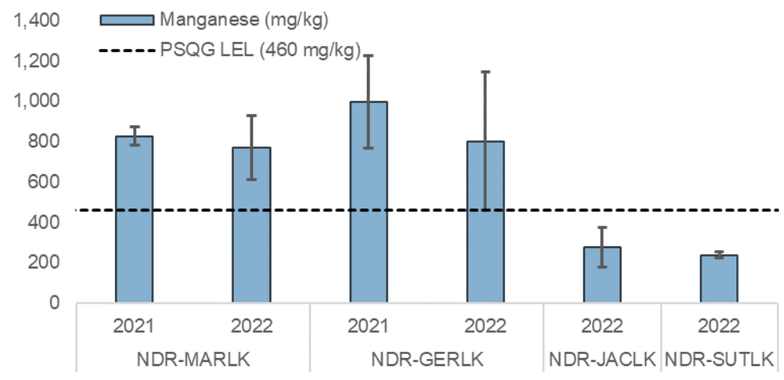


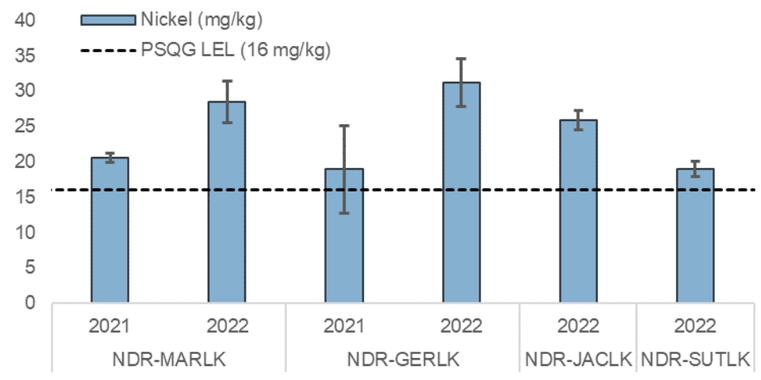












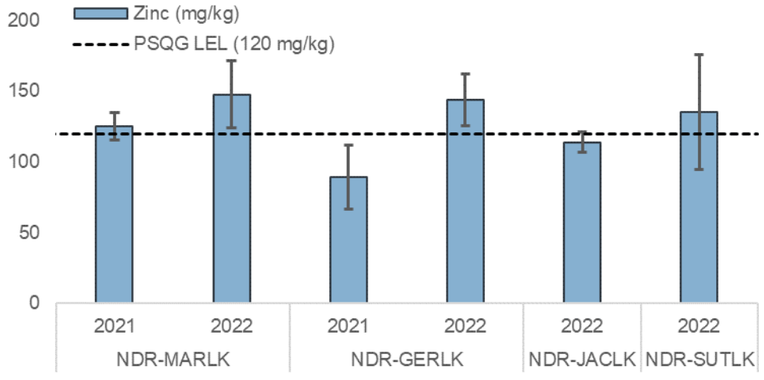
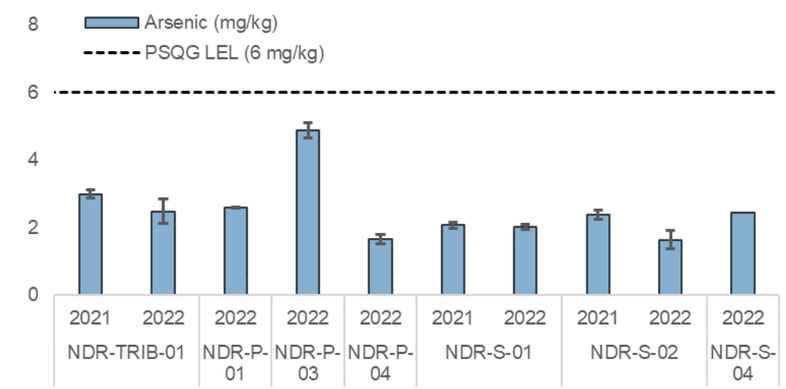
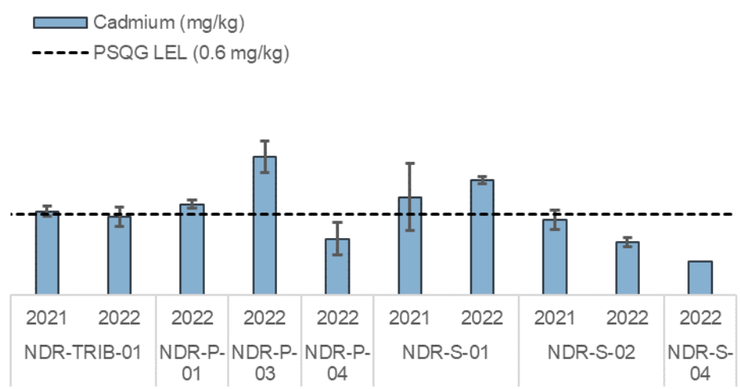
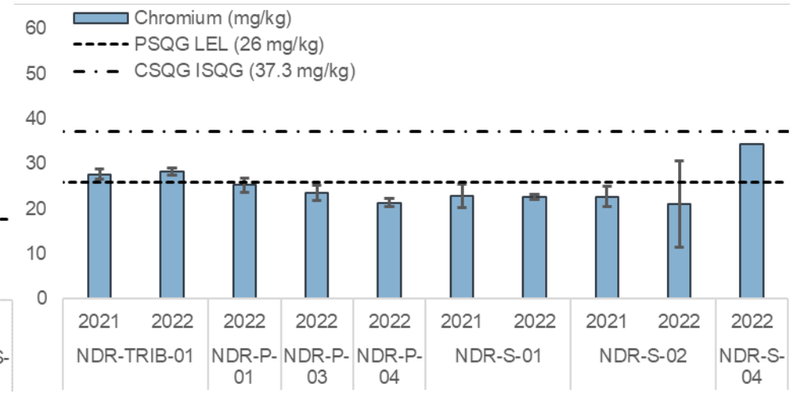
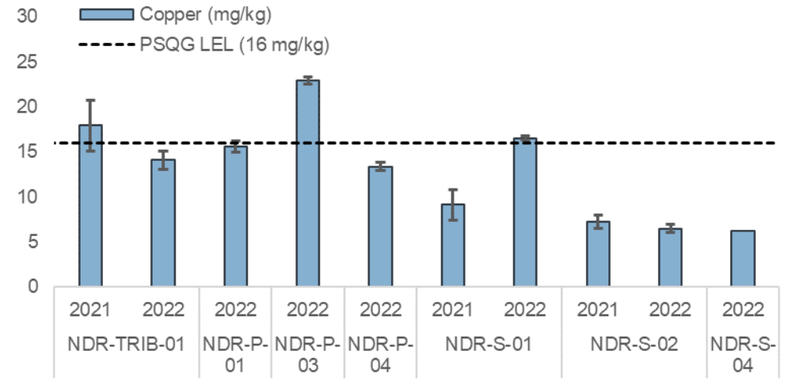


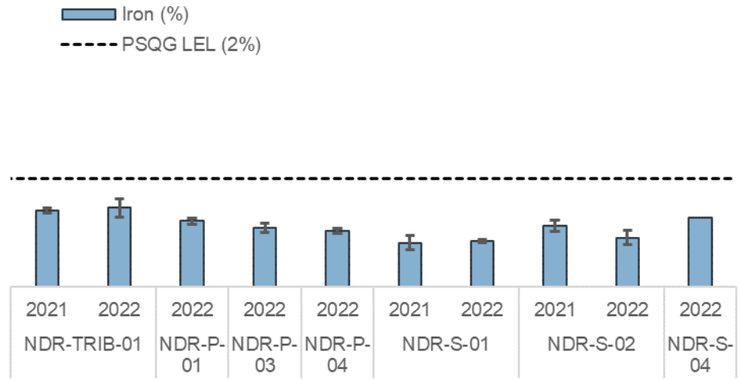
Figure 3-5: Mean Sediment Quality Parameters of Interest by Year (with standard error) – NDR Lakes

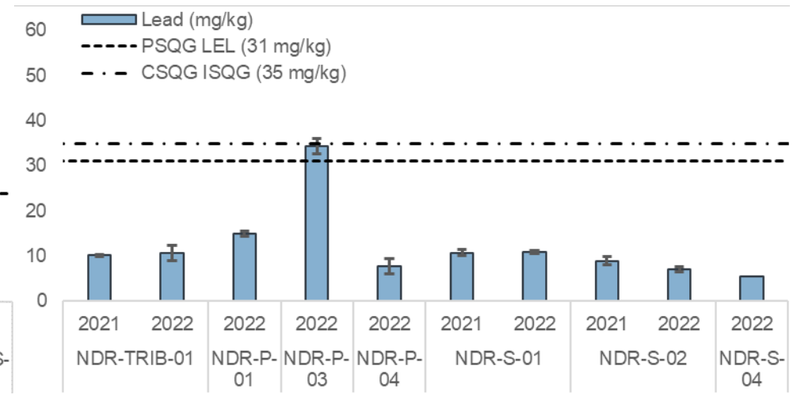


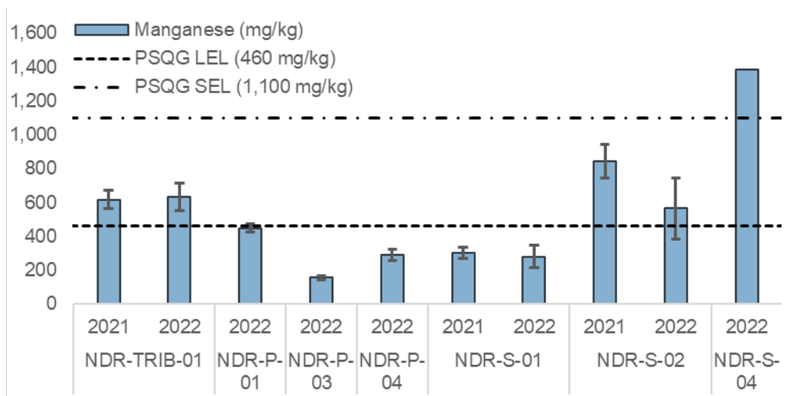


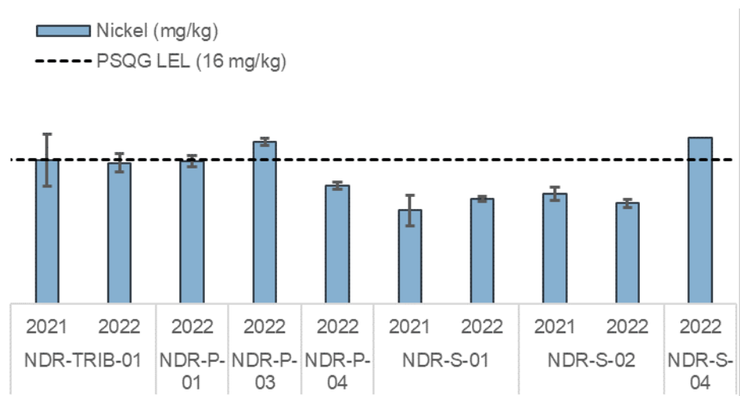


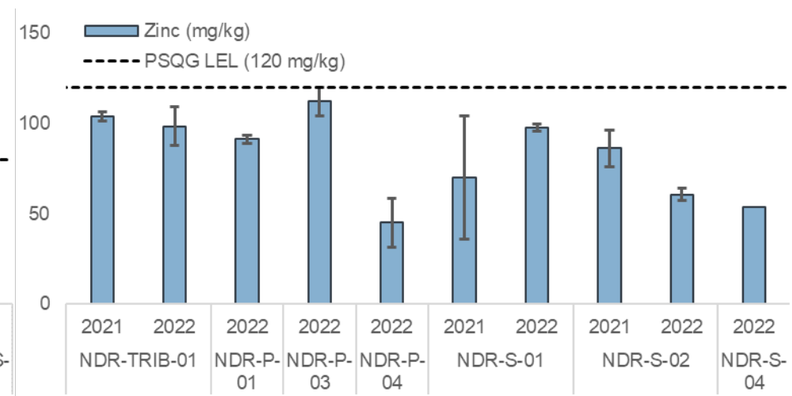






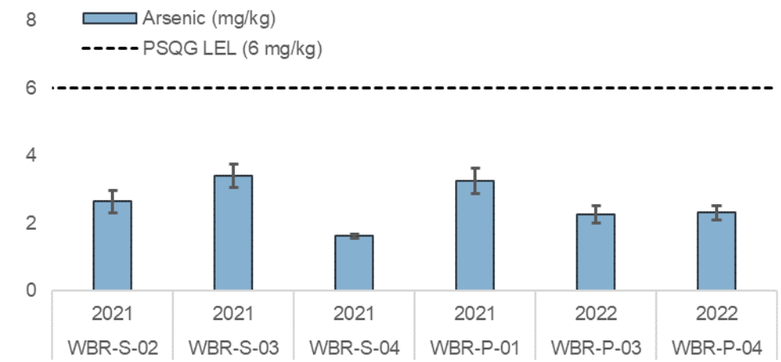


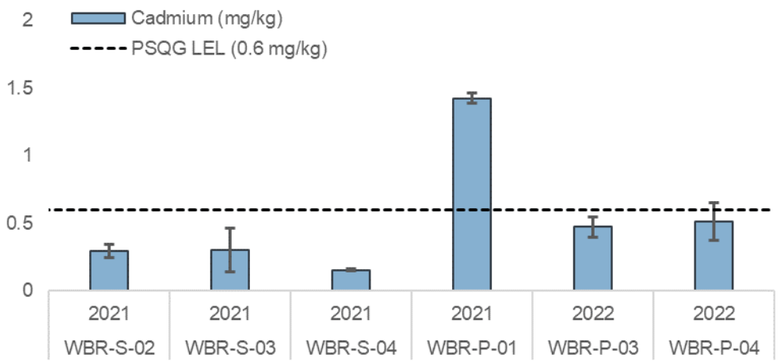


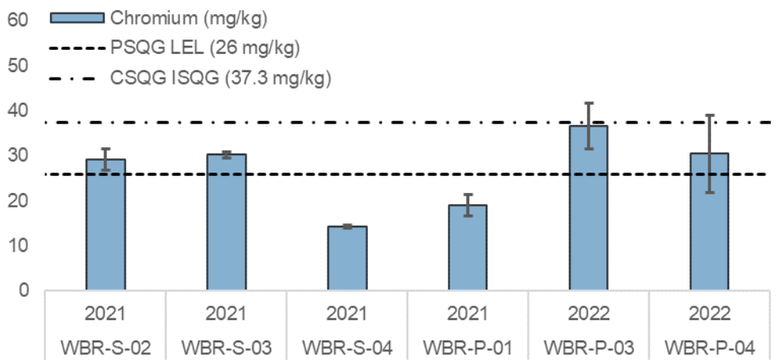


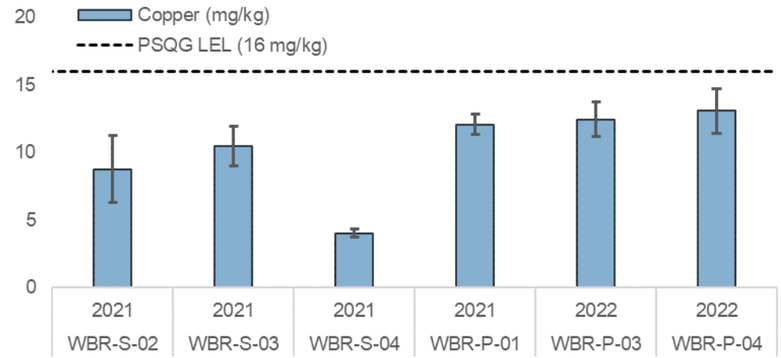
Note: results presented for NDR-P-04 represent concentration values of one sample, due to laboratory error the other two sediment samples were not available for analysis.

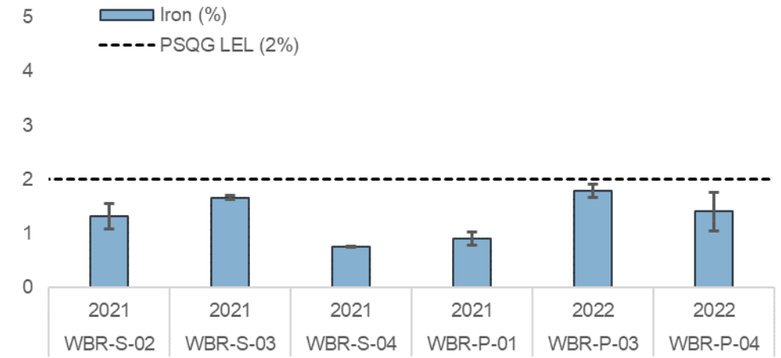
Figure 3-6: Mean Sediment Quality Parameters of Interest by Year (with standard error) – NDR Watercourses and Inland Ponds

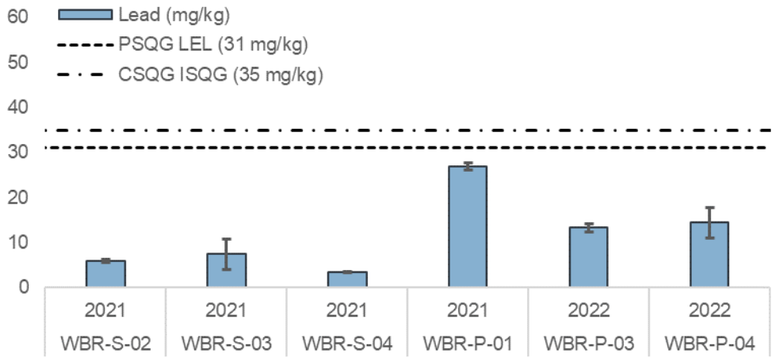


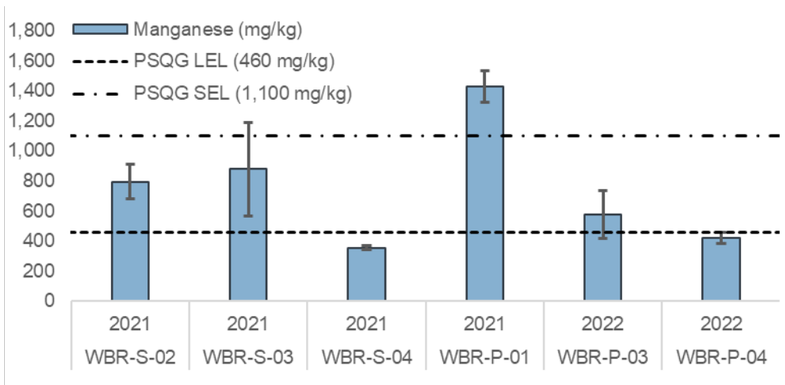


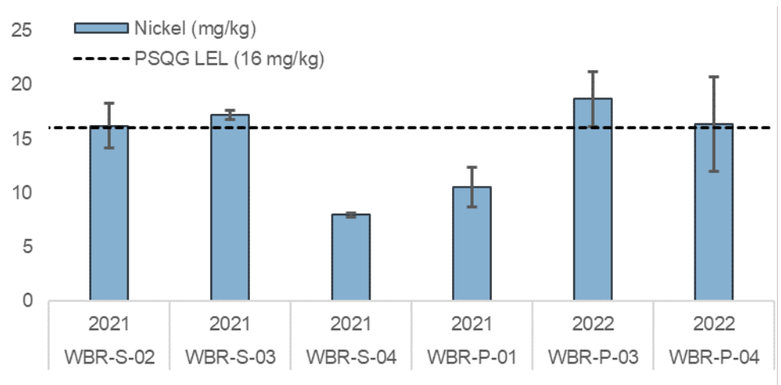












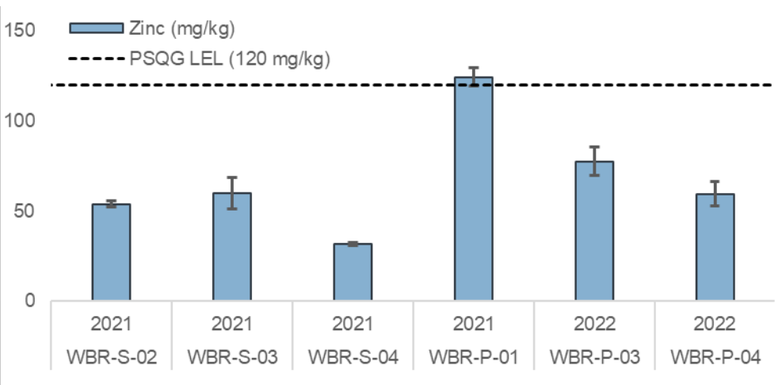


Figure 3-7: Mean Sediment Quality Parameters of Interest by Year (with standard error) – WBR Watercourses and Inland Ponds

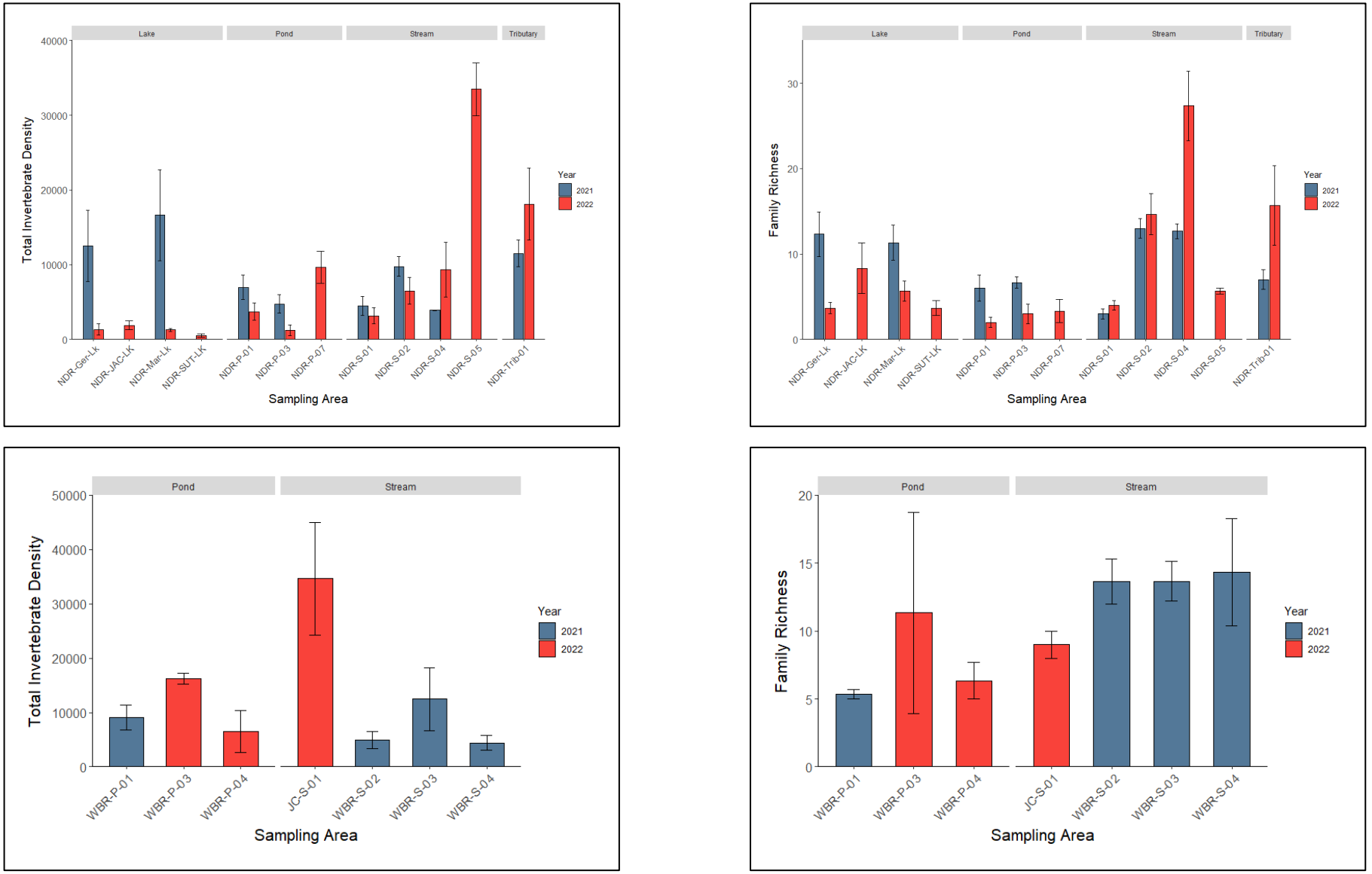
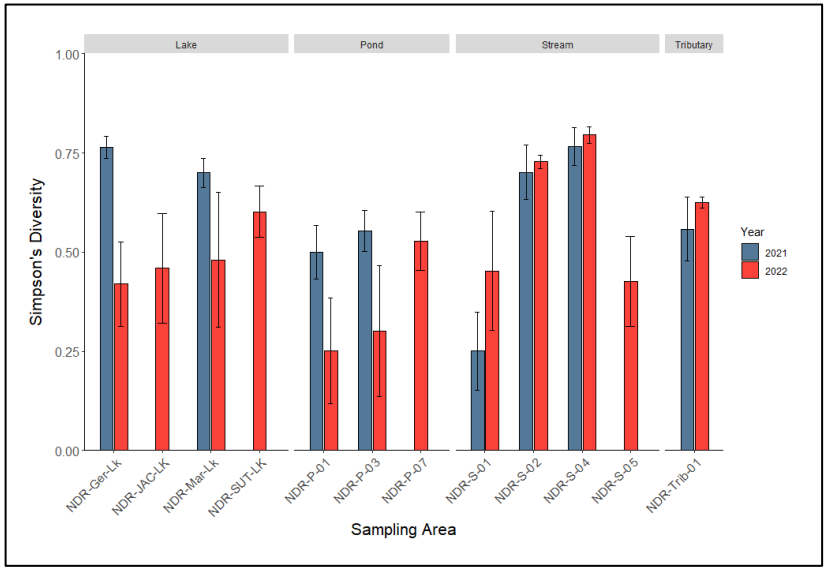
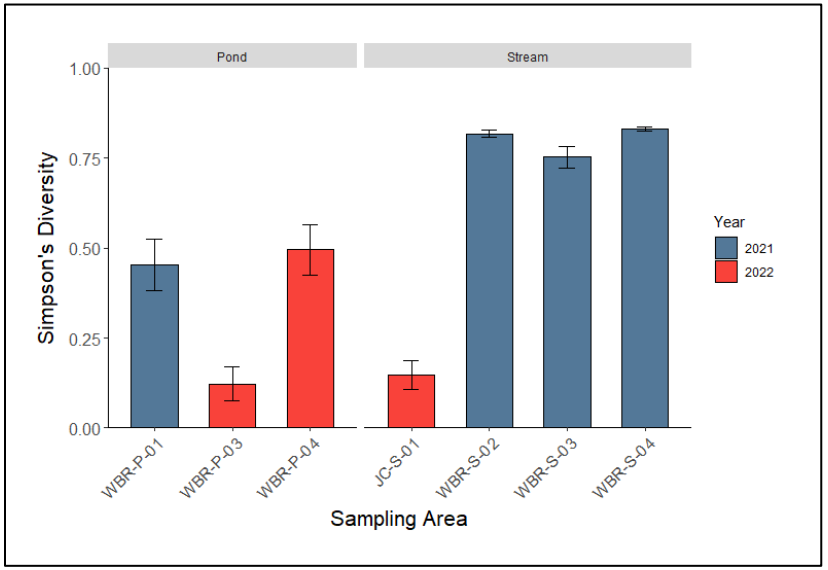
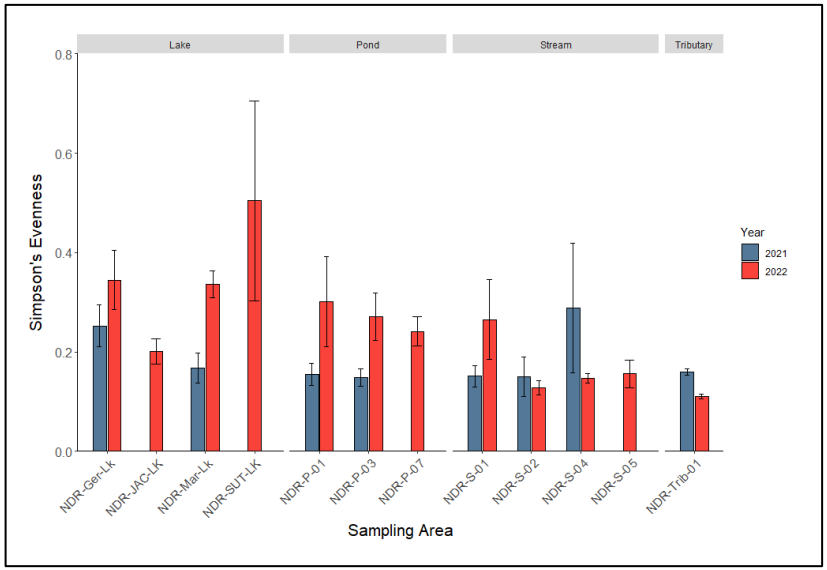


Figure 3-8: Mean Total Invertebrate Density and Family Richness by Location and Year (with standard error)







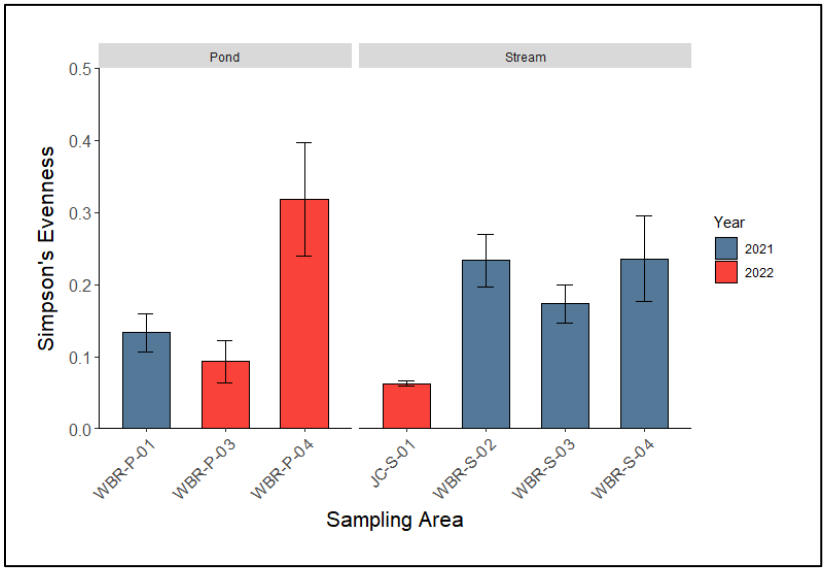


Figure 3-9: Mean Simpson's Diversity and Evenness by Location and Year (with standard error)

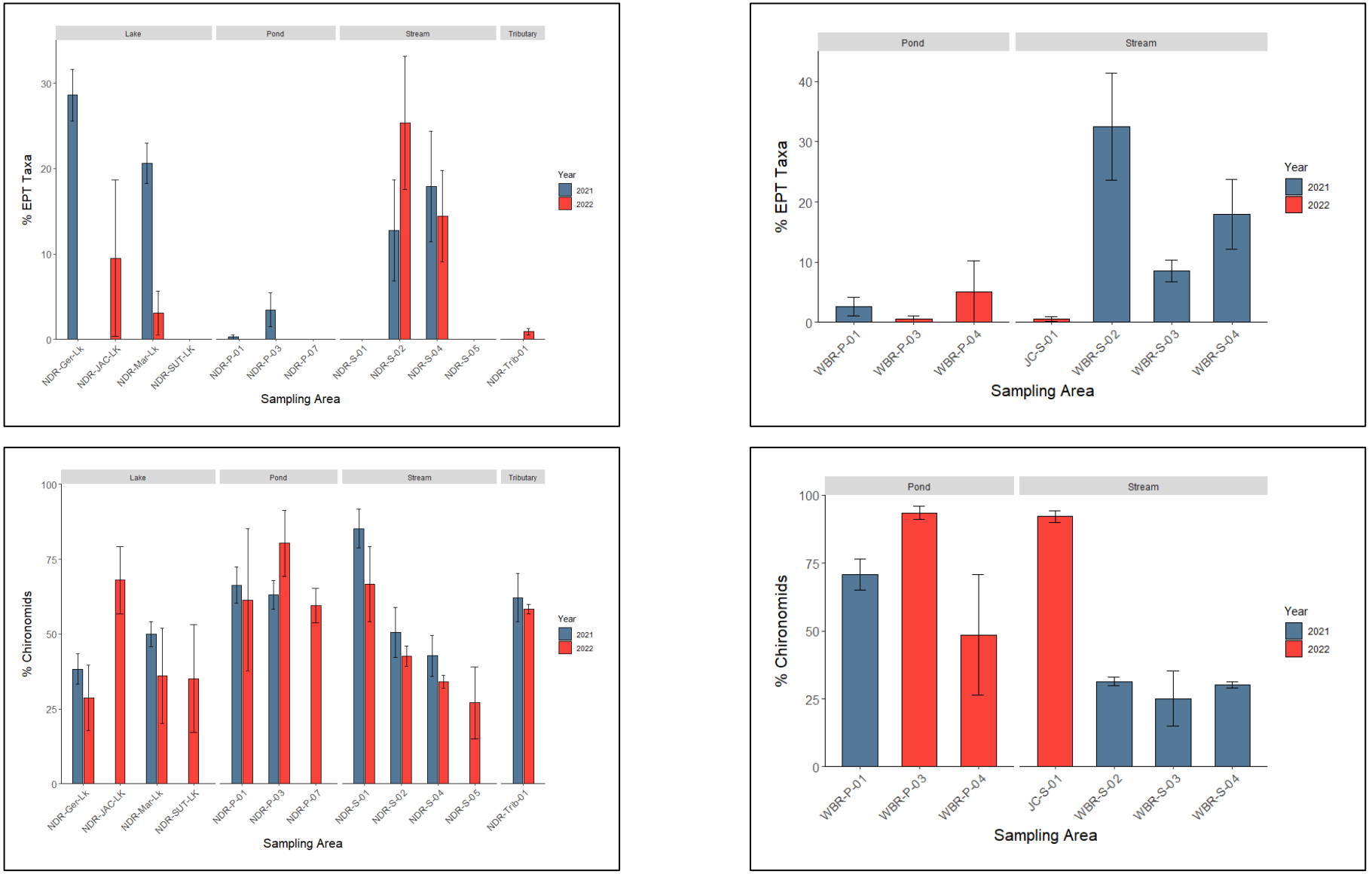
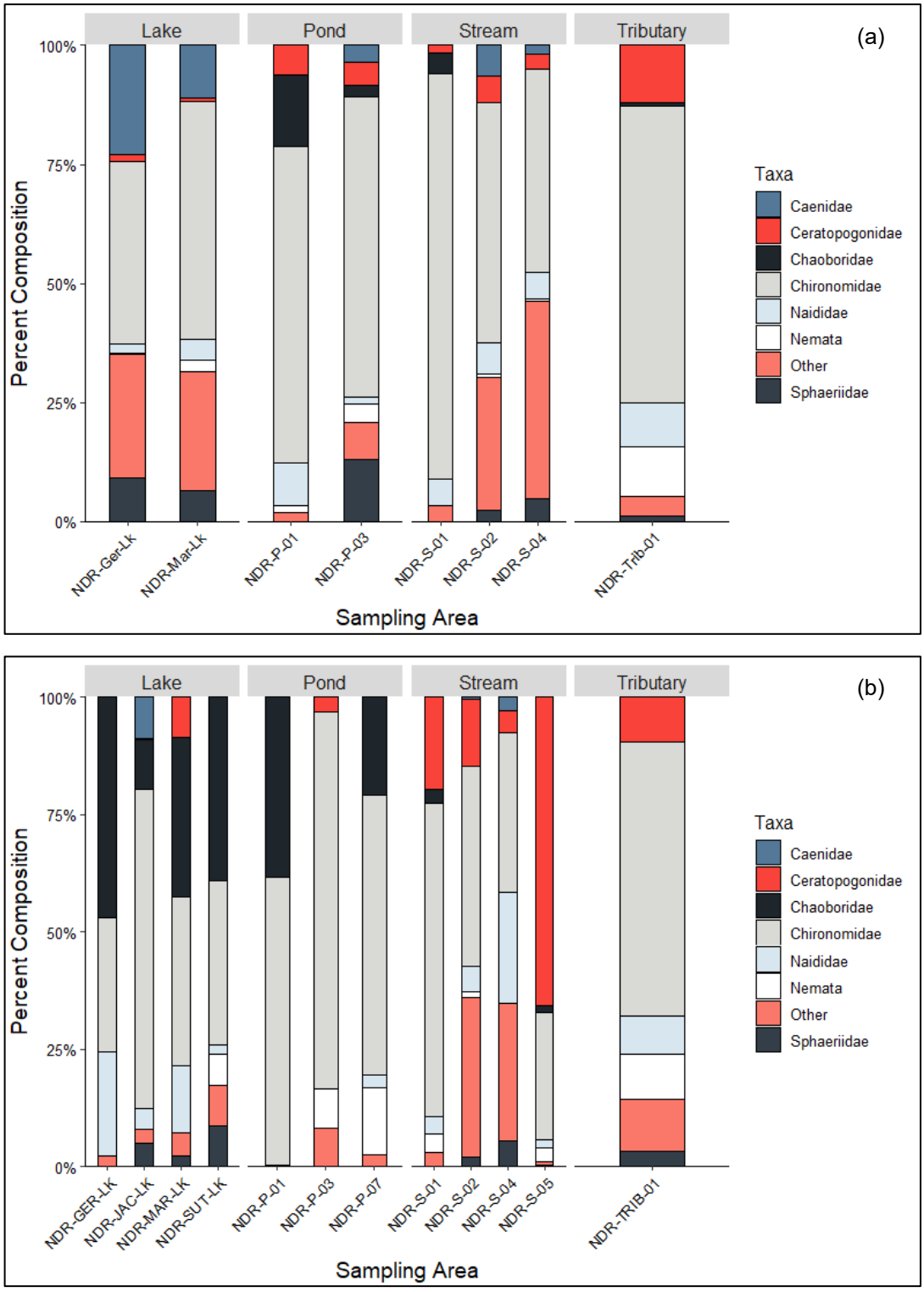
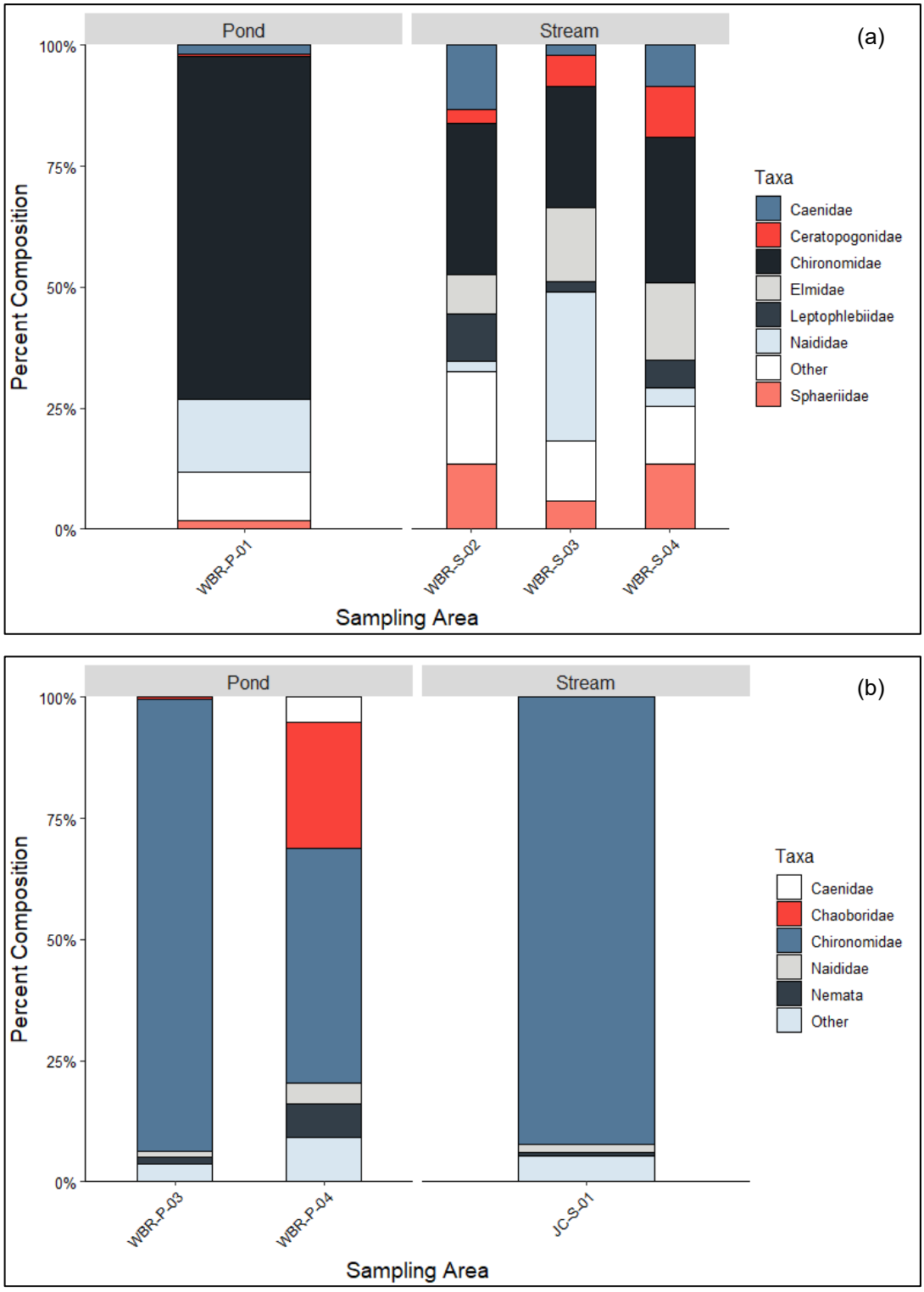


Figure 3-10: Mean Percent EPT and Percent Chironomids by Location and Year (with standard error)



Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area. Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-11: Mean Proportions of Major Benthic Invertebrate Families – NDR Watershed



Major taxonomic groups were determined as those which had mean proportions greater than 10% at a minimum of one sampling area. Figure (a) represents 2021 sampling and Figure (b) represents 2022 sampling.

Figure 3-12: Mean Proportions of Major Benthic Invertebrate Families – WBR Watershed and Jocko Creek

4.0 SUMMARY OF FINDINGS

The 2021 to 2023 fish and fish habitat studies characterized the existing conditions for surface water quality, fish habitat and community, fish tissue, sediment quality, and lower trophic level indices (e.g., benthic invertebrate and plankton communities) for a number of sites within, and adjacent to, the Project footprint. The terrestrial habitat within the Project area possessing the watercourses and waterbodies investigated during these fish and fish habitat studies , contained Black Spruce and Eastern Larch Forest and localized areas of treed muskeg and wetland assemblages, with drier upland communities comprised of Black Spruce. Mineral and organic wetlands connected by streams, ponds, and rivers are common in the region. Mineral wetlands generally produce little to no organic matter or peat and are usually associated with shallow water, less than 2 m deep. while organic wetlands contain peat accumulation on which organic soils develop.

4.1 Surface Water Quality

Surface water quality measured in the field generally met the respective quality criteria for the protection of aquatic life in baseline condition. The in-field pH values were typically circumneutral to slightly alkaline, although some waterbodies were acidic and below the lower bounds of the PAL quality criteria; these occurrences of lower pH were likely due to acidic organic inputs from the surrounding landscape. For all watersheds laboratory surface water quality analysis shows most parameters are within the respective range or less than quality criteria values for the protection of aquatic life. The laboratory analysis results showed some naturally elevated parameters, including total copper, iron, and dissolved aluminum. Lower trophic level parameters measured concurrently with the surface water samples included phytoplankton and zooplankton. Plankton results showed seasonal variability in taxa assemblage and biomass, typical of northeastern Ontario environs, and provide baseline data for future comparison.

4.2 Fish Habitat

Within all watersheds, the small streams and drainage channels connecting the inland waterbodies (i.e., beaver ponds) to mainstem river drainages are generally low gradient, low energy depositional environments with fine grained organic substrates consistent with conditions in the lentic waterbodies. The larger mainstem streams and rivers where present, are generally wide with broad floodplains and a fine substrate.

Lakes within the North Driftwood Watershed vary in size and maximum depth, all contain nearshore areas with aquatic macrophyte growth such as pondweed, horsetail, and cattails. Shrubs, sedges, and grasses provide overhead cover nearshore.

4.3 Fish Community

Fish community survey results from baseline studies show the fish species are typical of those inhabiting northeastern Ontario. Fish communities predominantly included forage (baitfish) species, as well as coarse fish (e.g., sucker) and upper trophic predatory species (e.g., northern pike). No aquatic Species at Risk were anticipated within the inland watercourses and waterbodies, and none were physically encountered during the 2021 to 2023 studies. The eDNA survey results confirmed lake sturgeon presence within the Mattagami River; however, eDNA surveys within the North Driftwood River did not detect lake sturgeon. The eDNA results paired well with the conventional fish community sampling techniques to provide a comprehensive species list for the Project.

4.4 Fish Tissue

Fish tissue analysis shows naturally elevated concentrations of total mercury and methylmercury in northern pike, which is commonly observed within northeastern Ontario and has been detected during the MECP sportfish tissue monitoring program. These parameters were also measured in baitfish (forage) species in Jocko Creek, North Driftwood River and West Buskegau River to better understand mercury concentrations in lower trophic levels. Total methylmercury concentrations exceeded the CCME (2000) guideline for the protection of wildlife consumers of aquatic biota in all Jocko Creek samples, in 37% of North Driftwood River watershed samples and in 7.7% of West Buskegau River watershed samples.

4.5 Sediment Quality

Sediment quality results showed typical nutrient and organic content exceeded their respective quality criteria for the protection of aquatic life in baseline condition. For example, total Kjeldahl nitrogen and total organic carbon were generally greater than their quality criteria, which is commonly observed in northeastern Ontario depositional lentic environs and low gradient watercourses that receive organic inputs and typically contain high organics content. Sediment metal concentrations also generally exceeded their respective PSQG LEL in all watersheds. These data help to identify baseline sediment quality parameter concentrations that are naturally greater than their respective quality criteria.

4.6 Benthic Macroinvertebrate Community

The benthic invertebrate community survey results show a typical range of taxa richness, diversity, and density observed in northeastern Ontario. These data help characterize another metric of the lower trophic status within lake (lentic) and riverine (lotic) environs for the Project and provide baseline data for future comparison.

Signature Page

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APPENDIX A

Surface Water Quality Data

Table A1-1: In-Field Surface Water Measurements (2021)

Watershed	Waterbody	Site ID	Date (dd/mm/yy)	Season	UTM Coordinates (Zone, Easting, Northing)			Time (24-hr)	Sample Depth (m)	Water Temperature (°C)	pH	Conductivity (µS/cm)	DO (%)	DO (mg/L)	ORP (mV)
Mattagami River	Mattagami River	MatR-01	28/10/21	Fall	17U	464,099	5,407,180	11:45	0.5	9.4	7.75	96.6	87.0	9.6	126.4
		MatR-02	28/10/21	Fall	17U	462,924	5,412,397	11:00	0.5	8.9	7.7	95.7	86.9	9.8	104.6
North Driftwood River	Gerry Lake	NDR-Ger-LK	11/08/21	Summer	17U	471,312	5,405,901	17:30	n/a	23.7	7.8	270.0	108.3	9.2	157.8
		NDR-Ger-LK	27/10/21	Fall	17U	471,361	5,405,956	16:50	0.5	8.2	7.71	193.1	57.9	6.6	222.8
	Martin Lake	NDR-Mar-LK	11/08/21	Summer	17U	470,885	5,406,511	16:45	0.5	23.7	7.1	119.0	90.8	7.7	106.3
		NDR-Mar-LK	27/10/21	Fall	17U	470,672	5,406,764	17:20	0.5	8.2	7.4	83.3	58.2	6.7	205.1
	Unnamed Pond	NDR-P-01	08/08/21	Summer	17U	473,172	5,406,511	16:30	0.5	20.8	5.79	57.0	74.3	6.6	210.3
		NDR-P-01	24/10/21	Fall	17U	473,187	5,406,480	11:15	0.5	4.7	6.02	30.7	58.4	7.3	199.7
		NDR-P-02A	05/08/21	Summer	17U	470,354	5,408,267	10:00	0.5	22.6	7.93	150.0	97.1	8.4	194.2
		NDR-P-02A	19/10/21	Fall	17U	470,356	5,408,270	17:45	0.5	10.7	7.96	131.5	105.5	11.1	257.4
		NDR-P-03	05/08/21	Summer	17U	469,847	5,409,437	12:45	0.5	23.1	7.64	82.0	100.8	8.6	155.8
		NDR-P-03	20/10/21	Fall	17U	469,829	5,409,435	8:40	1.0	10.9	6.82	61.1	79.6	8.6	200.9
		NDR-P-04	05/08/21	Summer	17U	470,331	5,408,339	9:00	0.5	21.3	5.64	148.0	73.0	6.5	212.6
		NDR-P-04	19/10/21	Fall	17U	470,330	5,408,330	17:30	1.0	12.9	6.83	129.4	56.0	5.7	216.6
	Unnamed Stream	NDR-S-01	08/08/21	Summer	17U	475,439	5,406,474	14:45	0.5	19.8	4.54	53.0	66.4	6.1	278.1
		NDR-S-01	23/10/21	Fall	17U	475,441	5,406,430	12:15	0.5	4.5	6.79	35.4	59.7	7.5	187.2
		NDR-S-02	11/08/21	Summer	17U	472,050	5,408,748	10:20	0.5	20.7	6.62	131.0	60.7	5.2	90.3
		NDR-S-04	06/08/21	Summer	17U	470,370	5,412,387	13:15	0.5	19.7	6.7	147.0	42.8	3.9	165.4
		NDR-S-04	21/10/21	Fall	17U	470,362	5,412,388	13:45	0.5	7.0	6.91	70.1	80.9	9.5	191.6
	Unnamed Tributary	NDR-TRIB-01	11/08/21	Summer	17U	471,523	5,406,902	15:45	0.5	21.7	6.39	130.0	26.1	2.3	118.7
		NDR-TRIB-01	19/10/21	Fall	17U	471,526	5,406,900	13:20	1.0	11.0	6.87	80.9	64.7	6.9	199
		NDR-TRIB-02	11/08/21	Summer	17U	471,050	5,409,487	13:00	0.5	18.2	5.53	35.0	7.0	0.7	122.3
		NDR-TRIB-02	20/10/21	Fall	17U	471,050	5,409,500	16:45	1.0	7.5	5.46	38.6	50.1	5.8	180.1
West Buskegau River	Prosser Creek	WBR-S-01	10/08/21	Summer	17U	478,677	5,405,872	15:30	0.5	20.9	7.1	131.0	75.5	6.8	148.2
		WBR-S-01	25/10/21	Fall	17U	478,692	5,405,841	15:45	0.3	5.4	7.21	68.3	87.0	10.8	211.5
	West Buskegau River	WBR-P-01	07/08/21	Summer	17U	475,225	5,412,044	13:30	0.5	21.4	6.21	52.0	71.4	6.3	165.1
		WBR-P-01	26/10/21	Fall	17U	475,218	5,412,053	10:00	0.5	4.4	6.14	27.1	54.0	6.9	n/a
		WBR-P-02	07/08/21	Summer	17U	475,876	5,412,164	11:45	0.5	19.7	5.95	40.0	59.8	5.5	141
		WBR-P-02	26/10/21	Fall	17U	475,875	5,412,208	12:30	0.5	5.2	5.89	23.9	33.3	4.1	156.1
		WBR-S-02	10/08/21	Summer	17U	478,566	5,405,888	16:20	0.5	21.3	6.96	106.0	66.3	5.9	145.5
		WBR-S-02	25/10/21	Fall	17U	478,873	5,405,897	14:00	0.5	4.9	6.23	32.2	93.4	11.7	197.3
		WBR-S-03	10/08/21	Summer	17U	476,696	5,412,340	10:00	0.5	20.6	6.11	109.0	72.5	6.5	162.3
		WBR-S-03	24/10/21	Fall	17U	476,696	5,412,340	16:40	0.2	5.3	6.68	35.1	90.4	11.2	195.7
		WBR-S-04	09/08/21	Summer	17U	476,574	5,412,898	14:30	0.5	20.6	5.55	103.0	83.1	7.5	176.5
		WBR-S-04	24/10/21	Fall	17U	476,573	5,412,891	14:10	0.5	5.1	6.38	34.3	89.7	11.1	210.5

Table A1-2a: Surface Water Laboratory Results – Martin Lake, Gerry Lake and NDR Unnamed Tributaries (2021)

					Sample Location	**Martin Lake**		**Gerry Lake**		**Unnamed Tributaries**			
					Location ID	**NDR-MARLK**	**NDR-MARLK**	**NDR-GERLK**	**NDR-GERLK**	**NDR-TRIB-01**	**NDR-TRIB-01**	**NDR-TRIB-02**	**NDR-TRIB-02**
					Date Sampled	**11-Aug-2021**	**26-Oct-2021**	**11-Aug-2021**	**26-Oct-2021**	**11-Aug-2021**	**19-Oct-2021**	**11-Aug-2021**	**20-Oct-2021**
					Time Sampled	**16:45**	**17:20**	**17:30**	**16:50**	**15:45**	**13:20**	**13:00**	**15:45**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**								
Physical Tests (Water)													
Conductivity	1.0	umhos/cm				120	129	273	297	135	124	37.3	35.7
Hardness (as CaCO3)	0.50	mg/L				64.7	67.5	140	147	73.4	69	22.4	26.9
pH	0.10	pH units	6.5-9.0		6.5-8.5	7.74	7.64	8.24	8.08	7.35	7.82	6.21	6.30
Total Suspended Solids	3.0	mg/L				<3.0	<3.0	<3.0	<3.0	<3.0	6.6	5.5	<3.0
Total Dissolved Solids	10	mg/L	5.5-9.5			88	93	183	167	99	74	78	93
Anions and Nutrients (Water)													
Alkalinity, Total (as CaCO3)	1.0	mg/L				63.3	68.4	153	163	71.9	68.9	<1.0	9.3
Ammonia, Total (as N)	0.010	mg/L				<0.010	0.011	0.015	0.017	0.011	0.024	<0.010	0.090
Bromide (Br)	0.10	mg/L				<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloride (Cl)	0.50	mg/L	120			<0.50	<0.50	<0.50	0.92	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L				0.030	0.032	0.073	0.079	0.034	0.030	<0.020	<0.020
Nitrate (as N)	0.020	mg/L	13			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.029
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0010	mg/L				0.0166	0.0189	0.0116	0.0220	0.0433	0.0180	0.0262	0.0178
Sulfate (SO4)	0.30	mg/L				0.33	0.40	1.30	1.28	<0.30	0.33	<0.30	<0.30
Cyanides (Water)													
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Total	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters (Water)													
Acidity (as CaCO3)	2.0	mg/L				<2.0	2.2	<2.0	<2.0	8.5	10.5	12.1	16.7
Total Metals (Water)													
Aluminum (Al)-Total	0.0050	mg/L	0.005 - 0.1			0.0243	0.0704	0.0065	0.0213	0.0310	0.0491	0.108	0.206
Antimony (Sb)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00010	mg/L	0.005		0.1	0.00060	0.00058	0.00054	0.00048	0.00104	0.00056	0.00097	0.00089
Barium (Ba)-Total	0.00010	mg/L				0.00569	0.00748	0.0154	0.0198	0.00905	0.00702	0.00373	0.00580
Beryllium (Be)-Total	0.00010	mg/L			0.011 or 1.1	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.0000050	mg/L	0.00005-0.00022		0.0002	<0.0000050	0.0000053	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000231	0.0000344
Calcium (Ca)-Total	0.050	mg/L				18.4	18.8	40.1	40.9	20.6	19.0	6.13	7.16
Cesium (Cs)-Total	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Total	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00058	0.00055
Cobalt (Co)-Total	0.00010	mg/L		0.000793 - 0.001196 *		<0.00010	<0.00010	<0.00010	<0.00010	0.00076	<0.00010	0.00087	0.00022

					Sample Location	Martin Lake		Gerry Lake		Unnamed Tributaries			
					Location ID	NDR-MARLK	NDR-MARLK	NDR-GERLK	NDR-GERLK	NDR-TRIB-01	NDR-TRIB-01	NDR-TRIB-02	NDR-TRIB-02
					Date Sampled	11-Aug-2021	26-Oct-2021	11-Aug-2021	26-Oct-2021	11-Aug-2021	19-Oct-2021	11-Aug-2021	20-Oct-2021
					Time Sampled	16:45	17:20	17:30	16:50	15:45	13:20	13:00	15:45
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**								
Copper (Cu)-Total	0.00050	mg/L	0.002-0.00329		0.005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00053	<0.00050	0.00087
Iron (Fe)-Total	0.010	mg/L	0.3		0.3	0.132	0.280	0.076	0.333	0.791	0.220	0.677	0.585
Lead (Pb)-Total	0.000050	mg/L	0.001-0.0052		0.001-0.005	<0.000050	0.000091	<0.000050	<0.000050	0.000077	0.000056	0.000579	0.000528
Lithium (Li)-Total	0.0010	mg/L				<0.0010	<0.0010	0.0016	0.0014	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total	0.0050	mg/L				4.54	4.98	9.77	10.9	5.30	5.22	1.73	2.18
Manganese (Mn)-Total	0.00050	mg/L	0.2-0.5			0.0234	0.0436	0.0266	0.122	0.550	0.0387	0.278	0.0391
Mercury (Hg)-Total	0.00050	ug/L	0.026		0.2	0.00113	0.00191	0.00088	0.00178	0.00104	0.00107	0.00141	0.00140
Molybdenum (Mo)-Total	0.000050	mg/L	0.073			0.000053	0.000064	0.000173	0.000172	0.000055	0.000066	<0.000050	<0.000050
Nickel (Ni)-Total	0.00050	mg/L	0.025-0.128		0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00067	0.00056	0.00105
Phosphorus (P)-Total	0.050	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	0.050	mg/L				0.421	0.484	1.05	1.13	0.306	0.483	0.096	0.201
Rubidium (Rb)-Total	0.00020	mg/L				0.00093	0.00108	0.00166	0.00173	0.00105	0.00119	0.00034	0.00074
Selenium (Se)-Total	0.000050	mg/L	0.001		0.1	0.000069	0.000115	0.000062	0.000061	0.000091	0.000083	0.000105	0.000141
Silicon (Si)-Total	0.10	mg/L				0.94	1.74	2.16	3.11	1.64	1.51	3.01	1.90
Silver (Ag)-Total	0.000050	mg/L	0.00025		0.0001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium (Na)-Total	0.050	mg/L				1.30	1.46	3.47	3.92	1.23	1.44	0.432	0.714
Strontium (Sr)-Total	0.0010	mg/L				0.0311	0.0346	0.0733	0.0779	0.0347	0.0318	0.0136	0.0138
Sulfur (S)-Total	0.50	mg/L				0.53	<0.50	0.67	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)-Total	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	0.000010	mg/L	0.0008			<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.00030	mg/L				0.00079	0.00238	<0.00030	0.00069	0.00082	0.00166	0.00281	0.00543
Tungsten (W)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total	0.000010	mg/L	0.015			0.000026	0.000048	0.000039	0.000036	0.000014	0.000026	<0.000010	0.000020
Vanadium (V)-Total	0.00050	mg/L		0.12		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	0.0030	mg/L			0.03	<0.0030	<0.0030	<0.0030	<0.0030	0.0031	<0.0030	0.0057	0.0072
Zirconium (Zr)-Total	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Metals (Water)													
Aluminum (Al)-Dissolved	0.0010	mg/L				0.0144	0.0360	0.0016	0.0107	0.0253	0.0263	0.100	0.193
Antimony (Sb)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00010	mg/L				0.00058	0.00054	0.00049	0.00046	0.00094	0.00055	0.00093	0.00088
Barium (Ba)-Dissolved	0.00010	mg/L				0.00577	0.00720	0.0158	0.0195	0.00897	0.00680	0.00327	0.00415
Beryllium (Be)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved	0.010	mg/L				<0.010	<0.010	0.014	0.013	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.0000050	mg/L				<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000228	0.0000263
Calcium (Ca)-Dissolved	0.050	mg/L				19.1	20.1	41.1	42.9	21.1	19.3	6.19	7.04

					Sample Location	Martin Lake		Gerry Lake		Unnamed Tributaries			
					Location ID	NDR-MARLK	NDR-MARLK	NDR-GERLK	NDR-GERLK	NDR-TRIB-01	NDR-TRIB-01	NDR-TRIB-02	NDR-TRIB-02
					Date Sampled	11-Aug-2021	26-Oct-2021	11-Aug-2021	26-Oct-2021	11-Aug-2021	19-Oct-2021	11-Aug-2021	20-Oct-2021
					Time Sampled	16:45	17:20	17:30	16:50	15:45	13:20	13:00	15:45
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**								
Cesium (Cs)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved	0.00010	mg/L				0.00020	0.00022	0.00017	0.00017	0.00024	0.00022	0.00060	0.00051
Cobalt (Co)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	0.00064	<0.00010	0.00081	0.00011
Copper (Cu)-Dissolved	0.00020	mg/L				0.00031	0.00039	0.00021	0.00020	<0.00020	0.00034	<0.00020	0.00061
Iron (Fe)-Dissolved	0.010	mg/L				0.102	0.187	0.032	0.198	0.530	0.156	0.586	0.521
Lead (Pb)-Dissolved	0.000050	mg/L				<0.000050	0.000104	<0.000050	<0.000050	<0.000050	0.000057	0.000471	0.000366
Lithium (Li)-Dissolved	0.0010	mg/L				<0.0010	<0.0010	0.0016	0.0019	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved	0.0050	mg/L				5.21	5.07	11.2	11.3	5.99	5.10	1.92	2.17
Manganese (Mn)-Dissolved	0.00010	mg/L				0.00626	0.0330	0.00344	0.0875	0.525	0.0282	0.241	0.0176
Molybdenum (Mo)-Dissolved	0.000050	mg/L				0.000052	0.000057	0.000159	0.000144	<0.000050	0.000053	<0.000050	<0.000050
Nickel (Ni)-Dissolved	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	0.00059
Phosphorus (P)-Dissolved	0.030	mg/L				<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Potassium (K)-Dissolved	0.050	mg/L				0.428	0.502	1.09	1.12	0.324	0.493	0.109	0.164
Rubidium (Rb)-Dissolved	0.00020	mg/L				0.00095	0.00103	0.00170	0.00165	0.00114	0.00118	0.00035	0.00068
Selenium (Se)-Dissolved	0.000050	mg/L				<0.000050	0.000073	0.000057	0.000051	0.000070	0.000066	0.000093	0.000151
Silicon (Si)-Dissolved	0.050	mg/L				0.779	1.66	2.22	2.98	1.58	1.49	3.10	1.93
Silver (Ag)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	0.050	mg/L				1.33	1.43	3.64	3.77	1.27	1.38	0.432	0.622
Strontium (Sr)-Dissolved	0.00010	mg/L		2.5		0.0333	0.0326	0.0796	0.0795	0.0365	0.0327	0.0138	0.0137
Sulfur (S)-Dissolved	0.50	mg/L				0.51	0.74	0.85	0.89	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)-Dissolved	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	0.00030	mg/L				0.00043	0.00114	<0.00030	<0.00030	0.00065	0.00083	0.00272	0.00521
Tungsten (W)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved	0.000010	mg/L				0.000024	0.000022	0.000039	0.000037	0.000012	0.000024	<0.000010	0.000017
Vanadium (V)-Dissolved	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved	0.0010	mg/L				<0.0010	0.0036	<0.0010	0.0012	0.0027	0.0018	0.0064	0.0064
Zirconium (Zr)-Dissolved	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00024
Speciated Metals (Water)													
Methylmercury (as MeHg)-Total	0.000020	ug/L				0.000125	0.000085	0.000077	0.000148	0.000136	0.000106	0.000127	0.000229

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

Table A1-2b: Surface Water Laboratory Results – NDR Unnamed Ponds (2021)

					Sample Location	**Unnamed Ponds**							
					Location ID	**NDR-P-01**	**NDR-P-01**	**NDR-P-02A**	**NDR-P-03**	**NDR-P-03**	**NDR-P-04**	**NDR-P-04**
					Date Sampled	**8-Aug-2021**	**24-Oct-2021**	**5-Aug-2021**	**5-Aug-2021**	**20-Oct-2021**	**5-Aug-2021**	**19-Oct-2021**
					Time Sampled	**16:30**	**11:15**	**10:00**	**9:00**	**8:40**	**9:00**	**17:30**
Parameter	Lowest Detection Limit	Units	**CCME CWQG**	**FEQG**	**PWQO**							
Physical Tests (Water)												
Conductivity	1.0	umhos/cm				61.2	49.9	148	80.8	83.1	150	169
Hardness (as CaCO3)	0.50	mg/L				38.5	34.4	76.3	43.1	44.2	80.4	89
pH	0.10	pH units	6.5-9.0		6.5-8.5	7.05	6.51	8.28	7.94	7.78	7.78	7.96
Total Suspended Solids	3.0	mg/L				<3.0	<3.0	<3.0	<3.0	3.4	<3.0	<3.0
Total Dissolved Solids	10	mg/L	5.5-9.5			114	122	100	66	48	99	97
Anions and Nutrients (Water)												
Alkalinity, Total (as CaCO3)	1.0	mg/L				29.2	20.0	74.8	42.4	53.3	75.4	95.5
Ammonia, Total (as N)	0.010	mg/L				0.016	0.020	0.019	<0.010	<0.010	<0.010	0.022
Bromide (Br)	0.10	mg/L				<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloride (Cl)	0.50	mg/L	120			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L				0.021	<0.020	0.023	0.021	0.020	0.027	0.026
Nitrate (as N)	0.020	mg/L	13			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0010	mg/L				0.0308	0.0196	0.0121	0.0131	0.0159	0.0099	0.0106
Sulfate (SO4)	0.30	mg/L				<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cyanides (Water)												
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Total	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters (Water)												
Acidity (as CaCO3)	2.0	mg/L				4.6	8.7	<2.0	<2.0	4.7	6.3	8.2
Total Metals (Water)												
Aluminum (Al)-Total	0.0050	mg/L	0.005 - 0.1			0.0872	0.201	0.0310	0.0256	0.0405	0.0156	0.0074
Antimony (Sb)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00010	mg/L	0.005		0.1	0.00127	0.00118	0.00087	0.00030	0.00028	0.00030	0.00030
Barium (Ba)-Total	0.00010	mg/L				0.00699	0.00331	0.00377	0.00167	0.00294	0.00808	0.00746
Beryllium (Be)-Total	0.00010	mg/L			0.011 or 1.1	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.0000050	mg/L	0.00005-0.00022		0.0002	0.0000120	0.0000183	<0.0000050	<0.0000050	0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	0.050	mg/L				10.7	9.16	23.2	11.9	12.1	24.6	27.1
Cesium (Cs)-Total	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Total	0.00050	mg/L				<0.00050	0.00061	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

					Sample Location	**Unnamed Ponds**							
					Location ID	**NDR-P-01**	**NDR-P-01**	**NDR-P-02A**	**NDR-P-03**	**NDR-P-03**	**NDR-P-04**	**NDR-P-04**
					Date Sampled	**8-Aug-2021**	**24-Oct-2021**	**5-Aug-2021**	**5-Aug-2021**	**20-Oct-2021**	**5-Aug-2021**	**19-Oct-2021**
					Time Sampled	**16:30**	**11:15**	**10:00**	**9:00**	**8:40**	**9:00**	**17:30**
Parameter	Lowest Detection Limit	Units	**CCME CWQG**	**FEQG**	**PWQO**							
Cobalt (Co)-Total	0.00010	mg/L		0.000793 - 0.001196 *		0.00018	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	0.00050	mg/L	0.002-0.00329		0.005	<0.00050	0.00070	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	0.010	mg/L	0.3		0.3	0.397	0.631	0.087	0.034	0.089	0.065	0.068
Lead (Pb)-Total	0.000050	mg/L	0.001-0.0052		0.001-0.005	0.000131	0.000160	0.000087	<0.000050	0.000099	0.000067	<0.000050
Lithium (Li)-Total	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total	0.0050	mg/L				2.87	2.79	4.48	3.25	3.39	4.60	5.16
Manganese (Mn)-Total	0.00050	mg/L	0.2-0.5			0.0461	0.0160	0.0117	0.0147	0.0239	0.0135	0.0433
Mercury (Hg)-Total	0.00050	ug/L	0.026		0.2	0.00108	0.00076	0.00052	0.00071	0.00087	<0.00050	<0.00050
Molybdenum (Mo)-Total	0.000050	mg/L	0.073			<0.000050	<0.000050	0.000077	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	0.00050	mg/L	0.025-0.128		0.025	0.00053	0.00056	<0.00050	<0.00050	0.00052	<0.00050	0.00051
Phosphorus (P)-Total	0.050	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	0.050	mg/L				0.068	0.089	2.33	0.313	0.367	0.550	0.823
Rubidium (Rb)-Total	0.00020	mg/L				0.00038	0.00055	0.00240	0.00058	0.00065	0.00078	0.00107
Selenium (Se)-Total	0.000050	mg/L	0.001		0.1	0.000147	0.000147	<0.000050	0.000068	0.000057	<0.000050	<0.000050
Silicon (Si)-Total	0.10	mg/L				0.90	1.58	1.92	0.26	0.50	1.14	1.74
Silver (Ag)-Total	0.000050	mg/L	0.00025		0.0001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium (Na)-Total	0.050	mg/L				0.454	0.655	0.308	0.552	0.573	0.574	0.624
Strontium (Sr)-Total	0.0010	mg/L				0.0240	0.0152	0.0236	0.0178	0.0157	0.0310	0.0328
Sulfur (S)-Total	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)-Total	0.00020	mg/L				0.00021	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.00030	mg/L				0.00123	0.00296	0.00107	<0.00030	0.00088	0.00049	<0.00030
Tungsten (W)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total	0.000010	mg/L	0.015			0.000013	0.000012	<0.000010	0.000010	0.000010	<0.000010	<0.000010
Vanadium (V)-Total	0.00050	mg/L		0.12		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	0.0030	mg/L			0.03	0.0042	0.0077	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Metals (Water)												
Aluminum (Al)-Dissolved	0.0010	mg/L				0.0875	0.205	0.0044	0.0184	0.0076	0.0034	0.0023
Antimony (Sb)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00010	mg/L				0.00124	0.00112	0.00084	0.00027	0.00026	0.00029	0.00027

					Sample Location	**Unnamed Ponds**							
					Location ID	**NDR-P-01**	**NDR-P-01**	**NDR-P-02A**	**NDR-P-03**	**NDR-P-03**	**NDR-P-04**	**NDR-P-04**
					Date Sampled	**8-Aug-2021**	**24-Oct-2021**	**5-Aug-2021**	**5-Aug-2021**	**20-Oct-2021**	**5-Aug-2021**	**19-Oct-2021**
					Time Sampled	**16:30**	**11:15**	**10:00**	**9:00**	**8:40**	**9:00**	**17:30**
Parameter	Lowest Detection Limit	Units	**CCME CWQG**	**FEQG**	**PWQO**							
Barium (Ba)-Dissolved	0.00010	mg/L				0.00679	0.00337	0.00344	0.00127	0.00233	0.00840	0.00686
Beryllium (Be)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved	0.010	mg/L				<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.0000050	mg/L				0.0000123	0.0000109	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved	0.050	mg/L				11.6	9.90	23.4	11.7	12.5	25.6	27.4
Cesium (Cs)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved	0.00010	mg/L				0.00068	0.00061	0.00011	<0.00010	0.00013	0.00019	0.00011
Cobalt (Co)-Dissolved	0.00010	mg/L				0.00012	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00020	mg/L				0.00047	0.00049	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Iron (Fe)-Dissolved	0.010	mg/L				0.322	0.618	0.034	<0.010	0.013	0.031	0.027
Lead (Pb)-Dissolved	0.000050	mg/L				0.000857	0.000137	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved	0.0050	mg/L				3.41	3.08	4.30	3.06	3.29	4.69	5.18
Manganese (Mn)-Dissolved	0.00010	mg/L				0.0265	0.0139	0.00451	0.00063	0.00122	0.00284	0.0169
Molybdenum (Mo)-Dissolved	0.000050	mg/L				<0.000050	<0.000050	0.000067	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Dissolved	0.030	mg/L				<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Potassium (K)-Dissolved	0.050	mg/L				0.055	0.103	2.35	0.315	0.340	0.567	0.807
Rubidium (Rb)-Dissolved	0.00020	mg/L				0.00035	0.00053	0.00227	0.00055	0.00067	0.00080	0.00111
Selenium (Se)-Dissolved	0.000050	mg/L				0.000155	0.000201	<0.000050	0.000059	<0.000050	<0.000050	<0.000050
Silicon (Si)-Dissolved	0.050	mg/L				0.825	1.64	1.70	0.213	0.449	1.08	1.78
Silver (Ag)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	0.050	mg/L				0.507	0.709	0.269	0.490	0.519	0.548	0.563
Strontium (Sr)-Dissolved	0.00010	mg/L		2.5		0.0253	0.0155	0.0228	0.0172	0.0162	0.0304	0.0332
Sulfur (S)-Dissolved	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)-Dissolved	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	0.00030	mg/L				0.00092	0.00267	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved	0.000010	mg/L				0.000013	0.000011	<0.000010	0.000011	<0.000010	<0.000010	<0.000010
Vanadium (V)-Dissolved	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved	0.0010	mg/L				0.0049	0.0077	0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved	0.00020	mg/L				<0.00020	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020

Sample Location						Unnamed Ponds						
Location ID						NDR-P-01	NDR-P-01	NDR-P-02A	NDR-P-03	NDR-P-03	NDR-P-04	NDR-P-04
Date Sampled						8-Aug-2021	24-Oct-2021	5-Aug-2021	5-Aug-2021	20-Oct-2021	5-Aug-2021	19-Oct-2021
Time Sampled						16:30	11:15	10:00	9:00	8:40	9:00	17:30
Parameter	Lowest Detection Limit	Units	**CCME CWQG**	**FEQG**	**PWQO**							
Speciated Metals (Water)												
Methylmercury (as MeHg)-Total	0.000020	ug/L				0.000086	0.000133	0.000026	0.000034	0.000034	0.000028	0.000022
Radiological Parameters (Water)												
Ra-226	0.011	Bq/L				n/a	n/a	n/a	<0.011	n/a	n/a	n/a

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

Table A1-2c: Surface Water Laboratory Results – NDR Unnamed Streams (2021)

					Sample Location	**Unnamed Streams**						
					Location ID	**NDR-S-01**	**NDR-S-01**	**NDR-S-02**	**NDR-S-02**	**NDR-S-04**	**NDR-S-04**
					Date Sampled	**8-Aug-2021**	**23-Oct-2021**	**11-Aug-2021**	**22-Oct-2021**	**6-Aug-2021**	**21-Oct-2021**
					Time Sampled	**14:45**	**12:15**	**10:30**	**11:45**	**13:15**	**13:45**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**						
Physical Tests (Water)											
Conductivity	1.0	umhos/cm				56.9	57.2	141	105	160	108
Hardness (as CaCO3)	0.50	mg/L				37.1	41.1	68.9	53.4	71	54.5
pH	0.10	pH units	6.5-9.0		6.5-8.5	6.85	6.58	7.53	6.88	7.63	7.04
Total Suspended Solids	3.0	mg/L				<3.0	<3.0	3.3	<3.0	3.9	<3.0
Total Dissolved Solids	10	mg/L	5.5-9.5			117	150	128	160	123	122
Anions and Nutrients (Water)											
Alkalinity, Total (as CaCO3)	1.0	mg/L				27.4	24.4	63.7	39.1	69.0	41.9
Ammonia, Total (as N)	0.010	mg/L				<0.010	0.020	0.025	0.022	0.023	0.045
Bromide (Br)	0.10	mg/L				<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloride (Cl)	0.50	mg/L	120			<0.50	<0.50	5.94	8.16	10.7	6.09
Fluoride (F)	0.020	mg/L				0.021	<0.020	0.030	0.021	0.031	0.023
Nitrate (as N)	0.020	mg/L	13			<0.020	0.023	<0.020	0.049	<0.020	0.040
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0010	mg/L				0.0229	0.0243	0.0243	0.0292	0.0337	0.0265
Sulfate (SO4)	0.30	mg/L				<0.30	1.45	<0.30	1.03	<0.30	0.89
Cyanides (Water)											
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	0.0022	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Total	0.0020	mg/L				<0.0020	0.0022	<0.0020	0.0021	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters (Water)											
Acidity (as CaCO3)	2.0	mg/L				9.0	9.8	4.8	6.0	3.4	5.3
Total Metals (Water)											
Aluminum (Al)-Total	0.0050	mg/L	0.005 -0.1			0.156	0.303	0.0774	0.243	0.328	0.243
Antimony (Sb)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00010	mg/L	0.005		0.1	0.00107	0.00122	0.00102	0.00112	0.00133	0.00093
Barium (Ba)-Total	0.00010	mg/L				0.00425	0.00565	0.00599	0.00684	0.00890	0.00624
Beryllium (Be)-Total	0.00010	mg/L			0.011 or 1.1	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	0.0000050	mg/L	0.00005-0.00022		0.0002	0.0000105	0.0000275	0.0000064	0.0000214	0.0000117	0.0000108
Calcium (Ca)-Total	0.050	mg/L				10.7	11.7	19.5	14.7	20.4	15.0
Cesium (Cs)-Total	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	0.000038	0.000013
Chromium (Cr)-Total	0.00050	mg/L				0.00063	0.00084	0.00052	0.00076	0.00094	0.00071

					Sample Location	**Unnamed Streams**						
					Location ID	**NDR-S-01**	**NDR-S-01**	**NDR-S-02**	**NDR-S-02**	**NDR-S-04**	**NDR-S-04**
					Date Sampled	**8-Aug-2021**	**23-Oct-2021**	**11-Aug-2021**	**22-Oct-2021**	**6-Aug-2021**	**21-Oct-2021**
					Time Sampled	**14:45**	**12:15**	**10:30**	**11:45**	**13:15**	**13:45**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**						
Cobalt (Co)-Total	0.00010	mg/L		0.000793 - 0.001196 *		0.00025	0.00014	0.00020	0.00021	0.00031	0.00017
Copper (Cu)-Total	0.00050	mg/L	0.002-0.00329		0.005	<0.00050	0.00155	0.00050	0.00116	0.00259	0.00093
Iron (Fe)-Total	0.010	mg/L	0.3		0.3	0.559	0.669	0.281	0.732	0.711	0.644
Lead (Pb)-Total	0.000050	mg/L	0.001-0.0052		0.001-0.005	0.000125	0.000243	0.000103	0.000222	0.000314	0.000182
Lithium (Li)-Total	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Total	0.0050	mg/L				2.50	2.91	4.89	4.05	4.89	4.13
Manganese (Mn)-Total	0.00050	mg/L	0.2-0.5			0.0582	0.0157	0.169	0.0569	0.210	0.0497
Mercury (Hg)-Total	0.00050	ug/L	0.026		0.2	0.00060	0.00402	0.00127	0.00337	0.00110	0.00209
Molybdenum (Mo)-Total	0.000050	mg/L	0.073			<0.000050	<0.000050	0.000078	0.000057	0.000111	0.000055
Nickel (Ni)-Total	0.00050	mg/L	0.025-0.128		0.025	0.00079	0.00100	0.00061	0.00083	0.00126	0.00077
Phosphorus (P)-Total	0.050	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	0.050	mg/L				<0.050	0.090	0.231	0.278	0.304	0.356
Rubidium (Rb)-Total	0.00020	mg/L				<0.00020	0.00051	0.00072	0.00102	0.00142	0.00129
Selenium (Se)-Total	0.000050	mg/L	0.001		0.1	0.000183	0.000204	0.000120	0.000182	0.000128	0.000148
Silicon (Si)-Total	0.10	mg/L				1.63	2.39	1.51	2.58	1.99	2.61
Silver (Ag)-Total	0.000050	mg/L	0.00025		0.0001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium (Na)-Total	0.050	mg/L				0.356	0.726	4.58	4.89	6.55	4.07
Strontium (Sr)-Total	0.0010	mg/L				0.0220	0.0230	0.0356	0.0280	0.0381	0.0284
Sulfur (S)-Total	0.50	mg/L				<0.50	0.83	<0.50	0.55	<0.50	<0.50
Tellurium (Te)-Total	0.00020	mg/L				0.00024	<0.00020	<0.00020	<0.00020	0.00028	<0.00020
Thallium (Tl)-Total	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	0.00030	mg/L				0.00324	0.00601	0.00280	0.00657	0.0138	0.00767
Tungsten (W)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total	0.000010	mg/L	0.015			0.000020	0.000026	0.000038	0.000038	0.000049	0.000033
Vanadium (V)-Total	0.00050	mg/L		0.12		<0.00050	0.00071	0.00057	0.00064	0.00101	0.00064
Zinc (Zn)-Total	0.0030	mg/L			0.03	0.0045	0.0082	<0.0030	0.0062	0.0066	0.0035
Zirconium (Zr)-Total	0.00020	mg/L				0.00025	0.00037	<0.00020	0.00031	0.00047	0.00028
Dissolved Metals (Water)											
Aluminum (Al)-Dissolved	0.0010	mg/L				0.145	0.312	0.0363	0.203	0.0653	0.149
Antimony (Sb)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00010	mg/L				0.00110	0.00126	0.00099	0.00113	0.00120	0.00097

					Sample Location	Unnamed Streams						
					Location ID	NDR-S-01	NDR-S-01	NDR-S-02	NDR-S-02	NDR-S-04	NDR-S-04
					Date Sampled	8-Aug-2021	23-Oct-2021	11-Aug-2021	22-Oct-2021	6-Aug-2021	21-Oct-2021
					Time Sampled	14:45	12:15	10:30	11:45	13:15	13:45
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**						
Barium (Ba)-Dissolved	0.00010	mg/L				0.00416	0.00595	0.00596	0.00675	0.00652	0.00590
Beryllium (Be)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved	0.010	mg/L				<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.0000050	mg/L				0.0000092	0.0000256	0.0000052	0.0000186	0.0000071	0.0000126
Calcium (Ca)-Dissolved	0.050	mg/L				11.5	12.1	19.2	15.1	22.3	15.5
Cesium (Cs)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved	0.00010	mg/L				0.00059	0.00086	0.00035	0.00062	0.00041	0.00051
Cobalt (Co)-Dissolved	0.00010	mg/L				0.00021	0.00013	0.00018	0.00017	0.00017	0.00011
Copper (Cu)-Dissolved	0.00020	mg/L				0.00034	0.00151	0.00042	0.00108	0.00063	0.00081
Iron (Fe)-Dissolved	0.010	mg/L				0.478	0.656	0.243	0.652	0.361	0.496
Lead (Pb)-Dissolved	0.000050	mg/L				0.000081	0.000226	0.000072	0.000159	0.000074	0.000104
Lithium (Li)-Dissolved	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved	0.0050	mg/L				2.93	3.10	5.52	4.13	5.40	4.30
Manganese (Mn)-Dissolved	0.00010	mg/L				0.0548	0.0149	0.168	0.0503	0.185	0.0419
Molybdenum (Mo)-Dissolved	0.000050	mg/L				<0.000050	<0.000050	0.000063	0.000059	0.000110	<0.000050
Nickel (Ni)-Dissolved	0.00050	mg/L				0.00059	0.00102	0.00052	0.00076	<0.00050	0.00062
Phosphorus (P)-Dissolved	0.030	mg/L				<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Potassium (K)-Dissolved	0.050	mg/L				<0.050	0.102	0.222	0.287	0.234	0.350
Rubidium (Rb)-Dissolved	0.00020	mg/L				<0.00020	0.00051	0.00075	0.00097	0.00092	0.00116
Selenium (Se)-Dissolved	0.000050	mg/L				0.000157	0.000230	0.000104	0.000169	0.000117	0.000126
Silicon (Si)-Dissolved	0.050	mg/L				1.59	2.44	1.36	2.56	1.41	2.47
Silver (Ag)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	0.050	mg/L				0.397	0.780	4.76	5.05	7.34	4.34
Strontium (Sr)-Dissolved	0.00010	mg/L		2.5		0.0228	0.0218	0.0379	0.0296	0.0406	0.0295
Sulfur (S)-Dissolved	0.50	mg/L				<0.50	1.09	0.68	0.86	<0.50	0.71
Tellurium (Te)-Dissolved	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	0.00030	mg/L				0.00219	0.00611	0.00131	0.00430	0.00303	0.00365
Tungsten (W)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved	0.000010	mg/L				0.000017	0.000022	0.000032	0.000028	0.000037	0.000026
Vanadium (V)-Dissolved	0.00050	mg/L				<0.00050	0.00070	<0.00050	0.00052	<0.00050	<0.00050
Zinc (Zn)-Dissolved	0.0010	mg/L				0.0045	0.0087	0.0303	0.0060	0.0013	0.0032
Zirconium (Zr)-Dissolved	0.00020	mg/L				0.00029	0.00053	0.00023	0.00038	0.00038	0.00034

					Sample Location	**Unnamed Streams**						
					Location ID	**NDR-S-01**	**NDR-S-01**	**NDR-S-02**	**NDR-S-02**	**NDR-S-04**	**NDR-S-04**
					Date Sampled	**8-Aug-2021**	**23-Oct-2021**	**11-Aug-2021**	**22-Oct-2021**	**6-Aug-2021**	**21-Oct-2021**
					Time Sampled	**14:45**	**12:15**	**10:30**	**11:45**	**13:15**	**13:45**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**						
Speciated Metals (Water)											
Methylmercury (as MeHg)-Total	0.000020	ug/L				0.000218	0.000498	0.000102	0.000355	0.000104	0.000311

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

Table A1-2d: Surface Water Laboratory Results – NDR Unnamed Ponds (2021)

Sample Location						West Buskegau River											
Location ID						WBR-P-01	WBR-P-01	WBR-P-02	WBR-P-02	WBR-S-01	WBR-S-01	WBR-S-02	WBR-S-02	WBR-S-03	WBR-S-03	WBR-S-04	WBR-S-04
Date Sampled						7-Aug-2021	26-Oct-2021	7-Aug-2021	26-Oct-2021	10-Aug-2021	25-Oct-2021	10-Aug-2021	25-Oct-2021	10-Aug-2021	24-Oct-2021	9-Aug-2021	24-Oct-2021
Time Sampled						13:30	10:00	11:45	12:30	15:30	15:45	16:30	14:00	10:00	16:40	14:30	14:10
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**												
Physical Tests (Water)																	
Conductivity	1.0	umhos/cm				55.8	45.8	44.7	38.3	142	112	106	53.4	119	55.7	114	55.2
Hardness (as CaCO3)	0.50	mg/L				31.8	28.1	26.5	24.9	75.3	67.8	64.4	37.6	69.4	40.7	66.7	39.2
pH	0.10	pH units	6.5-9.0		6.5-8.5	6.79	6.74	6.48	6.37	7.76	7.52	7.57	6.99	7.63	6.90	7.62	6.91
Total Suspended Solids	3.0	mg/L				<3.0	<3.0	3.4	<3.0	<3.0	<3.0	12.9	5.4	4.4	<3.0	3.1	4.2
Total Dissolved Solids	10	mg/L	5.5-9.5			86	82	62	79	120	131	132	125	134	132	132	129
Anions and Nutrients (Water)																	
Alkalinity, Total (as CaCO3)	1.0	mg/L				26.3	17.6	18.8	11.5	74.3	55.8	54.7	23.6	63.0	26.8	66.2	25.6
Ammonia, Total (as N)	0.010	mg/L				0.015	0.011	0.019	0.012	0.013	0.014	0.016	0.014	0.023	0.018	0.034	0.019
Bromide (Br)	0.10	mg/L				<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloride (Cl)	0.50	mg/L	120			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L				0.023	0.021	<0.020	<0.020	0.038	0.029	0.028	<0.020	0.033	<0.020	0.032	<0.020
Nitrate (as N)	0.020	mg/L	13			<0.020	<0.020	<0.020	<0.020	<0.020	0.141	<0.020	0.050	<0.020	0.058	<0.020	0.046
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0010	mg/L				0.0200	0.0275	0.0179	0.0164	0.0201	0.0190	0.0487	0.0288	0.0500	0.0301	0.0439	0.0290
Sulfate (SO4)	0.30	mg/L				<0.30	<0.30	<0.30	<0.30	1.13	1.58	1.10	0.92	0.50	0.83	0.46	0.78
Cyanides (Water)																	
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Total	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters (Water)																	
Acidity (as CaCO3)	2.0	mg/L				4.0	3.8	5.3	4.6	<2.0	3.6	3.9	5.4	4.0	6.7	4.2	6.6
Total Metals (Water)																	
Aluminum (Al)-Total	0.0050	mg/L	0.005 - 0.1			0.0501	0.162	0.0724	0.130	0.215	0.337	1.35	0.733	0.820	0.713	0.773	0.661
Antimony (Sb)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	0.00010	mg/L	0.005		0.1	0.00087	0.00079	0.00098	0.00079	0.00078	0.00100	0.00167	0.00145	0.00158	0.00141	0.00156	0.00135
Barium (Ba)-Total	0.00010	mg/L				0.00308	0.00375	0.00573	0.00335	0.0102	0.0101	0.0152	0.00948	0.0117	0.00925	0.0107	0.00906
Beryllium (Be)-Total	0.00010	mg/L			0.011 or 1.1	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Sample Location						West Buskegau River											
Location ID						WBR-P-01	WBR-P-01	WBR-P-02	WBR-P-02	WBR-S-01	WBR-S-01	WBR-S-02	WBR-S-02	WBR-S-03	WBR-S-03	WBR-S-04	WBR-S-04
Date Sampled						7-Aug-2021	26-Oct-2021	7-Aug-2021	26-Oct-2021	10-Aug-2021	25-Oct-2021	10-Aug-2021	25-Oct-2021	10-Aug-2021	24-Oct-2021	9-Aug-2021	24-Oct-2021
Time Sampled						13:30	10:00	11:45	12:30	15:30	15:45	16:30	14:00	10:00	16:40	14:30	14:10
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**												
Cadmium (Cd)-Total	0.0000050	mg/L	0.00005-0.00022		0.0002	0.0000073	0.0000074	0.0000113	0.0000089	0.0000168	0.0000304	0.0000356	0.0000406	0.0000281	0.0000400	0.0000214	0.0000438
Calcium (Ca)-Total	0.050	mg/L				8.75	7.44	7.54	6.59	21.5	18.6	18.6	10.4	20.1	11.3	19.2	10.9
Cesium (Cs)-Total	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	0.000017	<0.000010	0.000129	0.000043	0.000073	0.000041	0.000070	0.000040
Chromium (Cr)-Total	0.00050	mg/L				<0.00050	0.00058	<0.00050	<0.00050	0.00074	0.00106	0.00288	0.00171	0.00195	0.00157	0.00182	0.00157
Cobalt (Co)-Total	0.00010	mg/L		0.000793 - 0.001196 *		0.00048	0.00026	0.00051	0.00011	0.00013	0.00012	0.00074	0.00033	0.00046	0.00033	0.00042	0.00037
Copper (Cu)-Total	0.00050	mg/L	0.002-0.00329		0.005	<0.00050	<0.00050	<0.00050	<0.00050	0.00100	0.00160	0.00228	0.00265	0.00184	0.00228	0.00171	0.00211
Iron (Fe)-Total	0.010	mg/L	0.3		0.3	0.346	0.611	0.464	0.497	0.418	0.620	1.76	1.25	1.36	1.19	1.31	1.16
Lead (Pb)-Total	0.000050	mg/L	0.001-0.0052		0.001-0.005	0.000075	0.000159	0.000099	0.000101	0.000138	0.000230	0.000768	0.000454	0.000565	0.000464	0.000522	0.000465
Lithium (Li)-Total	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0022	0.0010	0.0016	<0.0010	0.0015	<0.0010
Magnesium (Mg)-Total	0.0050	mg/L				2.41	2.30	1.86	2.06	5.22	5.17	4.33	2.83	4.69	3.03	4.53	2.89
Manganese (Mn)-Total	0.00050	mg/L	0.2-0.5			0.203	0.0586	0.219	0.0197	0.0375	0.0484	0.118	0.0500	0.0782	0.0536	0.0756	0.0669
Mercury (Hg)-Total	0.00050	ug/L	0.026		0.2	0.00080	0.00122	0.00106	0.00107	0.00182	0.00402	0.00311	0.00368	0.00268	0.00286	0.00206	0.00203
Molybdenum (Mo)-Total	0.000050	mg/L	0.073			<0.000050	<0.000050	<0.000050	<0.000050	0.000125	0.000095	0.000096	0.000066	0.000107	0.000057	0.000113	<0.000050
Nickel (Ni)-Total	0.00050	mg/L	0.025-0.128		0.025	0.00051	0.00056	<0.00050	0.00053	0.00063	0.00087	0.00228	0.00155	0.00151	0.00148	0.00147	0.00144
Phosphorus (P)-Total	0.050	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.062	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	0.050	mg/L				<0.050	0.270	<0.050	0.050	0.496	0.347	0.622	0.292	0.545	0.295	0.488	0.274
Rubidium (Rb)-Total	0.00020	mg/L				0.00029	0.00125	<0.00020	0.00027	0.00158	0.00088	0.00330	0.00139	0.00235	0.00148	0.00208	0.00135
Selenium (Se)-Total	0.000050	mg/L	0.001		0.1	0.000111	0.000119	0.000105	0.000110	0.000131	0.000200	0.000155	0.000219	0.000149	0.000218	0.000127	0.000187
Silicon (Si)-Total	0.10	mg/L				1.81	1.72	1.62	1.80	2.13	2.53	3.85	2.93	3.20	2.95	3.18	2.83
Silver (Ag)-Total	0.000050	mg/L	0.00025		0.0001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium (Na)-Total	0.050	mg/L				0.256	0.573	0.141	0.608	2.39	2.21	1.71	1.24	1.84	1.20	1.75	1.08
Strontium (Sr)-Total	0.0010	mg/L				0.0181	0.0136	0.0182	0.0120	0.0496	0.0436	0.0358	0.0258	0.0405	0.0254	0.0387	0.0245
Sulfur (S)-Total	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	0.73	0.80	0.74	0.56	<0.50	<0.50	0.56	<0.50
Tellurium (Te)-Total	0.00020	mg/L				0.00024	<0.00020	0.00029	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00025	<0.00020	0.00029	<0.00020
Thallium (Tl)-Total	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000018	<0.000010	0.000012	<0.000010	0.000011	<0.000010
Thorium (Th)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00025	0.00017	0.00021	0.00015	0.00022	0.00013

Sample Location						West Buskegau River											
Location ID						WBR-P-01	WBR-P-01	WBR-P-02	WBR-P-02	WBR-S-01	WBR-S-01	WBR-S-02	WBR-S-02	WBR-S-03	WBR-S-03	WBR-S-04	WBR-S-04
Date Sampled						7-Aug-2021	26-Oct-2021	7-Aug-2021	26-Oct-2021	10-Aug-2021	25-Oct-2021	10-Aug-2021	25-Oct-2021	10-Aug-2021	24-Oct-2021	9-Aug-2021	24-Oct-2021
Time Sampled						13:30	10:00	11:45	12:30	15:30	15:45	16:30	14:00	10:00	16:40	14:30	14:10
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**												
Tin (Sn)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	<0.00010	<0.00010
Titanium (Ti)-Total	0.00030	mg/L				0.00094	0.00392	0.00121	0.00175	0.00813	0.00909	0.0511	0.0243	0.0324	0.0243	0.0288	0.0216
Tungsten (W)-Total	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total	0.000010	mg/L	0.015			<0.000010	0.000013	<0.000010	<0.000010	0.000094	0.000086	0.000127	0.000068	0.000093	0.000065	0.000092	0.000061
Vanadium (V)-Total	0.00050	mg/L		0.12		<0.00050	<0.00050	<0.00050	<0.00050	0.00094	0.00082	0.00303	0.00146	0.00211	0.00146	0.00197	0.00135
Zinc (Zn)-Total	0.0030	mg/L			0.03	0.0030	0.0040	0.0044	0.0062	<0.0030	0.0044	0.0068	0.0094	0.0046	0.0081	0.0039	0.0080
Zirconium (Zr)-Total	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	0.00034	0.00064	0.00119	0.00085	0.00105	0.00078	0.00126	0.00070
Dissolved Metals (Water)																	
Aluminum (Al)-Dissolved	0.0010	mg/L				0.0467	0.112	0.0718	0.126	0.0697	0.260	0.185	0.331	0.158	0.378	0.198	0.362
Antimony (Sb)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00010	mg/L				0.00089	0.00075	0.00096	0.00081	0.00074	0.00091	0.00140	0.00134	0.00140	0.00141	0.00139	0.00135
Barium (Ba)-Dissolved	0.00010	mg/L				0.00292	0.00332	0.00566	0.00337	0.00961	0.00941	0.00755	0.00669	0.00759	0.00727	0.00753	0.00729
Beryllium (Be)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved	0.010	mg/L				<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	0.0000050	mg/L				0.0000054	0.0000056	0.0000095	0.0000068	0.0000135	0.0000310	0.0000183	0.0000438	0.0000179	0.0000333	0.0000169	0.0000383
Calcium (Ca)-Dissolved	0.050	mg/L				9.47	7.67	8.04	7.04	22.4	18.6	18.3	11.0	19.6	11.5	20.2	11.2
Cesium (Cs)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved	0.00010	mg/L				0.00037	0.00042	0.00035	0.00042	0.00050	0.00073	0.00074	0.00092	0.00074	0.00090	0.00080	0.00093
Cobalt (Co)-Dissolved	0.00010	mg/L				0.00035	0.00020	0.00048	<0.00010	<0.00010	<0.00010	0.00016	0.00013	0.00016	0.00017	0.00016	0.00016
Copper (Cu)-Dissolved	0.00020	mg/L				<0.00020	0.00027	<0.00020	0.00022	0.00087	0.00143	0.00169	0.00284	0.00140	0.00203	0.00144	0.00193
Iron (Fe)-Dissolved	0.010	mg/L				0.228	0.454	0.363	0.459	0.271	0.517	0.604	0.798	0.667	0.824	0.682	0.807
Lead (Pb)-Dissolved	0.000050	mg/L				<0.000050	0.000109	0.000052	0.000079	0.000069	0.000178	0.000254	0.000298	0.000271	0.000306	0.000265	0.000303
Lithium (Li)-Dissolved	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)-Dissolved	0.0050	mg/L				2.81	2.18	2.18	1.94	5.89	4.94	4.48	2.60	5.08	2.98	4.88	2.94
Manganese (Mn)-Dissolved	0.00010	mg/L				0.142	0.0381	0.204	0.0182	0.0316	0.0407	0.0935	0.0359	0.0656	0.0436	0.0621	0.0457
Molybdenum (Mo)-Dissolved	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	0.000110	0.000080	0.000092	<0.000050	0.000094	0.000054	0.000099	<0.000050
Nickel (Ni)-Dissolved	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00069	0.00087	0.00102	0.00082	0.00101	0.00085	0.00095
Phosphorus (P)-Dissolved	0.030	mg/L				<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Potassium (K)-Dissolved	0.050	mg/L				<0.050	0.249	<0.050	0.151	0.489	0.321	0.344	0.193	0.378	0.216	0.353	0.207
Rubidium (Rb)-Dissolved	0.00020	mg/L				0.00026	0.00104	<0.00020	0.00053	0.00145	0.00071	0.00120	0.00068	0.00121	0.00074	0.00118	0.00068
Selenium (Se)-Dissolved	0.000050	mg/L				0.000132	0.000121	0.000094	0.000101	0.000090	0.000212	0.000151	0.000189	0.000099	0.000203	0.000161	0.000197

Sample Location						West Buskegau River											
Location ID						WBR-P-01	WBR-P-01	WBR-P-02	WBR-P-02	WBR-S-01	WBR-S-01	WBR-S-02	WBR-S-02	WBR-S-03	WBR-S-03	WBR-S-04	WBR-S-04
Date Sampled						7-Aug-2021	26-Oct-2021	7-Aug-2021	26-Oct-2021	10-Aug-2021	25-Oct-2021	10-Aug-2021	25-Oct-2021	10-Aug-2021	24-Oct-2021	9-Aug-2021	24-Oct-2021
Time Sampled						13:30	10:00	11:45	12:30	15:30	15:45	16:30	14:00	10:00	16:40	14:30	14:10
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**												
Silicon (Si)-Dissolved	0.050	mg/L				1.71	1.55	1.59	1.70	1.80	2.28	1.88	2.08	1.95	2.29	2.01	2.24
Silver (Ag)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	0.050	mg/L				0.276	0.531	0.155	0.570	2.49	2.05	1.63	1.11	1.83	1.14	1.76	1.11
Strontium (Sr)-Dissolved	0.00010	mg/L		2.5		0.0193	0.0132	0.019	0.0121	0.0515	0.042	0.0355	0.0229	0.0399	0.0257	0.0398	0.0242
Sulfur (S)-Dissolved	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	0.72	0.94	0.89	0.93	0.60	0.61	0.70	0.64
Tellurium (Te)-Dissolved	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00020	0.00013	0.00015	0.00012	0.00016	0.00011
Tin (Sn)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	0.00030	mg/L				0.00073	0.00207	0.00089	0.00161	0.00246	0.00628	0.00850	0.00797	0.00701	0.00983	0.00913	0.00963
Tungsten (W)-Dissolved	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved	0.000010	mg/L				<0.000010	0.000010	<0.000010	<0.000010	0.000087	0.000076	0.000091	0.000059	0.000071	0.000055	0.000075	0.000047
Vanadium (V)-Dissolved	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	0.00055	0.00060	0.00101	0.00086	0.00086	0.00081	0.00084	0.00078
Zinc (Zn)-Dissolved	0.0010	mg/L				0.0029	0.0036	0.0045	0.0059	0.0012	0.0039	0.0019	0.0078	0.0019	0.0067	0.0033	0.0099
Zirconium (Zr)-Dissolved	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	0.00030	0.00048	0.00096	0.00064	0.00083	0.00070	0.00086	0.00066
Speciated Metals																	
Methylmercury (as MeHg)-Total	0.000020	ug/L				0.000056	0.000059	0.000052	0.000058	0.000201	0.000156	0.000372	0.000213	0.000380	0.000277	0.000340	0.000296
Radiological Parameters																	
Ra-226	0.011	Bq/L				n/a	n/a	n/a	n/a	n/a	0.0031	n/a	n/a	n/a	n/a	n/a	n/a

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

Table A1-2e: Surface Water Laboratory Results – Mattagami River (2021)

					Sample Location	**Mattagami River**	
					Location ID	**MATR-01**	**MATR-02**
					Date Sampled	**28-Oct-2021**	**28-Oct-2021**
					Time Sampled	**11:00**	**11:45**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**		
Physical Tests (Water)							
Conductivity	1.0	umhos/cm				133	131
Hardness (as CaCO3)	0.50	mg/L				65.6	73.1
pH	0.10	pH units	6.5-9.0		6.5-8.5	7.72	8.01
Total Suspended Solids	3.0	mg/L				<3.0	4.1
Total Dissolved Solids	10	mg/L	5.5-9.5			99	86
Anions and Nutrients (Water)							
Alkalinity, Total (as CaCO3)	1.0	mg/L				64.9	63.6
Ammonia, Total (as N)	0.010	mg/L				0.016	0.019
Bromide (Br)	0.10	mg/L				<0.10	<0.10
Chloride (Cl)	0.50	mg/L	120			3.62	3.67
Fluoride (F)	0.020	mg/L				0.037	0.035
Nitrate (as N)	0.020	mg/L	13			0.094	0.100
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010
Phosphorus (P)-Total	0.0010	mg/L				0.0191	0.0180
Sulfate (SO4)	0.30	mg/L				5.10	4.96
Cyanides (Water)							
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020
Cyanide, Total	0.0020	mg/L				<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020
Inorganic Parameters (Water)							
Acidity (as CaCO3)	2.0	mg/L				3.5	3.5
Total Metals (Water)							
Aluminum (Al)-Total	0.0050	mg/L	0.005 -0.1			0.202	0.225
Antimony (Sb)-Total	0.00010	mg/L				<0.00010	<0.00010
Arsenic (As)-Total	0.00010	mg/L	0.005		0.1	0.00082	0.00085
Barium (Ba)-Total	0.00010	mg/L				0.00823	0.00877
Beryllium (Be)-Total	0.00010	mg/L			0.011 or 1.1	<0.00010	<0.00010
Bismuth (Bi)-Total	0.000050	mg/L				<0.000050	<0.000050
Boron (B)-Total	0.010	mg/L	1.5		0.2	0.012	0.013
Cadmium (Cd)-Total	0.0000050	mg/L	0.00005-0.00022		0.0002	0.0000151	0.0000171
Calcium (Ca)-Total	0.050	mg/L				18.4	20.7
Cesium (Cs)-Total	0.000010	mg/L				0.000019	0.000019
Chromium (Cr)-Total	0.00050	mg/L				0.00069	0.00070

					Sample Location	**Mattagami River**	
					Location ID	**MATR-01**	**MATR-02**
					Date Sampled	**28-Oct-2021**	**28-Oct-2021**
					Time Sampled	**11:00**	**11:45**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**		
Cobalt (Co)-Total	0.00010	mg/L		0.000793 - 0.001196 *		0.00017	0.00016
Copper (Cu)-Total	0.00050	mg/L	0.002-0.00329		0.005	0.00133	0.00175
Iron (Fe)-Total	0.010	mg/L	0.3		0.3	0.448	0.442
Lead (Pb)-Total	0.000050	mg/L	0.001-0.0052		0.001-0.005	0.000125	0.000142
Lithium (Li)-Total	0.0010	mg/L				<0.0010	<0.0010
Magnesium (Mg)-Total	0.0050	mg/L				4.78	5.18
Manganese (Mn)-Total	0.00050	mg/L	0.2-0.5			0.0319	0.0286
Mercury (Hg)-Total	0.00050	ug/L	0.026		0.2	0.00200	0.00216
Molybdenum (Mo)-Total	0.000050	mg/L	0.073			0.000132	0.000152
Nickel (Ni)-Total	0.00050	mg/L	0.025-0.128		0.025	0.00070	0.00125
Phosphorus (P)-Total	0.050	mg/L				<0.050	<0.050
Potassium (K)-Total	0.050	mg/L				0.584	0.585
Rubidium (Rb)-Total	0.00020	mg/L				0.00147	0.00141
Selenium (Se)-Total	0.000050	mg/L	0.001		0.1	0.000115	0.000117
Silicon (Si)-Total	0.10	mg/L				2.99	2.96
Silver (Ag)-Total	0.000050	mg/L	0.00025		0.0001	<0.000050	<0.000050
Sodium (Na)-Total	0.050	mg/L				3.69	3.37
Strontium (Sr)-Total	0.0010	mg/L				0.0347	0.0338
Sulfur (S)-Total	0.50	mg/L				1.77	1.80
Tellurium (Te)-Total	0.00020	mg/L				<0.00020	<0.00020
Thallium (Tl)-Total	0.000010	mg/L	0.0008			<0.000010	<0.000010
Thorium (Th)-Total	0.00010	mg/L				<0.00010	<0.00010
Tin (Sn)-Total	0.00010	mg/L				<0.00010	<0.00010
Titanium (Ti)-Total	0.00030	mg/L				0.00684	0.00741
Tungsten (W)-Total	0.00010	mg/L				<0.00010	<0.00010
Uranium (U)-Total	0.000010	mg/L	0.015			0.000074	0.000077
Vanadium (V)-Total	0.00050	mg/L		0.12		0.00063	0.00067
Zinc (Zn)-Total	0.0030	mg/L			0.03	0.0032	0.0042
Zirconium (Zr)-Total	0.00020	mg/L				0.00029	0.00033
Dissolved Metals (Water)							
Aluminum (Al)-Dissolved	0.0010	mg/L				0.0681	0.0655
Antimony (Sb)-Dissolved	0.00010	mg/L				<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00010	mg/L				0.00076	0.00078
Barium (Ba)-Dissolved	0.00010	mg/L				0.00720	0.00725

					Sample Location	Mattagami River	
					Location ID	MATR-01	MATR-02
					Date Sampled	28-Oct-2021	28-Oct-2021
					Time Sampled	11:00	11:45
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**		
Beryllium (Be)-Dissolved	0.00010	mg/L				<0.00010	<0.00010
Bismuth (Bi)-Dissolved	0.000050	mg/L				<0.000050	<0.000050
Boron (B)-Dissolved	0.010	mg/L				0.014	0.015
Cadmium (Cd)-Dissolved	0.0000050	mg/L				0.0000131	0.0000105
Calcium (Ca)-Dissolved	0.050	mg/L				19.4	19.6
Cesium (Cs)-Dissolved	0.000010	mg/L				<0.000010	<0.000010
Chromium (Cr)-Dissolved	0.00010	mg/L				0.00037	0.00035
Cobalt (Co)-Dissolved	0.00010	mg/L				<0.00010	<0.00010
Copper (Cu)-Dissolved	0.00020	mg/L				0.00120	0.00116
Iron (Fe)-Dissolved	0.010	mg/L				0.235	0.239
Lead (Pb)-Dissolved	0.000050	mg/L				0.000058	0.000058
Lithium (Li)-Dissolved	0.0010	mg/L				<0.0010	<0.0010
Magnesium (Mg)-Dissolved	0.0050	mg/L				4.90	5.10
Manganese (Mn)-Dissolved	0.00010	mg/L				0.0180	0.0163
Molybdenum (Mo)-Dissolved	0.000050	mg/L				0.000118	0.000134
Nickel (Ni)-Dissolved	0.00050	mg/L				0.00055	0.00057
Phosphorus (P)-Dissolved	0.030	mg/L				<0.030	<0.030
Potassium (K)-Dissolved	0.050	mg/L				0.513	0.535
Rubidium (Rb)-Dissolved	0.00020	mg/L				0.00123	0.00133
Selenium (Se)-Dissolved	0.000050	mg/L				0.000109	0.000083
Silicon (Si)-Dissolved	0.050	mg/L				2.71	2.76
Silver (Ag)-Dissolved	0.000010	mg/L				<0.000010	<0.000010
Sodium (Na)-Dissolved	0.050	mg/L				3.24	3.25
Strontium (Sr)-Dissolved	0.00010	mg/L		2.5		0.0332	0.0334
Sulfur (S)-Dissolved	0.50	mg/L				1.87	1.81
Tellurium (Te)-Dissolved	0.00020	mg/L				<0.00020	<0.00020
Thallium (Tl)-Dissolved	0.000010	mg/L				<0.000010	<0.000010
Thorium (Th)-Dissolved	0.00010	mg/L				<0.00010	<0.00010
Tin (Sn)-Dissolved	0.00010	mg/L				<0.00010	<0.00010
Titanium (Ti)-Dissolved	0.00030	mg/L				0.00207	0.00185
Tungsten (W)-Dissolved	0.00010	mg/L				<0.00010	<0.00010
Uranium (U)-Dissolved	0.000010	mg/L				0.000069	0.000075
Vanadium (V)-Dissolved	0.00050	mg/L				<0.00050	<0.00050
Zinc (Zn)-Dissolved	0.0010	mg/L				0.0021	0.0019
Zirconium (Zr)-Dissolved	0.00020	mg/L				0.00025	0.00025
Speciated Metals (Water)							

					Sample Location	**Mattagami River**	
					Location ID	**MATR-01**	**MATR-02**
					Date Sampled	**28-Oct-2021**	**28-Oct-2021**
					Time Sampled	**11:00**	**11:45**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**		
Methylmercury (as MeHg)-Total	0.000020	ug/L				0.000148	n/a
Radiological Parameters (Water)							
Ra-226	0.011	Bq/L				<0.0020	0.0021

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

465000 467500 470000 472500 475000 477500 480000

5412500 5410000 5407500 5405000

MATR-02-SW
MATR-01-SW
NDR-S-04-SW
NDR-TRIB-02-SW
NDR-P-03-SW
NDR-S-02-SW
NDR-P-04-SW
NDR-P-02A-SW
NDR-TRIB-01-SW
NDR-Mar-LK-SW
NDR-Ger-LK-SW
NDR-P-01-SW
NDR-S-01-SW
WBR-S-04-SW
WBR-P-02-SW
WBR-S-03-SW
WBR-P-01-SW
WBR-S-02-SW
WBR-S-01-SW

Nesbyit Creek
Matagami River
CAMP 40 RD
North Driftwood River
655
LOWER STURGEON DAM RD
Martin Lake
Gerry Lake
Jack Lake
Jocko Creek
West Buskegau River
Prosser Creek

X:\CA\CAOAK300-OAK\MS-FS1-ProjectFI\2020\Projects\OMEMA2002_Canada Nickel_Crawford Lake\11_GIS\VAquaticBaseline_2021\MXD\Surface_Water_Sampling_Locs_3.mxd

LEGEND

- Property Boundary (2021)
- Utility Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Surface Water Sampling Location
- Fall
- Summer/Fall

NOTES:
- Topographic map information extracted from Land Information Ontario (NDMNRF), Queen's Printer for Ontario, 2021
- Aerial imagery around property boundary provided by CNC, scene date, summer 2021.
- Surrounding aerial imagery extracted from ESRI ArcGIS Online Image Service, scene date is May 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 1 2 4 6 8 10 Kilometres

N W E S

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Surface Water Sampling Locations (2021)

PROJECT N°:OMEMA2304 | **FIGURE: A1-1**

SCALE: 1:45,000 | DATE: November 2023

460000 462500 465000 467500 470000 472500 475000 477500 480000 482500

5412500 5410000 5407500 5405000 5402500

MatR-02-SW
NDR-S-04-SW
WBR-S-04-SW
WBR-P-03-SW
WBR-P-04-SW
WBR-S-05-SW
WBR-P-01-SW
WBR-S-03-SW
NDR-P-07-SW
NDR-S-05-SW
NDR-P-06-SW
NDR-TRIB-02-SW
NDR-P-03-SW
NDR-S-02-SW
MatR-01-SW
NDR-TRIB-01-SW
NDR-P-01-SW
NDR-S-01-SW
NDR-Mar-LK-SW
NDR-Ger-LK-SW
WBR-S-01-SW
NDR-MEL-Lk-SW
NDR-DVS-Lk-SW
JC-S-01-SW

Nesbitt Creek
Nettagami River
CAMP 40 RD
North Driftwood River
LOWER STURGEON DAM RD
655
West Basketgami River
Jocko Creek
Martin Lake
Gerry Lake
Mel Lake
Davis Lake
Zed Lake
Prosser Creek
Prosser Lake

NDR-P-04-SW
NDR-P-02-SW
50 m

NDR-JCK-LK-SW
NDR-SDR-LK-SW
Jack Lake
Sutherland Lake
100 m

X:\CA\CAOAK300-OAK\MS-FS1-ProjectF\2020\Projects\OMEMA2002_Canada Nickel_Crawford Lake\11_GIS\Aquatic\Baseline_2022\MXD\Surface_Water_Sampling_Locs_4.mxd

LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Surface Water Sampling Locations

- Spring
- Summer
- Fall

0 1 2 4 6 8 10 Kilometres

OVERVIEW MAP
Enlarged Area
10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

CANADA NICKEL COMPANY
wsp

CRAWFORD NICKEL PROJECT

Surface Water Sampling Locations (2022)

PROJECT N°:OMEMA2304 | **FIGURE: A1-2**

SCALE: 1:58,000 | DATE: November 2023

462500 465000 467500 470000 472500 475000 477500

5420000 5417500 5415000 5412500 5410000 5407500 5405000 5402500 5400000 5397500

NDR-S-06
WBR-S-07
CAMP 40 RD
Nesbitt Creek
655
WBR-S-04
MAT-R-02
NDR-S-04
WBR-P-04
RDAL-06
NDR-S-06b
North Driftwood River
WBR-S-06
Mattagami River
LOWER STURGEON DAM RD
West Buskegau River
MAT-R-01
NDR-MARLK
Martin Lake
NDR-GERLK
Gerry Lake
Jocko Creek
RDAL-04
Jack Lake
Sutherland Lake
Prosser Creek
NDR-SUTLK
Mel Lake
NDR-DAVLK
Prosser Lake
Zed Lake
JC-S-01
RDAL-02
JC-S-03
Kidd Creek
RDAL-01

OVERVIEW MAP
NDR-US-TC
Mattagami River
Buskegau River
Enlarged Area
655
5 Km

X:\CA\CAOAK300-OAK\MIS-FS1-Project\FI2023\Projects\OMEMA2304S_WSP_Canada_Inc_Crawford_Impact_Assessment\13_0_GIS\Aquatic\Baseline_2023\MXD\Surface_Water_Sampling_Locs_1.mxd

LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Surface Water Sampling Location
- Spring
- Summer
- Spring / Summer

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

CANADA NICKEL COMPANY

WSP

CRAWFORD NICKEL PROJECT

Surface Water Sampling Locations (2023)

Datum: NAD83
Projection: UTM Zone 17N

N W E S

0 1 2 4 6 8 10 Kilometres

PROJECT N°:OMEMA2304 **FIGURE: A1-3**

SCALE: 1:70,000 DATE: November 2023

Table A2-1: In-Field Surface Water Measurements (2022)

Waterbody	Site ID	Date (dd/mm/yy)	Season	Zone	Easting	Northing	Time (24-hrs)	Sample Depth (m)	Water Temperature (°C)	pH	Conductivity (µS/cm)	Conductivity (mS/cm)	DO (%)	DO (mg/L)
Davis Lake	NDR-DAVLK	03/06/22	Spring	17U	471,689	5,403,765	13:30	0.1	18.2	7.57	228.2	n/a	76.5	7.2
Gerry Lake	NDR-GER-LK	03/06/22	Spring	17U	471,086	5,405,364	10:20	0.1	19.3	7.46	200.1	n/a	62.7	5.8
Jack Lake	NDR-JAC-LK	03/06/22	Spring	17U	471,035	5,404,771	11:15	0.1	19.2	7.64	232.1	n/a	113.4	10.4
Jocko Creek	JC-S-01	22/05/22	Spring	17U	473,224	5,401,657	10:30	0.2	10.1	3.74	47.6	n/a	50.4	5.7
		30/08/22	Summer	17U	473,298	5,401,501	14:54	0.5	16.73	5.35	58.0	0.070	55.0	85.4
		18/10/22	Fall	17U	473,298	5,401,485	14:15	0.3	6	5.32	46.5	0.073	44.9	5.6
Martin Lake	NDR-MAR-LK	30/05/22	Spring	17U	470,336	5,406,861	n/a	0.1	10.4	4.81	28.5	-	83.5	9.3
Mattagami River	MATR-01	08/06/22	Spring	17U	463,524	5,409,188	19:30	0.1	17.3	6.7	83.8	n/a	87.8	8.4
		25/10/22	Fall	17U	463,418	5,410,086	14:30	0.2	6.8	7.15	51.0	0.078	21.0	2.6
	MATR-02	08/06/22	Spring	17U	562,924	5,412,397	0:00	0.1	17.4	6.62	84.1	n/a	89.0	8.5
		25/10/22	Fall	17U	462,846	5,412,371	15:15	0.3	6.7	7.28	50.7	0.078	19.4	2.4
North Driftwood River	NDR-P-01	29/05/22	Spring	17U	473,341	5,406,523	13:53	0.1	13	4.68	39.0	n/a	36.1	3.7
		31/08/22	Summer	17U	473,176	5,406,522	18:15	0.5	16.2	5.69	n/a	0.053	35.8	3.3
	NDR-P-02B	31/05/22	Spring	17U	470,355	5,408,266	n/a	0.1	23.3	7.45	221.6	n/a	125.1	10.6
		31/08/22	Summer	17U	470,354	5,408,259	17:00	0.2	17.54	8.11	145.0	0.170	74.6	7.0
	NDR-P-03	02/06/22	Spring	17U	469,783	5,409,473	10:35	0.1	20.6	6.84	69.9	n/a	98.0	8.8
		30/08/22	Summer	17U	469,845	5,409,437	10:30	0.5	20.55	7.45	70.0	n/a	87.9	7.9
		13/10/22	Fall	17U	469,841	5,409,430	n/a	0.1	9.5	7.19	n/a	0.780	96.4	11.0
	NDR-P-04	30/05/22	Spring	17U	470,323	5,408,322	10:50	0.1	16	5.88	120.3	n/a	55.3	5.3
		31/08/22	Summer	17U	470,330	5,408,326	16:30	0.5	18.47	6.92	129.0	n/a	57.9	5.4
	NDR-P-05	06/06/22	Spring	17U	476,718	5,403,463	14:05	0.1	20.1	5.65	48.6	n/a	77.3	7.0
	NDR-P-06	01/06/22	Spring	17U	468,569	5,410,391	11:30	0.1	22.4	4.74	27.1	n/a	72.1	6.2
		30/08/22	Summer	17U	468,560	5,410,412	14:35	0.3	21	6.42	n/a	0.049	68.6	5.8
		16/10/22	Fall	17U	468,556	5,410,412	12:00	0.1	6.4	5.45	19.2	0.030	58.5	7.2
	NDR-P-07	01/06/22	spring	17U	467,516	5,411,228	10:00	0.1	17.8	4.46	27.9	n/a	50.3	4.7
		30/08/22	Summer	17U	467,554	5,411,220	13:00	0.3	19.5	5.32	n/a	0.044	75.1	6.6
		15/10/22	Fall	17U	467,537	5,411,207	15:00	0.1	6.5	5.27	20.3	0.031	68.0	8.3
	NDR-S-01	29/05/22	Spring	17U	475,391	5,406,435	13:15	0.1	14.7	4.88	38.9	n/a	60.8	6.2
		23/10/22	Fall	17U	475,424	5,406,463	11:45	0.2	5.5	5.84	25.4	0.040	27.1	3.4
	NDR-S-02	07/06/22	Spring	17U	472,038	5,408,765	13:35	0.3	16	5.86	74.2	n/a	59.2	5.8
		31/08/22	Summer	17U	472,036	5,408,767	10:00	0.5	17.4	6.68	n/a	0.126	54.4	5.0
		16/10/22	Fall	17U	472,031	5,408,775	13:30	0.2	6.5	6.56	52.6	0.081	46.6	5.7
	NDR-S-04	31/05/22	Spring	17U	470,352	5,412,352	n/a	0.1	16.1	5.78	74.0	n/a	67.3	6.6
		30/08/22	Summer	17U	470,369	5,412,393	1200	0.5	12.27	6.93	107.0	0.120	44.5	4.1
	NDR-S-05	01/06/22	Spring	17U	468,505	5,410,450	19:00	0.1	21.4	4.64	26.0	n/a	61.0	5.3
		30/08/22	Summer	17U	468,567	5,410,420	14:25	0.1	19.3	6.16	n/a	0.183	40.0	3.5
	NDR-TRIB-01	06/06/22	spring	17U	471,521	5,406,931	8:50	0.1	17	6.95	85.3	n/a	65.7	6.4
		31/08/22	Summer	17U	471,522	5,406,892	15:30	0.5	17.2	6.4	n/a	0.126	25.8	2.5

Waterbody	Site ID	Date (dd/mm/yy)	Season	Zone	Easting	Northing	Time (24-hrs)	Sample Depth (m)	Water Temperature (°C)	pH	Conductivity (µS/cm)	Conductivity (mS/cm)	DO (%)	DO (mg/L)
		18/10/22	Fall	17U	471,580	5,406,908	12:15	0.1	6.1	6.81	66.9	0.105	43.0	5.3
	NDR-TRIB-02	07/06/22	Spring	17U	471,035	5,409,463	15:05	0.1	14.2	4.82	33.0	n/a	18.8	1.9
		16/10/22	Fall	17U	471,054	5,409,502	16:00	1.0	6.3	5.53	19.2	0.030	58.3	7.2
West Buskegau River	WBR-P-01	07/06/22	Spring	17U	475,229	5,412,085	9:45	0.2	14.4	5.79	61.8	n/a	39.1	4.0
	WBR-P-03	17/09/22	Summer	17U	474,910	5,412,159	16:00	0.3	12.5	6.46	n/a	0.052	88.0	9.1
		24/10/22	Fall	17U	474,910	5,412,159	15:00	0.2	10	5.33	22.3	0.031	20.4	2.3
	WBR-P-04	17/09/22	Summer	17U	474,594	5,412,296	13:30	0.5	12.7	5.91	n/a	0.040	63.1	6.5
		23/10/22	Fall	17U	474,594	5,412,296	11:15	0.2	8.2	4.9	20.9	0.031	21.2	2.5
	WBR-S-01	06/06/22	Spring	17U	478,572	5,405,884	12:28	0.1	14.2	5.89	42.1	n/a	87.4	8.9
		16/09/22	Summer	17U	478,677	5,405,872	17:00	0.5	14.97	6.85	45.0	0.055	84.9	8.6
	WBR-S-03	06/06/22	Spring	17U	476,662	5,412,385		0.1	15.7	5.85	45.8	n/a	85.8	8.5
		01/09/22	Summer	17U	476,696	5,412,340	13:15	0.5	14.97	6.7	48.0	0.059	82.2	8.3
	WBR-S-04	06/06/22	Spring	17U	476,567	5,412,897	15:00	0.1	15.9	5.79	45.1	n/a	85.9	8.5
		01/09/22	Summer	17U	476,567	5,412,900	14:30	0.5	15.42	6.65	49.0	0.060	78.7	7.8
	WBR-S-05	17/09/22	Summer	17U	474,673	5,412,187	17:00	0.3	11	5.79	n/a	0.051	3.2	0.3

Table A2-2a: Surface Water Laboratory Results – Martin Lake, Gerry Lake, Jack Lake, Jocko Creek, Davis Lake, Mel Lake, Sutherland Lake (2022)

					Sample Location	Martin Lake			Gerry Lake			Jack Lake		
					Location ID	NDR-MARLK			NDR-GERLK			NDR-JACLK		
					Date Sampled	02-Jun	31-Aug-22	20-Oct-22	03-Jun-2022	31-Aug-2022	20-Oct-2022	03-Jun-2022	16-Sep-2022	17-Oct-2022
					Time Sampled	09:50	18:00	14:45	10:30	15:00	11:30	11:30	18:50	13:15
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**									
Physical Tests														
Conductivity (EC)	1.0	uS/cm				20	113	110	202	264	258	249	242	258
Hardness (as CaCO3)	0.50	mg/L				46	65.20	61.40	105	144.00	133.00	130	118.00	131.00
pH	0.10	pH	6.5-9.0		6.5-8.5	7.29	7.62	7.73	8.17	8.19	8.21	8.37	8.43	8.31
Total Suspended Solids	3.0	mg/L				<3.0	<3	<3	3.4	<3	<7.5	4	<3	<3
Total Dissolved Solids	10	mg/L				62	78	104	123	140.00	153.00	102	122.00	130.00
Acidity (as CaCO3)	2.0	mg/L				<2.0	<2	<2	<2.0	<2	<2	<2.0	<2	<2
Anions and Nutrients														
Alkalinity, Total (as CaCO3)	2.0	mg/L				42	29.2	57	122	139	136	196	132	137
Ammonia, Total (as N)	0.0050	mg/L				0.012	0.0306	0.0169	0.0185	0.0204	0.0364	0.0365	0.0242	0.078
Bromide (Br)	0.1000	mg/L												
Chloride (Cl)	0.10	mg/L	120			<0.50	<0.50	<0.50	0.52	<0.50	0.58	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L				<0.020	0.031	0.025	0.052	0.074	0.062	0.049	0.0600	0.0530
Nitrate (as N)	0.020	mg/L	13			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L				0.0098	0.0132	0.0117	0.0177	0.0131	0.0102	0.0118	0.0078	0.0036
Sulfate (SO4)	0.30	mg/L				<0.30	0.39	0.35	1.03	1.36	1.07	2.02	1.73	1.49
Cyanides														
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, SAD (Total)	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters														
Acidity (as CaCO3)	2.0	mg/L				<2.0	<2	<2	<2.0	<2	<2	<2.0	<2	<2
Total Metals														
Aluminum (Al)	0.0030	mg/L	0.005 -0.1			0.0904	0.0549	0.113	0.0592	0.0161	0.0404	0.18	0.0065	0.0086
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00051	0.00072	0.00067	0.00052	0.00058	0.00056	0.00029	0.00024	0.00025
Barium (Ba)	0.00010	mg/L				0.00847	0.01	0.01	0.0147	0.02	0.02	0.0153	0.0134	0.0147
Beryllium (Be)	0.000020	mg/L			1.1	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00004 - 0.00021		0.0002	0.0000077	0.000011	0.000011	0.0000103	<0.0000050	<0.0000050	0.0000102	<0.0000050	<0.0000050
Calcium (Ca)	0.050	mg/L				12.9	19.3	18.6	31.2	41.9	39.9	37.4	29.4	36.5
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000023	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00068	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L		0.0008 - 1.1859*		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00024	<0.00010	<0.00010
Copper (Cu)	0.00050	mg/L	0.002 - 0.00323		0.005	0.00082	0.001	0.00054	0.00144	0.00051	<0.00050	0.00092	<0.00050	<0.00050
Iron (Fe)	0.01	mg/L	0.3		0.30	0.24	0.22	0.51	0.23	0.10	0.49	0.30	0.02	0.07

					Sample Location	Martin Lake			Gerry Lake			Jack Lake		
					Location ID	NDR-MARLK			NDR-GERLK			NDR-JACLK		
					Date Sampled	02-Jun	31-Aug-22	20-Oct-22	03-Jun-2022	31-Aug-2022	20-Oct-2022	03-Jun-2022	16-Sep-2022	17-Oct-2022
					Time Sampled	09:50	18:00	14:45	10:30	15:00	11:30	11:30	18:50	13:15
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**									
Lead (Pb)	0.000050	mg/L	0.001 - 0.005		0.0050	0.000076	0.000742	0.000112	0.000055	0.000248	<0.000050	0.000265	<0.000050	<0.000050
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	0.0016	<0.0010	0.0012	<0.0010	<0.0010
Magnesium (Mg)	0.0050	mg/L				3.58	4.68	4.59	7.85	10.3	9.23	10.6	11.7	10.9
Manganese (Mn)	0.00010	mg/L	0.190 - 0.44			0.0141	0.0351	0.0555	0.0365	0.0269	0.1380	0.0506	0.0177	0.0994
Mercury (Hg)	0.00010	ng/L	26		200	2.47	1.22	1.54	2.04	0.88	1.8	0.63	0.61	<0.50
Molybdenum (Mo)	0.000050	mg/L	0.073			<0.000050	0.000066	0.000057	0.000121	0.000174	0.000142	0.000107	0.00009	0.00008
Nickel (Ni)	0.00050	mg/L	0.025 - 0.1261		0.025	0.00061	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0006	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	0.139	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.4	0.4	0.46	1.04	1.08	1.03	1.23	1.1	1.2
Rubidium (Rb)	0.00020	mg/L				0.00067	0.00090	0.00091	0.00139	0.00163	0.00149	0.00172	0.00157	0.00168
Selenium (Se)	0.000050	mg/L	0.001		0.1	0.000068	0.000078	0.000093	0.000086	0.000067	0.000073	<0.000050	<0.000050	<0.000050
Silicon (Si)	0.10	mg/L				0.93	1.16	2.03	1.87	2.22	3.33	1.72	1.42	1.89
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				1.09	1.37	1.37	2.76	3.71	3.24	2.1	2.00	1.94
Strontium (Sr)	0.00020	mg/L				0.0229	0.0320	0.0313	0.0558	0.0775	0.0705	0.0517	0.0529	0.054
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	0.57	0.74	0.60	0.78	0.76	0.69
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00249	0.00165	0.00355	0.00135	0.00070	0.00120	0.00873	<0.00030	<0.00030
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L	0.015			0.000028	0.000029	0.000042	0.000033	0.000038	0.000035	0.000056	0.00004	0.000042
Vanadium (V)	0.00050	mg/L		0.12		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00061	<0.00050	<0.00050
Zinc (Zn)	0.0030	mg/L			0.03	0.0061	0.0045	0.0042	0.0144	<0.0030	<0.0030	0.0193	<0.0030	<0.0030
Zirconium (Zr)	0.00020	mg/L				<0.00020	0.00	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Metals														
Aluminum (Al)	0.0010	mg/L				0.0583	0.0251	0.0648	0.0463	0.0027	0.0253	0.0076	0.0016	0.0039
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L				0.00053	0.00076	0.00056	0.00053	0.00061	0.00053	0.00021	0.00025	0.0002
Barium (Ba)	0.00010	mg/L				0.00574	0.00669	0.00750	0.0135	0.0187	0.0179	0.0134	0.0129	0.0139
Beryllium (Be)	0.000020	mg/L				<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L				<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L				0.0000062	0.000007	0.000008	0.0000068	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	0.050	mg/L				12.8	18.6	16.9	29.3	40.7	36.8	34.6	29.9	33.6
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00020	mg/L				0.00057	0.00042	0.00043	0.00058	0.00027	0.00022	<0.00020	<0.00020	<0.00020

					Sample Location	Martin Lake			Gerry Lake			Jack Lake		
					Location ID	NDR-MARLK			NDR-GERLK			NDR-JACLK		
					Date Sampled	02-Jun	31-Aug-22	20-Oct-22	03-Jun-2022	31-Aug-2022	20-Oct-2022	03-Jun-2022	16-Sep-2022	17-Oct-2022
					Time Sampled	09:50	18:00	14:45	10:30	15:00	11:30	11:30	18:50	13:15
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**									
Iron (Fe)	0.010	mg/L				0.178	0.16	0.39	0.167	0.0370	0.3610	0.012	<0.010	0.03
Lead (Pb)	0.000050	mg/L				<0.000050	0.000075	0.00006	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	0.0018	0.0014	0.0012	<0.0010	0.0011
Magnesium (Mg)	0.0050	mg/L				3.41	4.56	4.67	7.67	10.3	10	10.5	10.6	11.5
Manganese (Mn)	0.00010	mg/L				0.00742	0.0075	0.0418	0.0151	0.0016	0.0858	0.0187	0.0014	0.0634
Molybdenum (Mo)	0.000050	mg/L				<0.000050	0.000057	0.000051	0.000099	0.000147	0.000137	0.000092	0.000084	0.000083
Nickel (Ni)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.361	0.3840	0.4210	0.835	1.08	0.97	1.06	1.03	1.12
Rubidium (Rb)	0.00020	mg/L				0.00062	0.00085	0.00071	0.00123	0.00166	0.00142	0.00131	0.00149	0.00148
Selenium (Se)	0.000050	mg/L				0.000087	<0.000500	0.000096	0.000075	0.000077	0.000069	<0.000050	<0.000050	<0.000050
Silicon (Si)	0.050	mg/L				0.864	1.13	1.88	1.89	2.25	3.3	1.55	1.3	1.84
Silver (Ag)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				1.05	1.25	1.33	2.51	3.67	3.29	1.79	1.82	1.85
Strontium (Sr)	0.00020	mg/L		2.5		0.0216	0.0318	0.0319	0.0522	0.0764	0.0690	0.0486	0.04850	0.05380
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	0.53	0.72	<0.50	0.9	0.61	0.52
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00124	0.000740	0.001590	0.00095	<0.00030	0.000540	<0.00030	<0.00030	<0.00030
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L				0.000026	0.000025	0.000037	0.000032	0.000034	0.000033	0.000045	0.00004	0.00004
Vanadium (V)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0010	mg/L				0.0039	0.00190	0.00380	0.0018	<0.0010	0.001200	0.0019	0.00140	<0.0010
Zirconium (Zr)	0.00020	mg/L				<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Total Speciated Metals														
Methylmercury (as MeHg)	0.000020	ug/L				0.000091	0.000057	0.000094	0.000275	0.000077	0.000065	0.000039	0.000034	0.000031

					Sample Location	Jocko Creek			Davis Lake		Mel Lake	Sutherland Lake	
					Location ID	JC-S-01			NDR-DAVLK		NDR-MELLK	NDR-SUTLK	
					Date Sampled	29-May-2022	30-Aug-2022	18-Oct-2022	03-Jun-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	21-Oct-2022
					Time Sampled	10:30	14:30	14:15	09:30	11:45	14:20	17:30	13:30
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**								
Physical Tests													
Conductivity (EC)	1.0	uS/cm				47.5	67.5	78.1	229	220	265	218	236
Hardness (as CaCO3)	0.50	mg/L				16.6	25.8	23.2	117.00	114.00	118.00	112.00	119.00
pH	0.10	pH	6.5-9.0		6.5-8.5	5.31	5.21	5.67	8.31	8.4	8.33	8.34	8.23
Total Suspended Solids	3.0	mg/L				<3.0	<3	<3	<3.0	<3	<3	<3	<3

					Sample Location	Jocko Creek			Davis Lake		Mel Lake	Sutherland Lake	
					Location ID	JC-S-01			NDR-DAVLK		NDR-MELLK	NDR-SUTLK	
					Date Sampled	29-May-2022	30-Aug-2022	18-Oct-2022	03-Jun-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	21-Oct-2022
					Time Sampled	10:30	14:30	14:15	09:30	11:45	14:20	17:30	13:30
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**								
Total Dissolved Solids	10	mg/L				57	120	122	98	114.00	142.00	104.00	123.00
Acidity (as CaCO3)	2.0	mg/L					11.3	6.3	<2.0	<2	<2.0	<2	<2
Anions and Nutrients													
Alkalinity, Total (as CaCO3)	2.0	mg/L				2.4	3.4	4.5	138	122	146	120	125
Ammonia, Total (as N)	0.0050	mg/L				<0.010	0.022	0.0131	0.0108	0.043	0.0074	0.0062	0.0347
Bromide (Br)	0.1000	mg/L				<0.10							
Chloride (Cl)	0.10	mg/L	120			6.54	10.40	14.10	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L				<0.020	<0.020	<0.020	0.032	0.037	0.044	0.036	0.03
Nitrate (as N)	0.020	mg/L	13			0.048	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L				0.0074	0.0024	0.0073	0.0072	0.0045	0.00560	0.00780	0.00460
Sulfate (SO4)	0.30	mg/L				<0.30	<0.30	<0.30	2.48	2.64	4.08	2.17	2.14
Cyanides													
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, SAD (Total)	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters													
Acidity (as CaCO3)	2.0	mg/L				14.8	11.3	6.3	<2.0	<2	<2	<2	<2
Total Metals													
Aluminum (Al)	0.0030	mg/L	0.005 -0.1			0.111	0.157	0.119	0.0077	0.0034	0.0038	0.0116	0.0081
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00069	0.00111	0.00077	0.00015	0.00016	0.00022	0.00025	0.00024
Barium (Ba)	0.00010	mg/L				0.00326	0.00525	0.00406	0.00954	0.00986	0.0139	0.0127	0.0137
Beryllium (Be)	0.000020	mg/L			1.1	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00004 - 0.00021		0.0002	0.0000428	0.0000595	0.0000375	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	0.050	mg/L				4.78	7.72	6.80	33.2	29.3	35.4	31.2	36.2
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	0.00057	0.00051	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L		0.0008 - 1.1859*		0.00012	0.00022	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00050	mg/L	0.002 - 0.00323		0.005	0.00125	0.00087	0.00092	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)	0.01	mg/L	0.3		0.30	0.25	0.50	0.34	<0.010	<0.010	<0.010	0.02	0.02
Lead (Pb)	0.000050	mg/L	0.001 - 0.005		0.0050	0.000773	0.001260	0.000880	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010
Magnesium (Mg)	0.0050	mg/L				1.05	1.70	1.48	8.88	9.74	11.8	8.94	8.77
Manganese (Mn)	0.00010	mg/L	0.190 - 0.44			0.0405	0.0523	0.0330	0.00988	0.00549	0.00596	0.01240	0.04720
Mercury (Hg)	0.00010	ng/L	26		200	0.00290	3.00000	2.70000	<0.50	<0.50	<0.50	0.55	0.81
Molybdenum (Mo)	0.000050	mg/L	0.073			<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00009	<0.000050	<0.000050

					Sample Location	Jocko Creek			Davis Lake		Mel Lake	Sutherland Lake	
					Location ID	JC-S-01			NDR-DAVLK		NDR-MELLK	NDR-SUTLK	
					Date Sampled	29-May-2022	30-Aug-2022	18-Oct-2022	03-Jun-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	21-Oct-2022
					Time Sampled	10:30	14:30	14:15	09:30	11:45	14:20	17:30	13:30
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**								
Nickel (Ni)	0.00050	mg/L	0.025 - 0.1261		0.025	0.00053	0.00059	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.083	<0.050	0.220	0.88	0.889	1.13	0.824	0.973
Rubidium (Rb)	0.00020	mg/L				0.00024	<0.00020	0.00047	0.00145	0.00150	0.00195	0.00136	0.00160
Selenium (Se)	0.000050	mg/L	0.001		0.1	0.000132	0.000178	0.000157	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon (Si)	0.10	mg/L				0.70	1.61	1.48	2.52	2.78	3.46	2.13	2.69
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				4.16	6.87	8.34	1.36	1.53	1.81	1.72	1.42
Strontium (Sr)	0.00020	mg/L				0.0093	0.0147	0.0124	0.0393	0.0428	0.0502	0.0426	0.0441
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	1.11	1.07	1.61	0.95	0.97
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000140	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00182	0.00236	0.00190	<0.00030	<0.00030	<0.00030	0.00038	<0.00030
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L	0.015			<0.000010	<0.000010	<0.000010	0.000093	0.000076	0.000184	0.00007	0.000089
Vanadium (V)	0.00050	mg/L		0.12		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0030	mg/L			0.03	0.0100	0.0142	0.0107	<0.0030	<0.0030	<0.0030	0.0071	<0.0030
Zirconium (Zr)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Metals													
Aluminum (Al)	0.0010	mg/L				0.106	0.150	0.114	0.0012	<0.0010	<0.0010	0.0011	0.0028
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L				0.00070	0.00120	0.00072	0.00014	0.00013	0.0002	0.00024	0.00022
Barium (Ba)	0.00010	mg/L				0.00326	0.00538	0.00397	0.0096	0.00981	0.01430	0.01130	0.01300
Beryllium (Be)	0.000020	mg/L				<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L				<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L				0.0000503	0.0000534	0.0000338	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	0.050	mg/L				4.87	7.56	6.88	32	30.4	36.5	31.2	32.4
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L				0.00011	0.00021	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00020	mg/L				0.00124	0.00083	0.00091	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Iron (Fe)	0.010	mg/L				0.242	0.470	0.330	<0.010	<0.010	<0.010	<0.010	0.01
Lead (Pb)	0.000050	mg/L				0.000816	0.001250	0.000804	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.0011	<0.0010	<0.0010
Magnesium (Mg)	0.0050	mg/L				1.08	1.67	1.46	8.93	9.28	11	8.24	9.22
Manganese (Mn)	0.00010	mg/L				0.0419	0.0517	0.0316	0.00147	0.00042	0.00088	0.00110	0.00606
Molybdenum (Mo)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000084	<0.000050	<0.000050

					Sample Location	Jocko Creek			Davis Lake		Mel Lake	Sutherland Lake	
					Location ID	JC-S-01			NDR-DAVLK		NDR-MELLK	NDR-SUTLK	
					Date Sampled	29-May-2022	30-Aug-2022	18-Oct-2022	03-Jun-2022	16-Sep-2022	16-Sep-2022	16-Sep-2022	21-Oct-2022
					Time Sampled	10:30	14:30	14:15	09:30	11:45	14:20	17:30	13:30
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**								
Nickel (Ni)	0.00050	mg/L				<0.00050	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.090	<0.050	0.223	0.913	0.84	1.06	0.76	0.91
Rubidium (Rb)	0.00020	mg/L				0.00024	<0.00020	0.00042	0.00131	0.00152	0.00188	0.00134	0.00149
Selenium (Se)	0.000050	mg/L				0.000134	0.000226	0.000126	0.000053	<0.000050	<0.000050	0.00005	<0.000050
Silicon (Si)	0.050	mg/L				0.670	1.610	1.420	2.54	2.58	3.18	1.97	2.59
Silver (Ag)	0.000010	mg/L				<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				4.41	6.66	8.08	1.38	1.33	1.55	1.23	1.44
Strontium (Sr)	0.00020	mg/L		2.5		0.0097	0.0145	0.0123	0.0392	0.04	0.0494	0.0399	0.0419
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	1.01	0.93	1.39	0.81	0.94
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012
Titanium (Ti)	0.00030	mg/L				0.00133	0.00205	0.00170	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	0.000084	0.000072	0.00017	0.00006	0.00008
Vanadium (V)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0010	mg/L				0.0115	0.0163	0.0119	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)	0.00020	mg/L				<0.00020	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Total Speciated Metals													
Methylmercury (as MeHg)	0.000020	ug/L				0.000234	0.000097	0.000157	0.000036	0.000027	0.000032	0.000028	0.000031

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

Table A2-2b: Surface Water Laboratory Results – NDR Unnamed Ponds (2022)

					Waterbody	North Driftwood River - Unnamed Ponds								
					Location ID	NDR-P-01			NDR-P-02	NDR-P-02B		NDR-P-03		
					Date Sampled	29-May-2022	30-Aug-2022	13-Oct-2022	31-May-2022	31-Sep-2022	13-Oct-2022	02-Jun-2022	30-Aug-2022	13-Oct-2022
					Time Sampled	14:00	0:00	17:00	15:10	0:00	11:15	10:30	0:00	14:15
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**									
Physical Tests														
Conductivity (EC)	1.0	uS/cm				49.1	52.7	42.5	228	166.0	180.0	71.6	75.8	83.00
Hardness (as CaCO3)	0.50	mg/L				34.3	38.4	32.8	107	84.9	88.4	36.4	40.70	42.9
pH	0.10	pH	6.5-9.0		6.5-8.5	6.59	7.09	6.51	8.36	8.09	8.17	7.7	7.56	7.79
Total Suspended Solids	3.0	mg/L				5.2	113.0	3.7	<3.0	<3	<3	3.6	<3	3.7
Total Dissolved Solids	10	mg/L				83	10	119	120	81	93	31	40.00	50
Acidity (as CaCO3)	2.0	mg/L					4.2	9.1	<2.0	<2	<2	<2.0	<2	3.3
Anions and Nutrients														
Alkalinity, Total (as CaCO3)	2.0	mg/L				22.3	20.8	11.0	127	90.7	96.6	36.2	37.4	43.600
Ammonia, Total (as N)	0.0050	mg/L				0.016	0.0509	0.0366	<0.0050	0.015	0.005	0.0201	0.0213	0.0327
Bromide (Br)	0.1000	mg/L				<0.10								
Chloride (Cl)	0.10	mg/L	120			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L				<0.020	<0.020	<0.020	<0.020	0.032	0.022	<0.020	<0.020	0.028
Nitrate (as N)	0.020	mg/L	13			0.027	<0.020	<0.020	<0.020	0.030	<0.020	<0.020	<0.020	<0.020
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L				0.0163	0.0030	0.0078	0.0083	0.0144	0.0031	0.0152	0.0039	0.006
Sulfate (SO4)	0.30	mg/L				<0.30	<0.30	<0.30	<0.30	1.18	<0.30	<0.30	<0.30	<0.30
Cyanides														
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, SAD (Total)	0.0020	mg/L				<0.0020	0.0021	0.0021	<0.0020	<0.0020	0.0021	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters														
Acidity (as CaCO3)	2.0	mg/L				13.0	4.2	9.1	<2.0	<2	<2	<2.0		3.3
Total Metals														
Aluminum (Al)	0.0030	mg/L	0.005 -0.1			0.213	0.166	0.289	0.0226	0.01180	0.00430	0.0561	0.0265	0.0191
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00099	0.00117	0.00118	0.00059	0.00072	0.00050	0.00028	0.0003	0.00029
Barium (Ba)	0.00010	mg/L				0.00556	0.00901	0.00596	0.00247	0.00418	0.00207	0.0199	0.00	0.00283
Beryllium (Be)	0.000020	mg/L			1.1	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00004 - 0.00021		0.0002	0.0000301	0.0000185	0.0000265	0.0000066	<0.0000050	<0.0000050	0.0000073	<0.0000050	<0.0000050
Calcium (Ca)	0.050	mg/L				9.37	10.60	9.57	36.1	25.60	27.90	10.7	10.9	12.3
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				0.00059	0.00076	0.00081	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L		0.0008 - 1.1859*		0.00021	0.00043	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00050	mg/L	0.002 - 0.00323		0.005	0.00084	<0.00050	0.00072	<0.00050	<0.00050	<0.00050	0.0014	<0.00050	<0.00050
Iron (Fe)	0.01	mg/L	0.3		0.30	0.43	0.78	0.73	0.08	0.10	0.03	0.09	0.04	0.14
Lead (Pb)	0.000050	mg/L	0.001 - 0.005		0.0050	0.000310	0.000288	0.000290	<0.000050	0.000145	<0.000050	0.000126	<0.000050	<0.000050

					Waterbody	North Driftwood River - Unnamed Ponds								
					Location ID	NDR-P-01			NDR-P-02	NDR-P-02B		NDR-P-03		
					Date Sampled	29-May-2022	30-Aug-2022	13-Oct-2022	31-May-2022	31-Sep-2022	13-Oct-2022	02-Jun-2022	30-Aug-2022	13-Oct-2022
					Time Sampled	14:00	0:00	17:00	15:10	0:00	11:15	10:30	0:00	14:15
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**									
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	0.0050	mg/L				2.15	2.83	2.24	4.64	5.34	4.90	2.82	3.11	2.940
Manganese (Mn)	0.00010	mg/L	0.190 - 0.44			0.0490	0.1110	0.0339	0.0216	0.0086	0.0075	0.013	0.01	0.03400
Mercury (Hg)	0.00010	ng/L	26		200	0.00340	0.95000	4.11000	<0.50	<0.50	0.62000	1	0.82	1.160000
Molybdenum (Mo)	0.000050	mg/L	0.073			<0.000050	<0.000050	<0.000050	0.000281	<0.000050	0.000062	<0.000050	<0.000050	<0.000050
Nickel (Ni)	0.00050	mg/L	0.025 - 0.1261		0.025	0.00079	0.00066	0.00075	<0.00050	<0.00050	<0.00050	0.00111	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.172	0.106	0.132	2.16	1.590	1.790	0.649	0.301	0.37700
Rubidium (Rb)	0.00020	mg/L				0.00029	0.00047	0.00026	0.00175	0.00142	0.00145	0.00078	0.00	0.000710
Selenium (Se)	0.000050	mg/L	0.001		0.1	0.000151	0.000155	0.000159	<0.000050	<0.000050	<0.000050	<0.000050	0.00006	0.000062
Silicon (Si)	0.10	mg/L				0.19	1.61	0.94	0.58	1.18	0.81	0.37	0.34	0.44
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.470	0.431	0.521	0.326	0.305	0.413	0.911	0.4750	0.5170
Strontium (Sr)	0.00020	mg/L				0.0171	0.0244	0.0164	0.0183	0.0289	0.0234	0.0149	0.0173	0.0182
Sulfur (S)	0.50	mg/L				<0.50	<0.50	0.55	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00032
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	0.00031	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00293	0.00256	0.00492	0.00089	0.00053	<0.00030	0.00155	<0.00030	<0.00030
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L	0.015			0.000017	0.000012	0.000016	0.000014	<0.000010	<0.000010	0.000013	0.00001	0.00001
Vanadium (V)	0.00050	mg/L		0.12		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0030	mg/L			0.03	0.0249	0.0089	0.0098	<0.0030	0.0036	<0.0030	0.0112	<0.0030	<0.0030
Zirconium (Zr)	0.00020	mg/L				0.00023	<0.00020	0.00024	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Metals														
Aluminum (Al)	0.0010	mg/L				0.231	0.162	0.243	0.0031	0.003	0.0013	0.0256	0.0199	0.00850
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L				0.00105	0.00119	0.00105	0.00066	0.00073	0.00053	0.00028	0.0003	0.00030
Barium (Ba)	0.00010	mg/L				0.00626	0.00874	0.00454	0.00211	0.00366	0.00193	0.00287	0.00	0.00256
Beryllium (Be)	0.000020	mg/L				<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L				<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L				0.0000348	0.0000164	0.0000228	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	0.050	mg/L				10.2	10.6	9.7	34.8	25.0	27.5	9.91	11.1	12.4
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	0.00062	0.00082	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L				0.00027	0.00040	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00020	mg/L				0.00092	0.00027	0.00057	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Iron (Fe)	0.010	mg/L				0.444	0.622	0.613	0.032	0.041	0.013	0.026	0.01	0.042000

					Waterbody	North Driftwood River - Unnamed Ponds								
					Location ID	NDR-P-01			NDR-P-02	NDR-P-02B		NDR-P-03		
					Date Sampled	29-May-2022	30-Aug-2022	13-Oct-2022	31-May-2022	31-Sep-2022	13-Oct-2022	02-Jun-2022	30-Aug-2022	13-Oct-2022
					Time Sampled	14:00	0:00	17:00	15:10	0:00	11:15	10:30	0:00	14:15
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**									
Lead (Pb)	0.000050	mg/L				0.000344	0.000305	0.000217	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	0.0050	mg/L				2.14	2.91	2.11	4.95	5.46	4.80	2.82	3.15	2.890
Manganese (Mn)	0.00010	mg/L				0.0723	0.1100	0.0202	0.00913	0.0053	0.0042	0.00104	0.00	0.001400
Molybdenum (Mo)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	0.00025	<0.000050	0.00006	<0.000050	<0.000050	<0.000050
Nickel (Ni)	0.00050	mg/L				0.00077	0.00059	0.00076	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.184	0.106	0.081	2.39	1.600	1.850	0.339	0.31	0.36300
Rubidium (Rb)	0.00020	mg/L				0.00030	0.00042	<0.00020	0.00164	0.00144	0.00148	0.00053	0.00056	0.000680
Selenium (Se)	0.000050	mg/L				0.000168	0.000176	0.000172	0.000051	<0.000050	<0.000050	0.00007	0.00	0.000060
Silicon (Si)	0.050	mg/L				0.173	1.610	0.817	0.545	1.180	0.785	0.324	0.282	0.407
Silver (Ag)	0.000010	mg/L				<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.556	0.420	0.600	0.361	0.324	0.416	0.506	0.526	0.5120
Strontium (Sr)	0.00020	mg/L		2.5		0.0194	0.0250	0.0168	0.0173	0.0280	0.0230	0.014	0.0188	0.0176
Sulfur (S)	0.50	mg/L				<0.50	<0.50	0.61	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00309	0.00217	0.00326	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L				0.000019	0.000012	0.000014	0.000014	<0.000010	<0.000010	0.00001	<0.000010	<0.000010
Vanadium (V)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0010	mg/L				0.0175	0.0094	0.0102	0.0025	0.0020	0.0022	<0.0010	0.0017	<0.0010
Zirconium (Zr)	0.00020	mg/L				0.00029	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Total Speciated Metals														
Methylmercury (as MeHg)	0.000020	ug/L				0.000172	0.000066	0.000057	0.000096	<0.000020	0.000020	0.000047	0.000022	0.000068

					Waterbody	North Driftwood River - Unnamed Ponds									
					Location ID	NDR-P-04			NDR-P-05		NDR-P-06		NDR-P-07		
					Date Sampled	30-May-2022	30-Aug-2022	13-Oct-2022	06-Jun-2022	17-Sep-2022	30-Aug-2022	16-Oct-2022	01-Jun-2022	30-Aug-2022	15-Oct-2022
					Time Sampled	10:50	0:00	10:30	00:00	10:30	14:35	12:00	10:00	13:00	15:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**										
Physical Tests															
Conductivity (EC)	1.0	uS/cm				122	118.0	165	46.9	61.2	46.2	28.3	27.6	40.1	31.3
Hardness (as CaCO3)	0.50	mg/L				68.2	66.7	85.6	35.4	40.40	19.80	19.60	20.6	8.70	21.90
pH	0.10	pH	6.5-9.0		6.5-8.5	7.65	7.40	7.92	6.88	7.1	6.81	5.77	6.15	6.55	5.63
Total Suspended Solids	3.0	mg/L				<3.0	38.4	<3	4.2	5.7	15.8	<3	<3.0	<3	<3
Total Dissolved Solids	10	mg/L				77	112	100	93	117.00	87.00	84.00	70	97.00	87.00

					Waterbody	North Driftwood River - Unnamed Ponds									
					Location ID	NDR-P-04			NDR-P-05		NDR-P-06		NDR-P-07		
					Date Sampled	30-May-2022	30-Aug-2022	13-Oct-2022	06-Jun-2022	17-Sep-2022	30-Aug-2022	16-Oct-2022	01-Jun-2022	30-Aug-2022	15-Oct-2022
					Time Sampled	10:50	0:00	10:30	00:00	10:30	14:35	12:00	10:00	13:00	15:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**										
Acidity (as CaCO3)	2.0	mg/L					3.2	3.9	2.5	4.50	4.70	9.30	5	4.40	10.00
Anions and Nutrients															
Alkalinity, Total (as CaCO3)	2.0	mg/L				72.8	60.0	87.3	20.8	27.5	19.8	4.6	6.6	8.7	4.4
Ammonia, Total (as N)	0.0050	mg/L				0.014	0.047	0.0108	0.0329	0.0295	0.048	0.0183	0.0095	0.0231	0.0182
Bromide (Br)	0.1000	mg/L				<0.10									
Chloride (Cl)	0.10	mg/L	120			0.51	4.24	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L				0.029	0.030	0.023	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	0.020	mg/L	13			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L				0.0130	0.0057	0.0042	0.0442	0.0351	0.1150	0.0742	0.0106	0.0093	0.0047
Sulfate (SO4)	0.30	mg/L				<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cyanides															
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	0.0024	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, SAD (Total)	0.0020	mg/L				<0.0020	<0.0020	<0.0020	0.0029	0.0023	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters															
Acidity (as CaCO3)	2.0	mg/L				4.3	3.2	3.9	2.5	4.50	4.70	9.30	5	4.40	10.00
Total Metals															
Aluminum (Al)	0.0030	mg/L	0.005 -0.1			0.0207	0.016	0.0374	0.315	0.212	0.118	0.166	0.0921	0.124	0.0965
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00033	0.00031	0.00027	0.00115	0.00133	0.00097	0.0007	0.00076	0.00111	0.00091
Barium (Ba)	0.00010	mg/L				0.00513	0.00777	0.00576	0.00642	0.01	0.0090	0.0039	0.00253	0.0045	0.0033
Beryllium (Be)	0.000020	mg/L			1.1	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00004 - 0.00021		0.0002	<0.0000050	<0.0000050	<0.0000050	0.000029	0.00	0.000018	0.000022	0.0000242	0.000018	0.000026
Calcium (Ca)	0.050	mg/L				19.0	22.2	25.6	9.92	11.4	8.4	5.49	4.94	8.23	5.72
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	<0.00050	0.00092	0.00084	<0.00050	0.00052	<0.00050	0.00086	<0.00050
Cobalt (Co)	0.00010	mg/L		0.0008 - 1.1859*		<0.00010	<0.00010	0.00011	0.00025	0.00048	0.00036	0.00018	<0.00010	0.00016	<0.00010
Copper (Cu)	0.00050	mg/L	0.002 - 0.00323		0.005	<0.00050	<0.00050	<0.00050	0.00191	0.00056	<0.00050	<0.00050	0.00066	<0.00050	<0.00050
Iron (Fe)	0.01	mg/L	0.3		0.30	0.09	0.09	0.16	0.54	0.8420	0.51	0.51	0.24	0.51	0.35
Lead (Pb)	0.000050	mg/L	0.001 - 0.005		0.0050	<0.000050	0.000195	<0.000050	0.000338	0.000193	0.000281	0.000367	0.000488	0.000356	0.000562
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	0.0050	mg/L				3.78	4.74	4.93	2.47	3.11	2.72	1.51	1.69	2.65	1.88
Manganese (Mn)	0.00010	mg/L	0.190 - 0.44			0.0109	0.0213	0.0620	0.0429	0.18	0.1140	0.0496	0.0248	0.0468	0.0290
Mercury (Hg)	0.00010	ng/L	26		200	0.00148	0.66000	0.73000	9.88	1.95	<0.50	2.6	0.6	0.93	4.14
Molybdenum (Mo)	0.000050	mg/L	0.073			<0.000050	<0.000050	<0.000050	0.000066	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	0.00050	mg/L	0.025 - 0.1261		0.025	<0.00050	<0.00050	<0.00050	0.00108	0.00082	0.00051	0.0005	0.00055	0.00063	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	0.0550	<0.050	<0.050	<0.050	<0.050

					Waterbody	North Driftwood River - Unnamed Ponds									
					Location ID	NDR-P-04			NDR-P-05		NDR-P-06		NDR-P-07		
					Date Sampled	30-May-2022	30-Aug-2022	13-Oct-2022	06-Jun-2022	17-Sep-2022	30-Aug-2022	16-Oct-2022	01-Jun-2022	30-Aug-2022	15-Oct-2022
					Time Sampled	10:50	0:00	10:30	00:00	10:30	14:35	12:00	10:00	13:00	15:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**										
Potassium (K)	0.050	mg/L				0.783	0.497000	0.784	0.262	0.162	0.221	<0.050	0.085	0.129	<0.050
Rubidium (Rb)	0.00020	mg/L				0.00085	0.00	0.00107	0.00062	0.00064	0.00079	<0.00020	0.00037	0.00039	<0.00020
Selenium (Se)	0.000050	mg/L	0.001		0.1	<0.000050	<0.000050	<0.000050	0.000196	0.000204	0.000132	0.000103	0.00012	0.000137	0.000118
Silicon (Si)	0.10	mg/L				1.06	1.30	2.06	0.34	2.55	2.10	0.81	0.38	1.61	1.15
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.606	0.525	0.569	0.926	0.6720	0.339	0.441	0.424	0.605	0.502
Strontium (Sr)	0.00020	mg/L				0.0215	0.0296	0.0321	0.0214	0.0292	0.0194	0.0102	0.00914	0.0155	0.00971
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.65	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000210	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00063	0.000580	0.00141	0.00755	0.00423	0.00274	0.00329	0.0016	0.00321	0.00113
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L	0.015			<0.000010	<0.000010	<0.000010	0.000025	0.000018	0.000021	0.000016	<0.000010	0.000012	<0.000010
Vanadium (V)	0.00050	mg/L		0.12		<0.00050	<0.00050	<0.00050	0.00072	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0030	mg/L			0.03	0.0071	0.003	<0.0030	0.0337	0.0086	0.0101	0.0094	0.0065	0.009	0.005
Zirconium (Zr)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	0.00038	0.00030	0.00029	<0.00020	<0.00020	0.00021	<0.00020
Dissolved Metals															
Aluminum (Al)	0.0010	mg/L				0.0129	0.0040	0.0040	0.215	0.147	0.0959	0.153	0.0902	0.086	0.0862
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L				0.00034	0.00028	0.00027	0.00119	0.00123	0.00092	0.00066	0.00081	0.00116	0.0009
Barium (Ba)	0.00010	mg/L				0.00521	0.00709	0.00556	0.00483	0.0076	0.0070	0.0039	0.00332	0.0036	0.0033
Beryllium (Be)	0.000020	mg/L				<0.00010	<0.000020	<0.000020	<0.000020	<0.000200	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000500	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L				<0.010	<0.010	<0.010	<0.010	<0.100	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L				<0.0000050	<0.0000050	<0.0000050	0.0000227	<0.0000500	0.000012	0.000021	0.000023	0.000012	0.000022
Calcium (Ca)	0.050	mg/L				21.1	22.1	26.3	10.4	12	8.25	5.52	5.25	7.72	5.81
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000100	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	<0.00050	0.00062	<0.00500	0.00056	<0.00050	<0.00050	0.00051	<0.00050
Cobalt (Co)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	0.00014	<0.00100	<0.00010	0.00	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00020	mg/L				0.00025	<0.00020	<0.00020	0.00127	<0.00200	0.00035	0.00027	0.00105	0.00024	0.00037
Iron (Fe)	0.010	mg/L				0.081	0.050	0.048	0.396	0.50	0.32	0.45	0.222	0.37	0.33
Lead (Pb)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	0.000159	<0.000500	0.000097	0.000333	0.000445	0.000146	0.000536
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0100	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	0.0050	mg/L				3.73	4.69	4.84	2.28	2.54	2.6	1.42	1.82	2.54	1.8
Manganese (Mn)	0.00010	mg/L				0.0157	0.0149	0.0409	0.0287	0.08	0.0168	0.0469	0.0238	0.0131	0.0294
Molybdenum (Mo)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000500	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	0.00076	<0.00500	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.500	<0.050	<0.050	<0.050	<0.050	<0.050

					Waterbody	North Driftwood River - Unnamed Ponds									
					Location ID	NDR-P-04			NDR-P-05		NDR-P-06		NDR-P-07		
					Date Sampled	30-May-2022	30-Aug-2022	13-Oct-2022	06-Jun-2022	17-Sep-2022	30-Aug-2022	16-Oct-2022	01-Jun-2022	30-Aug-2022	15-Oct-2022
					Time Sampled	10:50	0:00	10:30	00:00	10:30	14:35	12:00	10:00	13:00	15:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**										
Potassium (K)	0.050	mg/L				0.734	0.504	0.735	0.11	<0.500	0.219	<0.050	0.148	0.052	<0.050
Rubidium (Rb)	0.00020	mg/L				0.00076	0.00072	0.00108	0.0003	<0.00200	0.00067	<0.00020	0.00036	0.00022	<0.00020
Selenium (Se)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	0.000213	<0.000500	0.00015	0.00013	0.000164	0.00017	0.00015
Silicon (Si)	0.050	mg/L				1.08	1.28	1.91	0.066	2.03	2.04	0.749	0.447	1.53	1.07
Silver (Ag)	0.000010	mg/L				<0.000050	<0.000010	<0.000010	<0.000010	<0.000100	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.571	0.520	0.555	0.716	<0.500	0.352	0.427	0.825	0.501	0.502
Strontium (Sr)	0.00020	mg/L		2.5		0.0219	0.0309	0.0318	0.0214	0.03	0.01860	0.01030	0.00964	0.01500	0.00974
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<5.00	0.67	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00200	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000100	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00036	<0.00030	<0.00030	0.00268	<0.00300	0.001930	0.002760	0.00144	0.001380	0.000890
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	0.00002	<0.000100	0.000018	0.000013	0.000014	<0.000010	<0.000010
Vanadium (V)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00500	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0010	mg/L				0.0039	0.0021	<0.0010	0.0123	<0.0100	0.018	0.010	0.0107	0.009	0.006
Zirconium (Zr)	0.00020	mg/L				<0.00020	<0.00030	<0.00030	0.0004	<0.00300	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Total Speciated Metals															
Methylmercury (as MeHg)	0.000020	ug/L				0.000054	<0.000020	0.000413	0.000112	0.000045	0.000052	0.00006	0.000237	0.000142	0.000184

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

Table A2-2c: Surface Water Laboratory Results – NDR Unnamed Streams and Tributaries (2022)

					Sample Location	North Driftwood River - Unnamed Streams											
					Location ID	NDR-S-01			NDR-S-02			NDR-S-04			NDR-S-05		NDR-S-06
					Date Sampled	29-May-2022	18-Sep-2022	23-Oct-2022	07-Jun-2022	30-Aug-2022	17-Oct-2022	30-May-2022	30-Aug-2022	13-Oct-2022	01-Jun-2022	30-Aug-2022	01-Jun-2022
					Time Sampled	13:15	13:30	11:45	00:00	13:00	13:15	11:45	0:00	17:00	11:00	14:25	12:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**												
Physical Tests																	
Conductivity (EC)	1.0	uS/cm				38.5	56.5	41.7	72.5	116	86	74.6	118.0	88.4	27.1	152.0	26.8
Hardness (as CaCO3)	0.50	mg/L				28.7	36.7	31.4	42.6	61.60	51.00	40.4	66.7	48.4	18.2	87.9	18.6
pH	0.10	pH	6.5-9.0		6.5-8.5	6.40	7.08	6.50	7.13	7.6	7.38	7.05	7.40	7.33	6.41	7.55	6.45
Total Suspended Solids	3.0	mg/L				<3.0	<3	<3	9.2	10.8	3.4	9.6	38.4	<3	8	<3	<3.0
Total Dissolved Solids	10	mg/L				79	101	104	93	108.00	137.00	105	112	125	45	111	44
Acidity (as CaCO3)	2.0	mg/L					4.6	3.9	<2.0	6.30	<2		3.2	5.0	5.3	3.0	4.7
Anions and Nutrients																	
Alkalinity, Total (as CaCO3)	2.0	mg/L				11.7	25.0	11.2	30.9	52.2	35.5	28.4	60.0	33.8	7.2	87.7	7.1
Ammonia, Total (as N)	0.0050	mg/L				0.015	0.024	0.031	0.0216	0.0289	0.0415	0.019	0.047	0.032	0.0053	0.0171	<0.0050
Bromide (Br)	0.1000	mg/L				<0.10						<0.10					
Chloride (Cl)	0.10	mg/L	120			<0.50	<0.50	<0.50	3.17	3.37	2.98	4.55	4.24	5.82	<0.50	<0.50	<0.50
Fluoride (F)	0.020	mg/L				<0.020	<0.020	<0.020	0.02	0.024	<0.020	0.021	0.030	<0.020	<0.020	0.033	<0.020
Nitrate (as N)	0.020	mg/L	13			0.034	0.047	0.026	<0.020	<0.020	0.02	0.248	<0.020	0.022	<0.020	0.029	<0.020
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L				0.0117	0.0195	0.0119	0.0158	0.0146	0.0129	0.0124	0.0057	0.0118	0.0215	0.0069	0.016
Sulfate (SO4)	0.30	mg/L				<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cyanides																	
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, SAD (Total)	0.0020	mg/L				<0.0020	<0.0020	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters																	
Acidity (as CaCO3)	2.0	mg/L				10.5	4.6	3.9	<2.0	6.30	<2	6.5	3.2	5.0	5.3	3.0	4.7
Total Metals																	
Aluminum (Al)	0.0030	mg/L	0.005 -0.1			0.237	0.190	0.258	0.241	0.4400	0.2820	0.326	0.695	0.181	0.161	0.041	0.105
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00085	0.00102	0.00105	0.00094	0.00109	0.00105	0.00086	0.00150	0.00098	0.00066	0.00075	0.00062
Barium (Ba)	0.00010	mg/L				0.00464	0.00503	0.00523	0.00615	0.0085	0.0077	0.00711	0.01190	0.00622	0.00413	0.01230	0.00276
Beryllium (Be)	0.000020	mg/L			1.1	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.00010	0.000039	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00004 - 0.00021		0.0002	0.0000236	0.0000175	0.0000241	0.0000193	0.000019	0.000020	0.0000219	0.0000224	<0.0000200	0.0000209	0.0000063	0.0000158
Calcium (Ca)	0.050	mg/L				8.10	10.40	9.68	12.4	18	14.8	10.5	19.5	13.8	4.86	24.9	4.8
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	0.000045	0.000014	0.000018	0.000072	<0.000010	0.000015	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				0.00066	0.00076	0.00070	0.00076	0.00124	0.00083	0.00088	0.00203	0.00069	<0.00050	<0.00050	<0.00050

Sample Location						North Driftwood River - Unnamed Streams											
Location ID						NDR-S-01			NDR-S-02			NDR-S-04			NDR-S-05		NDR-S-06
Date Sampled						29-May-2022	18-Sep-2022	23-Oct-2022	07-Jun-2022	30-Aug-2022	17-Oct-2022	30-May-2022	30-Aug-2022	13-Oct-2022	01-Jun-2022	30-Aug-2022	01-Jun-2022
Time Sampled						13:15	13:30	11:45	00:00	13:00	13:15	11:45	0:00	17:00	11:00	14:25	12:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**												
Cobalt (Co)	0.00010	mg/L		0.0008 - 1.1859 *		<0.00010	0.00018	<0.00010	0.00021	0.0005	0.0002	0.00019	0.00064	<0.00010	0.00016	0.00025	0.00011
Copper (Cu)	0.00050	mg/L	0.002 - 0.00323		0.005	0.00152	0.00072	0.00140	0.00108	0.00077	0.00092	0.00122	0.00148	0.00095	0.00078	0.00062	<0.00050
Iron (Fe)	0.01	mg/L	0.3		0.30	0.33	0.63	0.55	0.57	0.91	0.78	0.51	1.38	0.54	0.30	0.31	0.28
Lead (Pb)	0.000050	mg/L	0.001 - 0.005		0.0050	0.000163	0.000223	0.000200	0.000203	0.000402	0.000265	0.000196	0.000556	0.000151	0.000459	0.000116	0.000263
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	0.0011	<0.0010
Magnesium (Mg)	0.0050	mg/L				1.89	2.93	2.16	3.2	4.57	3.52	2.97	5.14	3.60	1.52	6.66	1.56
Manganese (Mn)	0.00010	mg/L	0.190 - 0.44			0.0152	0.0293	0.0113	0.0675	0.14	0.08	0.0555	0.2350	0.0349	0.03	0.0784	0.0262
Mercury (Hg)	0.00010	ng/L	26		200	0.00648	2.86000	5.33000	7.48	1.59	1.84	0.00446	2.16000	5.06000	<0.50	<0.50	0.73
Molybdenum (Mo)	0.000050	mg/L	0.073			<0.000050	<0.000050	<0.000050	0.000065	0.000076	0.000064	<0.000050	0.000087	0.000062	<0.000050	<0.000050	<0.000050
Nickel (Ni)	0.00050	mg/L	0.025 - 0.1261		0.025	0.00088	0.00092	0.00081	0.00081	0.00103	0.0008	0.00094	0.00161	0.00072	0.00057	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.052	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.057	0.215	0.097	0.185	0.402	0.271	0.205	0.454	0.210	0.153	0.272	0.08
Rubidium (Rb)	0.00020	mg/L				0.00026	0.00107	0.00040	0.00055	0.001670	0.000840	0.00081	0.00217	0.00064	0.0006	0.00072	0.00034
Selenium (Se)	0.000050	mg/L	0.001		0.1	0.000160	0.000186	0.000193	0.000153	0.000134	0.000151	0.000152	0.000139	0.000166	0.000114	0.000071	0.00009
Silicon (Si)	0.10	mg/L				0.24	2.30	1.63	0.66	2.60	1.97	0.84	3.39	1.78	0.36	1.37	0.16
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.570	0.616	0.629	2.83	3.11	2.73	3.46	3.88	4.29	0.697	0.57	0.279
Strontium (Sr)	0.00020	mg/L				0.0150	0.0227	0.0170	0.024	0.0325	0.0259	0.0206	0.0352	0.0238	0.00932	0.0513	0.00938
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00022	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00364	0.00381	0.00442	0.00674	0.0174	0.00799	0.0103	0.0289	0.0034	0.00496	<0.00300	0.00221
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L	0.015			0.000024	0.000018	0.000027	0.000037	0.000043	0.000039	0.000039	0.000061	0.000034	0.00002	0.000016	0.000013
Vanadium (V)	0.00050	mg/L		0.12		0.00053	<0.00050	0.00055	0.00068	0.00115	0.00071	0.00080	0.00178	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0030	mg/L			0.03	0.0083	0.0090	0.0078	0.0065	0.0072	0.0064	0.0065	0.0073	0.0055	0.0114	0.0136	0.0058
Zirconium (Zr)	0.00020	mg/L				0.00035	0.00031	0.00034	0.00034	0.00045	0.00033	0.00043	0.00073	0.00027	<0.00020	<0.00020	<0.00020
Dissolved Metals																	
Aluminum (Al)	0.0010	mg/L				0.240	0.181	0.229	0.167	0.0752	0.171	0.175	0.103	0.243	0.103	0.0115	0.105
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L				0.00089	0.00103	0.00096	0.00096	0.0011	0.00091	0.00090	0.00140	0.00096	0.00067	0.00069	0.00059
Barium (Ba)	0.00010	mg/L				0.00459	0.00507	0.00482	0.00639	0.00626	0.00640	0.00582	0.00684	0.00641	0.00288	0.01100	0.00241
Beryllium (Be)	0.000020	mg/L				<0.00010	<0.000200	<0.000020	<0.000020	<0.000020	<0.000020	<0.00010	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000500	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L				<0.010	<0.100	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Sample Location						North Driftwood River - Unnamed Streams											
Location ID						NDR-S-01			NDR-S-02			NDR-S-04			NDR-S-05		NDR-S-06
Date Sampled						29-May-2022	18-Sep-2022	23-Oct-2022	07-Jun-2022	30-Aug-2022	17-Oct-2022	30-May-2022	30-Aug-2022	13-Oct-2022	01-Jun-2022	30-Aug-2022	01-Jun-2022
Time Sampled						13:15	13:30	11:45	00:00	13:00	13:15	11:45	0:00	17:00	11:00	14:25	12:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**												
Cadmium (Cd)	0.0000050	mg/L				0.0000288	<0.0000500	0.0000279	0.0000234	0.000009	0.000016	0.0000237	0.0000083	0.0000159	0.0000179	<0.0000050	0.0000152
Calcium (Ca)	0.050	mg/L				8.32	10.70	9.06	12.4	17.5	14.3	11.4	19.0	13.9	4.73	24.4	4.86
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000100	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				0.00058	<0.00500	0.00066	0.00056	<0.00050	0.00058	0.00051	0.00064	0.00069	<0.00050	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L				0.00010	<0.00100	<0.00010	0.00016	0.00017	0.00014	0.00011	0.00017	0.00013	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00020	mg/L				0.00150	<0.00200	0.00128	0.00106	0.00048	0.00078	0.00108	0.00072	0.00084	0.00049	<0.00020	0.00038
Iron (Fe)	0.010	mg/L				0.325	0.513	0.500	0.433	0.42	0.59	0.330	0.555	0.592	0.238	0.115	0.259
Lead (Pb)	0.000050	mg/L				0.000160	<0.000500	0.000162	0.000175	0.000123	0.000152	0.000113	0.000164	0.000191	0.000315	0.000051	0.000238
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0100	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010
Magnesium (Mg)	0.0050	mg/L				1.91	2.43	2.13	2.84	4.35	3.71	2.89	4.67	3.32	1.56	6.56	1.56
Manganese (Mn)	0.00010	mg/L				0.0163	0.0278	0.0100	0.0651	0.10	0.06	0.0478	0.1280	0.0401	0.0229	0.0151	0.024
Molybdenum (Mo)	0.000050	mg/L				<0.000050	<0.000500	<0.000050	0.000055	0.00006	<0.000050	<0.000050	0.000072	0.000052	<0.000050	<0.000050	<0.000050
Nickel (Ni)	0.00050	mg/L				0.00076	<0.00500	0.00078	0.00065	0.00056	0.00063	0.00061	0.00068	0.00070	<0.00050	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.500	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				<0.050	<0.500	0.078	0.151	0.34	0.23	0.160	0.308	0.222	0.124	0.205	0.084
Rubidium (Rb)	0.00020	mg/L				0.00020	<0.00200	0.00038	0.00053	0.00114	0.00062	0.00045	0.00107	0.00085	0.00046	0.00056	0.00034
Selenium (Se)	0.000050	mg/L				0.000184	<0.000500	0.000176	0.000175	0.000150	0.000151	0.000167	0.000178	0.000156	0.000132	0.000066	0.000126
Silicon (Si)	0.050	mg/L				0.197	2.100	1.540	0.48	1.88	1.71	0.441	2.410	1.810	0.162	1.320	0.124
Silver (Ag)	0.000010	mg/L				<0.000050	<0.000100	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.629	<0.500	0.587	2.7	3.07	2.73	3.80	3.77	3.98	0.35	0.58	0.323
Strontium (Sr)	0.00020	mg/L		2.5		0.0166	0.0200	0.0164	0.0226	0.0318	0.0260	0.0217	0.0350	0.0241	0.0083	0.0507	0.00916
Sulfur (S)	0.50	mg/L				<0.50	<5.00	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00200	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000100	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00331	<0.00300	0.00307	0.00363	0.002480	0.003000	0.00314	0.00372	0.00679	0.00202	0.00030	0.00178
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L				0.000025	<0.000100	0.000023	0.000039	0.000031	0.000033	0.000034	0.000041	0.000035	0.000012	0.000013	0.000013
Vanadium (V)	0.00050	mg/L				<0.00050	<0.00500	<0.00050	0.00053	<0.00050	<0.00050	<0.00050	0.00062	0.00054	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0010	mg/L				0.0080	0.0111	0.0074	0.0086	0.004300	0.005400	0.0059	0.0035	0.0052	0.0105	0.0148	0.0061
Zirconium (Zr)	0.00020	mg/L				0.00041	<0.00300	0.00037	0.00037	0.00031	<0.00030	0.00033	0.00043	0.00042	<0.00030	<0.00030	<0.00030
Total Speciated Metals																	
Methylmercury (as MeHg)	0.000020	ug/L				0.000233	0.000150	0.000173	0.000283	0.000128	0.000167	0.000217	0.000062	0.000114	0.00011	0.000035	0.000102

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life. Gray shaded values indicate concentrations that exceed the CCME CWQG.

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.* Blue shaded values indicate concentrations that exceed the FEQG.

PWQO; Provincial Water Quality Objectives. Dark blue shaded values indicate concentrations that exceed the PWQO.

					Sample Location	North Driftwood River - Unnamed Tributaries				
					Location ID	NDR-TRIB-01			NDR-TRIB-02	
					Date Sampled	07-Jun-2022	31-Aug-2021	18-Oct-2022	07-Jun-2022	16-Oct-2022
					Time Sampled	00:00	0:00	12:15	00:00	16:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**					
Physical Tests										
Conductivity (EC)	1.0	uS/cm				85.2	123	110	30	29.9
Hardness (as CaCO3)	0.50	mg/L				49	68.30	56.20	22.3	21.90
pH	0.10	pH	6.5-9.0		6.5-8.5	7.32	7.37	7.56	6.42	6.31
Total Suspended Solids	3.0	mg/L				6.6	<3	3.9	4.6	<3
Total Dissolved Solids	10	mg/L				74	59.00	107.00	62	76.00
Acidity (as CaCO3)	2.0	mg/L				<2.0	<2	<2	3.3	8.00
Anions and Nutrients										
Alkalinity, Total (as CaCO3)	2.0	mg/L				45.3	60.8	47.3	8.5	7.5
Ammonia, Total (as N)	0.0050	mg/L				0.0116	0.0167	0.0608	0.015	0.016
Bromide (Br)	0.1000	mg/L								
Chloride (Cl)	0.10	mg/L	120			<0.50	<0.50	4.92	<0.50	<0.50
Fluoride (F)	0.020	mg/L				0.024	0.032	0.021	<0.020	<0.020
Nitrate (as N)	0.020	mg/L	13			<0.020	0.03	0.02	<0.020	0.06
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L				0.0155	0.0144	0.0110	0.0133	0.01
Sulfate (SO4)	0.30	mg/L				<0.30	1.18	<0.30	<0.30	<0.30
Cyanides										
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, SAD (Total)	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters										
Acidity (as CaCO3)	2.0	mg/L				<2.0	<2	<2	3.3	8.00
Total Metals										
Aluminum (Al)	0.0030	mg/L	0.005 -0.1			0.0724	0.0336	0.202	0.202	0.127
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00057	0.00064	0.0009	0.00084	0.00062
Barium (Ba)	0.00010	mg/L				0.00607	0.01	0.01	0.00664	0.00
Beryllium (Be)	0.000020	mg/L			1.1	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00004 - 0.00021		0.0002	0.0000084	<0.0000050	0.000015	0.0000354	0.000016
Calcium (Ca)	0.050	mg/L				13.4	18.3	17.3	6.02	5.7
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	0.000011	0.000013	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	0.00064	0.00059	<0.00050
Cobalt (Co)	0.00010	mg/L		0.0008 - 1.1859*		<0.00010	0.00019	0.00015	0.00051	<0.00010
Copper (Cu)	0.00050	mg/L	0.002 - 0.00323		0.005	0.00058	<0.00050	0.00082	0.00067	<0.00050
Iron (Fe)	0.01	mg/L	0.3		0.30	0.25	0.38	0.59	0.64	0.42
Lead (Pb)	0.000050	mg/L	0.001 - 0.005		0.0050	0.000065	0.000061	0.000204	0.000656	0.000238
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

					Sample Location	North Driftwood River - Unnamed Tributaries				
					Location ID	NDR-TRIB-01			NDR-TRIB-02	
					Date Sampled	07-Jun-2022	31-Aug-2021	18-Oct-2022	07-Jun-2022	16-Oct-2022
					Time Sampled	00:00	0:00	12:15	00:00	16:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**					
Magnesium (Mg)	0.0050	mg/L				3.7	5.21	4.09	1.75	1.66
Manganese (Mn)	0.00010	mg/L	0.190 - 0.44			0.0447	0.15	0.05	0.121	0.01
Mercury (Hg)	0.00010	ng/L	26		200	5.22	0.84	2.12	4.98	3.23
Molybdenum (Mo)	0.000050	mg/L	0.073			0.000055	0.000050	0.000068	<0.000050	<0.000050
Nickel (Ni)	0.00050	mg/L	0.025 - 0.1261		0.025	<0.00050	<0.00050	0.00058	0.00063	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	0.055	<0.050
Potassium (K)	0.050	mg/L				0.32	0.365	0.352	0.23	0.285
Rubidium (Rb)	0.00020	mg/L				0.00068	0.000950	0.000790	0.00087	0.00106
Selenium (Se)	0.000050	mg/L	0.001		0.1	0.000078	0.000096	0.000145	0.000131	0.0001
Silicon (Si)	0.10	mg/L				0.77	1.00	2.03	0.62	1.15
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.982	1.26	3.82	0.495	0.44
Strontium (Sr)	0.00020	mg/L				0.0239	0.0333	0.0303	0.0128	0.011
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00202	0.00098	0.00579	0.00579	0.00342
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L	0.015			0.00003	0.000021	0.00006	0.00002	0.000016
Vanadium (V)	0.00050	mg/L		0.12		<0.00050	<0.00050	0.00054	0.00054	<0.00050
Zinc (Zn)	0.0030	mg/L			0.03	0.0032	0.0051	0.0055	0.0112	0.0057
Zirconium (Zr)	0.00020	mg/L				<0.00020	<0.00020	0.00025	0.0002	<0.00020
Dissolved Metals										
Aluminum (Al)	0.0010	mg/L				0.0514	0.0177	0.124	0.163	0.128
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L				0.00054	0.00062	0.00081	0.00086	0.0006
Barium (Ba)	0.00010	mg/L				0.0061	0.0072	0.00734	0.00403	0.003630
Beryllium (Be)	0.000020	mg/L				<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L				<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L				0.0000088	<0.0000050	0.00001	0.0000336	0.000018
Calcium (Ca)	0.050	mg/L				14.2	18.7	15.6	6.16	5.9
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L				<0.00010	0.00012	0.00011	0.00016	<0.00010
Copper (Cu)	0.00020	mg/L				0.0005	0.00026	0.00065	0.00059	0.00048
Iron (Fe)	0.010	mg/L				0.198	0.27	0.46	0.472	0.44
Lead (Pb)	0.000050	mg/L				<0.000050	0.000055	0.000131	0.000363	0.000229
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

					Sample Location	North Driftwood River - Unnamed Tributaries				
					Location ID	NDR-TRIB-01			NDR-TRIB-02	
					Date Sampled	07-Jun-2022	31-Aug-2021	18-Oct-2022	07-Jun-2022	16-Oct-2022
					Time Sampled	00:00	0:00	12:15	00:00	16:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**					
Magnesium (Mg)	0.0050	mg/L				3.29	5.25	4.18	1.69	1.74
Manganese (Mn)	0.00010	mg/L				0.0314	0.08	0.04	0.0392	0.01
Molybdenum (Mo)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)	0.00050	mg/L				<0.00050	<0.00050	0.00052	0.00052	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.295	0.37	0.31	0.05	0.28
Rubidium (Rb)	0.00020	mg/L				0.00067	0.00094	0.00068	0.00022	0.00109
Selenium (Se)	0.000050	mg/L				0.000102	0.000107	0.000156	0.000153	0.000126
Silicon (Si)	0.050	mg/L				0.642	0.99	1.78	0.49	1.13
Silver (Ag)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.923	1.28	3.91	0.482	0.463
Strontium (Sr)	0.00020	mg/L		2.5		0.0242	0.0344	0.0294	0.0131	0.0112
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.0012	0.000450	0.002170	0.00425	0.00345
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L				0.000031	0.000019	0.000053	0.000018	0.000016
Vanadium (V)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0010	mg/L				0.0038	0.0066	0.0052	0.0097	0.00760
Zirconium (Zr)	0.00020	mg/L				<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Total Speciated Metals										
Methylmercury (as MeHg)	0.000020	ug/L				0.000124	0.000166	0.000142	0.000089	0.000141

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

Table A2-2d: Surface Water Laboratory Results – West Buskegau River (2022)

					Waterbody	West Buskegau River												
					Location ID	WBR-P-01	WBR-P-03		WBR-P-04		WBR-S-01	WBR-S-02	WBR-S-03		WBR-S-04		WBR-S-05
					Date Sampled	06-Jun-2022	18-Sep-2022	24-Oct-2022	18-Sep-2022	24-Oct-2022	30-Aug-2022	06-Jun-2022	06-Jun-2022	1-Sep-2022	06-Jun-2022	30-Aug-2022	18-Sep-2022
					Time Sampled	00:00	16:00	15:00	13:30	11:15	0:00	00:00	00:00	0:00	00:00	0:00	17:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**													
Physical Tests																		
Conductivity (EC)	1.0	uS/cm				44.1	37.70	32.30	35.9	31	53.7	40.9	44.3	58.5	40.4	58.8	35.2
Hardness (as CaCO3)	0.50	mg/L				31.8	23.4	22.3	22.1	17.6	37.50	29.5	31.2	41.00	28.4	40.20	20.90
pH	0.10	pH	6.5-9.0		6.5-8.5	6.97	7.03	5.67	6.94	5.05	6.93	6.89	6.98	7.13	6.91	7.04	6.85
Total Suspended Solids	3.0	mg/L				4.2	4.5	<5	3.7	<3	6.1	<3.0	6	8.8	7.6	11.8	<3
Total Dissolved Solids	10	mg/L				83	58	106	47	99	103.00	85	84	105.00	72	111.00	57.00
Acidity (as CaCO3)	2.0	mg/L				2.3	2.8	7.5	3.3	10	3.40	2.4	2.3	3.00	2.3	3.10	4.50
Anions and Nutrients																		
Alkalinity, Total (as CaCO3)	2.0	mg/L				20.8	13.400	4.600	11.700	1.000	22	17.6	20.8	25	17.1	25.3	10.8
Ammonia, Total (as N)	0.0050	mg/L				0.0129	0.0167	0.0267	0.0164	0.0236	0.0328	0.0159	0.0136	0.0315	0.0153	0.0263	0.0897
Bromide (Br)	0.1000	mg/L															
Chloride (Cl)	0.10	mg/L	120			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<.50	<0.50
Fluoride (F)	0.020	mg/L				<0.020	0.02	<0.020	0.020	<0.020	0.021	<0.020	<0.020	0.023	<0.020	0.023	<0.020
Nitrate (as N)	0.020	mg/L	13			<0.020	<0.020	<0.020	<0.020	<0.020	0.0780	0.022	0.027	0.0590	0.02	0.177	0.033
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L				0.0232	0.0218	0.0088	0.0250	0.0060	0.0356	0.028	0.0449	0.0395	0.0326	0.0053	0.0271
Sulfate (SO4)	0.30	mg/L				<0.30	<0.30	<0.30	<0.30	<0.30	0.66	<0.30	<0.30	0.6	<0.30	0.98	<0.30
Cyanides																		
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, SAD (Total)	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	0.0023	0.0021	<0.0020	0.0022	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0021	<0.0020
Inorganic Parameters																		
Acidity (as CaCO3)	2.0	mg/L				2.3	2.8	7.5	3.3	10.0	3.40	2.4	2.3	3.00	2.3	3.10	4.50
Total Metals																		
Aluminum (Al)	0.0030	mg/L	0.005 -0.1			0.298	0.188	0.225	0.274	0.149	0.7110	0.769	0.775	0.8080	0.738	0.8840	0.1400
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00091	0.00076	0.00092	0.00089	0.00080	0.001590	0.00117	0.00118	0.0016	0.00111	0.0016	0.0007
Barium (Ba)	0.00010	mg/L				0.00618	0.0039	0.00491	0.00572	0.00306	0.009470	0.00868	0.00921	0.0104	0.0086	0.0108	0.0037
Beryllium (Be)	0.000020	mg/L			1.1	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000031	0.000035	0.000033	0.0000	0.000033	0.000046	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00004 - 0.00021		0.0002	0.0000242	0.000011	0.000035	0.000011	0.000034	0.000044	0.0000463	0.00005	0.0000	0.0000375	0.000041	0.000014
Calcium (Ca)	0.050	mg/L				8.29	6.62	6.53	6.51	5.170000	11.200000	8.4	9.08	11.60	8.14	11.7000	5.7700
Cesium (Cs)	0.000010	mg/L				0.000014	0.00001	<0.000010	0.00003	<0.000010	0.000054	0.000066	0.000065	0.0001	0.000065	0.0001	<0.000010
Chromium (Cr)	0.00010	mg/L				0.00074	0.00078	0.00061	0.00086	<0.00050	0.001900	0.00182	0.00184	0.0022	0.00169	0.0024	0.0007
Cobalt (Co)	0.00010	mg/L		0.0008 - 1.1859*		0.00029	0.00023	0.00017	0.00024	0.00021	0.000370	0.0004	0.00042	0.0005	0.00047	0.0005	0.0005
Copper (Cu)	0.00050	mg/L	0.002 - 0.00323		0.005	0.00083	<0.00050	0.001	0.00054	<0.00050	0.002390	0.00275	0.00245	0.0024	0.00206	0.0024	0.0006

					Waterbody	West Buskegau River											
					Location ID	WBR-P-01	WBR-P-03		WBR-P-04		WBR-S-01	WBR-S-02	WBR-S-03		WBR-S-04		WBR-S-05
					Date Sampled	06-Jun-2022	18-Sep-2022	24-Oct-2022	18-Sep-2022	24-Oct-2022	30-Aug-2022	06-Jun-2022	06-Jun-2022	1-Sep-2022	06-Jun-2022	30-Aug-2022	18-Sep-2022
					Time Sampled	00:00	16:00	15:00	13:30	11:15	0:00	00:00	00:00	0:00	00:00	0:00	17:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**												
Iron (Fe)	0.01	mg/L	0.3		0.30	0.70	0.60	0.68	0.61	0.55	1.26	1.08	1.10	1.48	1.09	1.56	0.74
Lead (Pb)	0.000050	mg/L	0.001 - 0.005		0.0050	0.000291	0.000242	0.000445	0.000247	0.000474	0.000537	0.000508	0.000523	0.000547	0.000546	0.0006	0.0003
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001200	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010
Magnesium (Mg)	0.0050	mg/L				2.5	1.980	1.640	2.0000	1.340	2.980000	2.03	2.45	2.99	2.16	3.1300	1.7600
Manganese (Mn)	0.00010	mg/L	0.190 - 0.44			0.0593	0.03130	0.05270	0.03010	0.06320	0.050700	0.0473	0.0537	0.0639	0.0804	0.0841	0.0967
Mercury (Hg)	0.00010	ng/L	26		200	4.82	1.540000	3.520000	1.240000	2.230000		8.66	8.8	5.26	7.9	4.2100	1.3700
Molybdenum (Mo)	0.000050	mg/L	0.073			0.00006	<0.000050	<0.000050	<0.000050	<0.000050	0.000060	0.000055	<0.000050	0.0001	0.000057	0.0001	<0.000050
Nickel (Ni)	0.00050	mg/L	0.025 - 0.1261		0.025	0.00081	0.0007	0.0006	0.00075	<0.00050	0.001640	0.00152	0.00155	0.0018	0.00145	0.0019	0.0006
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.07	0.07800	0.07600	0.16900	0.05200	0.359000	0.282	0.281	0.4190	0.301	0.4360	0.1780
Rubidium (Rb)	0.00020	mg/L				0.00053	0.000540	0.000380	0.000910	<0.00020	0.001890	0.00151	0.00148	0.0022	0.00138	0.0022	0.0010
Selenium (Se)	0.000050	mg/L	0.001		0.1	0.00012	0.000112	0.000153	0.00011	0.0001	0.000210	0.000164	0.000174	0.0002	0.000156	0.0002	0.0001
Silicon (Si)	0.10	mg/L				0.69	1.87	1.27	1.53	1.22	3.330000	1.83	1.87	3.53	1.66	3.7800	2.0400
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.463	0.3500	0.4030	0.2980	0.3440	1.100000	0.789	0.84	1.08	0.788	1.0700	0.3560
Strontium (Sr)	0.00020	mg/L				0.0162	0.0135	0.0118	0.0157	0.00951	0.029300	0.0189	0.0204	0.0263	0.0183	0.0287	0.0122
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<0.50	0.770000	<0.50	<0.50	<0.50	<0.50	0.6300	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.0000	<0.000010	0.000011	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.000140	0.00017	0.00015	0.0002	0.00014	0.0002	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00834	0.00516	0.00469	0.00964	0.00277	0.024800	0.0267	0.0277	0.0298	0.0262	0.0328	0.0034
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L	0.015			0.000043	0.00002	0.00002	0.00002	<0.000010	0.000074	0.000065	0.000064	0.0001	0.000055	0.0001	<0.000010
Vanadium (V)	0.00050	mg/L		0.12		0.00087	<0.00050	0.0005	0.0006	<0.00050	0.001610	0.00178	0.00178	0.0020	0.00166	0.0020	<0.00050
Zinc (Zn)	0.0030	mg/L			0.03	0.0057	0.0045	0.0088	0.00590	0.00840	0.008500	0.0078	0.0081	0.0081	0.0136	0.0084	0.0066
Zirconium (Zr)	0.00020	mg/L				0.00032	0.0002	0.00021	0.00032	<0.00020	0.000780	0.00079	0.00078	0.0009	0.00065	0.0008	<0.00020
Dissolved Metals																	
Aluminum (Al)	0.0010	mg/L				0.204	0.124	0.20800	0.0900	0.141	0.342000	0.297	0.321	0.331	0.235	0.325	0.109
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00100	<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00100
Arsenic (As)	0.00010	mg/L				0.001	<0.00100	0.00084	<0.00100	0.00078	0.001530	0.00121	0.00122	0.00150	0.00106	0.00152	<0.00100
Barium (Ba)	0.00010	mg/L				0.00575	0.00326	0.00456	0.00403	0.00337	0.007540	0.00669	0.00642	0.007320	0.00529	0.0073	0.0034
Beryllium (Be)	0.000020	mg/L				0.00002	<0.000200	<0.000020	<0.000200	<0.000020	0.000029	0.000026	0.000024	0.000026	<0.000020	0.000024	<0.000200
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000500	<0.000050	<0.000500	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000500
Boron (B)	0.010	mg/L				<0.010	<0.100	<0.010	<0.100	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.100
Cadmium (Cd)	0.0000050	mg/L				0.0000178	<0.0000500	0.00003	<0.0000500	0.00003	0.000037	0.0000534	0.0000345	0.000030	0.0000314	0.000032	<0.0000500
Calcium (Ca)	0.050	mg/L				8.86	6.51	6.24	6.04	4.86	10.500000	8.71	9.13	11.8	8.28	11.3	5.86
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000100	<0.000010	<0.000100	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000100
Chromium (Cr)	0.00010	mg/L				0.00056	<0.00500	0.00054	<0.00500	<0.00050	0.001060	0.0008	0.00082	0.00107	0.00063	0.00111	<0.00500

					Waterbody	West Buskegau River											
					Location ID	WBR-P-01	WBR-P-03		WBR-P-04		WBR-S-01	WBR-S-02	WBR-S-03		WBR-S-04		WBR-S-05
					Date Sampled	06-Jun-2022	18-Sep-2022	24-Oct-2022	18-Sep-2022	24-Oct-2022	30-Aug-2022	06-Jun-2022	06-Jun-2022	1-Sep-2022	06-Jun-2022	30-Aug-2022	18-Sep-2022
					Time Sampled	00:00	16:00	15:00	13:30	11:15	0:00	00:00	00:00	0:00	00:00	0:00	17:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**												
Cobalt (Co)	0.00010	mg/L				0.00026	<0.00100	0.00014	<0.00100	0.00021	0.000150	0.00025	0.00015	0.00015	0.00018	0.000190	<0.00100
Copper (Cu)	0.00020	mg/L				0.00084	<0.00200	0.00049	<0.00200	0.000	0.002070	0.00232	0.00222	0.00199	0.00155	0.00196	<0.00200
Iron (Fe)	0.010	mg/L				0.571	0.360000	0.641000	0.295000	0.512000	0.775000	0.56	0.542	0.76	0.494	0.77	0.53
Lead (Pb)	0.000050	mg/L				0.000259	<0.000500	0.000357	<0.000500	0.00045	0.000292	0.00038	0.00033	0.000276	0.000272	0.000284	<0.000500
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0100	<0.0010	<0.0100	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0100
Magnesium (Mg)	0.0050	mg/L				2.35	1.730	1.630	1.7100	1.320	2.740000	1.88	2.04	2.81	1.88	2.92	1.53
Manganese (Mn)	0.00010	mg/L				0.0588	0.022400	0.046700	0.021000	0.062700	0.035800	0.0966	0.0427	0.04	0.0581	0.05	0.0908
Molybdenum (Mo)	0.000050	mg/L				0.000051	<0.000500	<0.000050	<0.000500	<0.000050	0.000052	<0.000050	0.000053	0.000052	<0.000050	0.000054	<0.000500
Nickel (Ni)	0.00050	mg/L				0.00068	<0.00500	0.00061	<0.00500	<0.00050	0.001100	0.00089	0.00084	0.00	0.0007	0.001110	<0.00500
Phosphorus (P)	0.030	mg/L				<0.050	<0.500	<0.050	<0.500	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.500
Potassium (K)	0.050	mg/L				<0.050	<0.500	<0.050	<0.500	<0.050	0.276000	0.148	0.171	0.31	0.104	0.32	<0.500
Rubidium (Rb)	0.00020	mg/L				0.00031	<0.00200	0.000250	<0.00200	<0.00020	0.001130	0.00062	0.00069	0.00119	0.00043	0.00123	<0.00200
Selenium (Se)	0.000050	mg/L				0.000157	<0.000500	0.000148	<0.000500	0.00014	0.000237	0.000198	0.0002	0.00	0.000173	0.000239	<0.000500
Silicon (Si)	0.050	mg/L				0.452	1.64	1.18	0.985	1.15	2.700000	0.848	1.04	2.73	0.651	2.78	1.84
Silver (Ag)	0.000010	mg/L				<0.000010	<0.000100	<0.000010	<0.000100	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000100
Sodium (Na)	0.050	mg/L				0.447	<0.500	0.3930	<0.500	0.3440	1.080000	0.741	0.774	1	0.634	1.01	<0.500
Strontium (Sr)	0.00020	mg/L		2.5		0.0163	0.0122	0.0115	0.0130	0.00944	0.025900	0.0191	0.019	0.0253	0.017	0.0260	0.0108
Sulfur (S)	0.50	mg/L				<0.50	<5.00	<0.50	<5.00	<0.50	0.680000	<0.50	<0.50	0.61	<0.50	0.61	<5.00
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00200	<0.00020	<0.00200	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00200
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000100	<0.000010	<0.000100	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000100
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00100	<0.00010	<0.00100	<0.00010	0.000160	0.00014	0.00017	0.00	0.00011	0.000170	<0.00100
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00100	<0.00010	<0.00100	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00100
Titanium (Ti)	0.00030	mg/L				0.00501	<0.00300	0.00377	<0.00300	0.00223	0.009510	0.0081	0.01	0.0100	0.00591	0.0098	<0.00300
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00100	<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00100
Uranium (U)	0.000010	mg/L				0.000042	<0.000100	0.000012	<0.000100	<0.000010	0.000062	0.000062	0.000063	0.000060	0.000046	0.000060	<0.000100
Vanadium (V)	0.00050	mg/L				0.00064	<0.00500	<0.00050	<0.00500	<0.00050	0.000910	0.00089	0.00088	0.00094	0.00069	0.00093	<0.00500
Zinc (Zn)	0.0010	mg/L				0.0063	<0.0100	0.00880	<0.0100	0.00990	0.007200	0.0089	0.0079	0.01	0.0065	0.006300	<0.0100
Zirconium (Zr)	0.00020	mg/L				0.00041	<0.00300	<0.00030	<0.00300	<0.00030	0.000810	0.0007	0.00077	0.00079	0.00051	0.00081	<0.00300
Total Speciated Metals																	
Methylmercury (as MeHg)	0.000020	ug/L				0.000078	0.000102	0.000047	0.000059		0.000206	0.000248	0.00204	0.000206	0.00233	0.000062	0.000187

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

Table A2-2e: Surface Water Laboratory Results – Mattagami River (2022)

					Sample Location	**Mattagami River**						
					Location ID	**MATR-01**			**MATR-02**			
					Date Sampled	**08-Jun-2022**	**2-Sep-2022**	**25-Oct-2022**	**08-Jun-2022**	**2-Sep-2022**	**25-Oct-2022**
					Time Sampled	**19:30**	**0:00**	**14:30**	**19:00**	**0:00**	**15:15**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**						
Physical Tests											
Conductivity (EC)	1.0	uS/cm				82.8	148	83.3	83.1	147	82.8
Hardness (as CaCO3)	0.50	mg/L				41.4	72.00	43.70	42.3	71.10	40.90
pH	0.10	pH	6.5-9.0		6.5-8.5	7.36	7.63	7.67	7.4	7.66	7.68
Total Suspended Solids	3.0	mg/L				5	<3	5.8	6.4	<3	5
Total Dissolved Solids	10	mg/L				70	85.00	81.00	66	83.00	90.00
Acidity (as CaCO3)	2.0	mg/L				<2.0	<2	<2	<2.0	<2	<2
Anions and Nutrients											
Alkalinity, Total (as CaCO3)	2.0	mg/L				39.9	60.7	35.5	38.3	28.6	36.5
Ammonia, Total (as N)	0.0050	mg/L				0.0176	0.0324	0.0189	0.0203	0.041	0.014
Bromide (Br)	0.1000	mg/L									
Chloride (Cl)	0.10	mg/L	120			2.26	4.5400	1.8300	2.15	4.62	1.76
Fluoride (F)	0.020	mg/L				0.031	0.0350	0.0250	0.03	0.035	0.024
Nitrate (as N)	0.020	mg/L	13			0.079	0.0810	0.0350	0.076	0.0870	0.0320
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L				0.0161	0.0128	0.0062	0.0157	0.0158	0.0047
Sulfate (SO4)	0.30	mg/L				2.55	5.5200	2.3200	2.54	5.67	2.27
Cyanides											
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, SAD (Total)	0.0020	mg/L				0.0029	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Inorganic Parameters											
Acidity (as CaCO3)	2.0	mg/L				<2.0	<2	<2	<2.0	<2	<2
Total Metals											
Aluminum (Al)	0.0030	mg/L	0.005 -0.1			0.308	0.218000	0.324000	0.318	0.225000	0.315000
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00059	0.000930	0.000610	0.00059	0.000940	0.000620
Barium (Ba)	0.00010	mg/L				0.00728	0.008800	0.007130	0.00714	0.008830	0.007020
Beryllium (Be)	0.000020	mg/L			1.1	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	0.015000	<0.010	<0.010	0.015000	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00004 - 0.00021		0.0002	0.0000126	0.000013	0.000017	0.0000146	0.000015	0.000018
Calcium (Ca)	0.050	mg/L				12.3	19.600000	12.900000	12.2	19.300000	12.700000
Cesium (Cs)	0.000010	mg/L				0.000032	0.000022	0.000028	0.000034	0.000023	0.000028
Chromium (Cr)	0.00010	mg/L				0.00093	0.000780	0.000960	0.00089	0.000830	0.000910
Cobalt (Co)	0.00010	mg/L		0.0008 - 1.1859*		0.00022	0.000160	0.000190	0.00023	0.000170	0.000180
Copper (Cu)	0.00050	mg/L	0.002 - 0.00323		0.005	0.0013	0.001440	0.001340	0.0013	0.001470	0.001250
Iron (Fe)	0.01	mg/L	0.3		0.30	0.46	0.36	0.50	0.47	0.39	0.49
Lead (Pb)	0.000050	mg/L	0.001 - 0.005		0.0050	0.00019	0.000130	0.000195	0.000191	0.000158	0.000190

					Sample Location	Mattagami River						
					Location ID	MATR-01			MATR-02			
					Date Sampled	08-Jun-2022	2-Sep-2022	25-Oct-2022	08-Jun-2022	2-Sep-2022	25-Oct-2022	
					Time Sampled	19:30	0:00	14:30	19:00	0:00	15:15	
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**							
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)	0.0050	mg/L				2.9	4.960000	3.030000	2.85	5.030000	3.050000	
Manganese (Mn)	0.00010	mg/L	0.190 - 0.44			0.0297	0.030600	0.022600	0.0299	0.032200	0.022400	
Mercury (Hg)	0.00010	ng/L	26		200	3.62	2.160000	3.770000	6.89	2.090000	4.620000	
Molybdenum (Mo)	0.000050	mg/L	0.073			0.000105	0.000136	0.000079	0.000104	0.000133	0.000078	
Nickel (Ni)	0.00050	mg/L	0.025 - 0.1261		0.025	0.00077	0.000700	0.000810	0.00083	0.000760	0.000830	
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Potassium (K)	0.050	mg/L				0.453	0.570000	0.439000	0.428	0.577000	0.410000	
Rubidium (Rb)	0.00020	mg/L				0.00142	0.001670	0.001280	0.00153	0.001650	0.001320	
Selenium (Se)	0.000050	mg/L	0.001		0.1	0.000093	0.000112	0.000125	0.000098	0.000111	0.000118	
Silicon (Si)	0.10	mg/L				2.7	2.580000	2.850000	2.75	2.640000	2.970000	
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)	0.050	mg/L				2.11	3.800000	1.780000	2.22	3.830000	1.770000	
Strontium (Sr)	0.00020	mg/L				0.02	0.034100	0.021000	0.0208	0.033700	0.020700	
Sulfur (S)	0.50	mg/L				1.06	1.900000	0.960000	1	1.950000	0.980000	
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium (Ti)	0.00030	mg/L				0.0109	0.008080	0.010400	0.0116	0.008280	0.010400	
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium (U)	0.000010	mg/L	0.015			0.00008	0.000071	0.000062	0.000081	0.000075	0.000062	
Vanadium (V)	0.00050	mg/L		0.12		0.0009	0.000800	0.000790	0.0009	0.000820	0.000800	
Zinc (Zn)	0.0030	mg/L			0.03	0.0036	<0.0030	0.004900	0.0038	0.003200	0.004100	
Zirconium (Zr)	0.00020	mg/L				0.00032	0.000330	0.000370	0.00033	0.000350	0.000340	
Dissolved Metals												
Aluminum (Al)	0.0010	mg/L				0.0637	0.054900	0.100000	0.0606	0.059300	0.106000	
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Arsenic (As)	0.00010	mg/L				0.00052	0.000880	0.000520	0.00048	0.000900	0.000510	
Barium (Ba)	0.00010	mg/L				0.00555	0.007500	0.005070	0.00536	0.007700	0.005100	
Beryllium (Be)	0.000020	mg/L				<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)	0.010	mg/L				<0.010	0.016000	<0.010	<0.010	0.015000	<0.010	
Cadmium (Cd)	0.0000050	mg/L				0.0000149	0.000010	0.000015	0.0000113	0.000010	0.000012	
Calcium (Ca)	0.050	mg/L				12.1	20.700000	12.800000	12.4	19.900000	11.400000	
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.000570	
Cobalt (Co)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Copper (Cu)	0.00020	mg/L				0.00107	0.001170	0.001030	0.001	0.001200	0.001020	
Iron (Fe)	0.010	mg/L				0.141	0.148000	0.218000	0.137	0.160000	0.218000	
Lead (Pb)	0.000050	mg/L				0.000056	0.000057	0.000065	<0.000050	0.000094	0.000068	

					Sample Location	Mattagami River						
					Location ID	MATR-01			MATR-02			
					Date Sampled	08-Jun-2022	2-Sep-2022	25-Oct-2022	08-Jun-2022	2-Sep-2022	25-Oct-2022	
					Time Sampled	19:30	0:00	14:30	19:00	0:00	15:15	
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**							
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium (Mg)	0.0050	mg/L				2.72	4.930000	2.850000	2.75	5.200000	3.030000	
Manganese (Mn)	0.00010	mg/L				0.00951	0.005530	0.010400	0.00956	0.004660	0.010400	
Molybdenum (Mo)	0.000050	mg/L				0.000086	0.000125	0.000063	0.000089	0.000132	0.000072	
Nickel (Ni)	0.00050	mg/L				<0.00050	0.000550	<0.00050	<0.00050	0.000540	0.000550	
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Potassium (K)	0.050	mg/L				0.364	0.527000	0.311000	0.36	0.537000	0.321000	
Rubidium (Rb)	0.00020	mg/L				0.00112	0.001300	0.000900	0.00109	0.001240	0.000880	
Selenium (Se)	0.000050	mg/L				0.000094	0.000106	0.000115	0.000099	0.000124	0.000108	
Silicon (Si)	0.050	mg/L				2.16	2.370000	2.260000	2.13	2.360000	2.280000	
Silver (Ag)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)	0.050	mg/L				2.03	3.660000	1.610000	2.08	3.740000	1.670000	
Strontium (Sr)	0.00020	mg/L		2.5		0.0207	0.035900	0.021100	0.02	0.035500	0.020200	
Sulfur (S)	0.50	mg/L				0.78	2.260000	0.860000	0.85	2.160000	0.940000	
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium (Ti)	0.00030	mg/L				0.00126	0.001780	0.001900	0.00121	0.001960	0.002170	
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Uranium (U)	0.000010	mg/L				0.000074	0.000065	0.000049	0.000072	0.000065	0.000047	
Vanadium (V)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Zinc (Zn)	0.0010	mg/L				0.002	0.002500	0.003300	0.0016	0.001900	0.003200	
Zirconium (Zr)	0.00020	mg/L				<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
Total Speciated Metals												
Methylmercury (as MeHg)	0.000020	ug/L				0.00011	0.000077	0.000126	0.000058	0.000086	0.000204	

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

470500 470750 471000 471250 471500

5407000 5406750 5406500 5406250 5406000 5405750 5405500

North Driftwood River

Martin Lake

Gerry Lake

X:\CA\CAOAK300-OAK\MIS-FS1-Project\F\2020\Projects\OMEMA2002_Canada Nickel_Crawford Lake\11_GIS\Aquatic\Bathymetry_Sept2022\MXD_Maps\GerryLake_MartinLake_Bathymetry_3.mxd

LEGEND

- Bathymetry Analysis Extent
- Bathymetry Contours (2 m interval)
- Waterbody
- Watercourse
- Flow Direction

Water Depth (metres) (Filled Contours)

0 - 2	8 - 10	16 - 18
2 - 4	10 - 12	18 - 20
4 - 6	12 - 14	20 - 22
6 - 8	14 - 16	

NOTES:
- Aerial imagery provided by CNC, scene date, summer 2021.
- Watercourses and waterbodies extracted from Land Information Ontario (MNRF) and modified to match 2021 aerial imagery.
- Bathymetry survey conducted on September 6, 2022.

0 50 100 200 300 400 500 Metres

Datum: NAD83
Projection: UTM Zone 17N

N W E S

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Gerry Lake and Martin Lake Bathymetry

PROJECT N°:OMEMA2304 | **FIGURE: A2-1**

SCALE: 1:4,750 | DATE: November 2023

Table A3-1: In-Field Surface Water Measurements (2023)

Waterbody	Site ID	Date (dd/mm/yy)	Season	Location Coordinates (Zone, Easting, Northing)[1]			Sample Depth (m)	Water Temperature (°C)	pH	Conductivity (µS/cm)	Conductivity (mS/cm)	DO (%)	DO (mg/L)	ORP (mV)
Jocko Creek	JCRK-01	03/06/23	Spring	17U	473,297	5,401,493	0.1	18.4	5.08	54.7	0.055	81.0	7.6	177
		13/07/23	Summer	17U	473,298	5,401,501	0.1	17.8	4.85	51.1	0.051	82.0	7.4	
	JCRK-03	03/06/23	Spring	17U	470,617	5,399,915	0.1	18.3	7.23	128.9	0.129	79.4	7.5	138.2
		12/07/23	Summer	17U	470,616	5,399,908	0.1	17.4	6.59			111.9	10.4	196.2
Mattagami River	MATR-01	16/07/23	Summer	17U	464,060	5,408,522	0.1	21.7	7.62	115.0	0.115	85.5	7.7	130.2
	MATR-02	16/07/23	Summer	17U	462,924	5,412,397	0.1	21.5	7.53	114.0	0.114	82.9	7.4	132.9
Davis Lake	NDR-DVSLK	13-07-23	Summer	17U	471,641	5,403,926	0.1	23.4	8.46	219.0	0.219	107.8	9.3	
Gerry Lake	NDR-GERLK	12/06/23	Spring	17U	471,198	5,405,396	0.1	17.9	7.93	165.3	0.165	90.0	8.5	
		12/07/23	Summer	17U	471,312	5,405,901	0.1	21.2	8.13	204.0	0.204	80.0	7.3	182.3
Martin Lake	NDR-MARLK	12/06/23	Spring	17U	470,800	5,406,674	0.1	19.8	7.8	67.4	0.067	84.1	8.2	
Sutherland Lake	NDR-SUTHLK	13/06/23	Spring	17U	471,251	5,404,404	0.1	17.4	8.13	176.8	0.177	97.6	9.3	
		14/07/23	Summer	17U	471,196	5,404,506	0.1	22.8	8.1	207.0	0.207	92.3	8.0	
North Driftwood River	NDR-S-04	31/05/23	Spring	17U	470,356	5,412,383	0.1	23	7.15	86.8	0.087	75.9	6.5	74.7
		12/07/23	Summer	17U	470,369	5,412,388	0.1	22.5	6.73	89.3	0.089	104.6	8.7	
	NDR-S-06	09/06/23	Spring	17U	469,370	5,416,292	0.1	16.2	7.98	72.6	0.087	76.5	7.7	6.86
		13/07/23	Summer	17U	469,374	5,416,327	0.1	18.7	6.45	83.7	0.084	69.2	6.3	
	NDR-S-06b	01/06/23	Spring	17U	467,501	5,410,942	0.1	16.7	6.11	21.1	0.021	74.8	7.3	123.3
Highway 655 Realignment	RDAL-01	16/07/23	Summer	17U	472,891	5,398,175	0.1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	RDAL-02	03/06/23	Spring	17U	471,737	5,400,909	0.1	16.8	6.54	14.3	0.014	44.2	4.3	133.4
		16/07/23	Summer	17U	471,737	5,400,909	0.1	17.7	6.77	171.0	0.171	45.3	4.3	76.5
	RDAL-04	13/06/23	Spring	17U	470,034	5,404,940	0.1	15.4	5.73	18.5	0.019	22.8	2.3	
	RDAL-06	31/05/23	Spring	17U	469,653	5,411,714	0.1	16.3	6.09	34.7	0.035	12.6	1.2	93
		17/07/23	Summer	17U	469,688	5,411,706	0.1	17.9	4.96	36.2	0.036	25.9	2.2	
West Buskegau River	WBR-P-04	08/06/23	Spring	17U	474,504	5,412,303	0.1	20	7.13	27.0	0.027	99.3	9.0	
		14/07/23	Summer	17U	474,492	5,412,217	0.1	21.9	5.41	34.3	0.034	76.4	6.5	
		04/06/23	Spring	17U	476,570	5,412,913	0.1	20.7	7.01	55.4	0.055	86.9	7.8	70.9
		17/07/23	Summer	17U	476,572	5,412,913	0.1	20.8	6.37	75.0	0.075	96.2	8.0	
		14/07/23	Summer	17U	476,574	5,412,898	0.1	19.8	6.52	70.0	0.070	88.0	7.7	
	WBR-S-06	04/06/23	Spring	17U	477,107	5,410,043	0.1	20.5	7.23	75.0	0.075	85.1	7.7	63.4
		15/07/23	Summer	17U	477,097	5,410,013	0.1	20.3	7.13	75.0	0.075	84.7	7.7	126.9
	WBR-S-07	07/06/23	Spring	17U	477,331	5,416,351	0.1	19	7.59	72.2	0.082	92.2	8.6	62.6
		17/07/23	Summer	17U	477,328	5,416,353	0.1	21.8	6.59	81.2	0.081	86.0	7.8	

Table A3-2a: Surface Water Laboratory Results – Martin Lake, Gerry Lake, Davis Lake, Sutherland Lake (2023)

					Sample Location	**Martin Lake**		**Gerry Lake**		**Davis Lake**	**Sutherland Lake**	
					Sample ID	**NDR-MARLK**	**NDR-MARLK**	**NDR-GERLK**	**NDR-GERLK**	**NDR-DAVLK**	**NDR-SUTLK**	**NDR-SUTLK**
					Date Sampled	**12-Jun-2023**	**12-Jul-2023**	**10-Jun-2023**	**12-Jul-2023**	**13-Jul-2023**	**13-Jun-2023**	**14-Jul-2023**
					Time Sampled	**14:00**	**17:40**	**12:40**	**12:40**	**14:30**	**11:20**	**14:00**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**							
Physical Tests												
Conductivity (EC)	1.0	uS/cm				76.3	89.5	183	217	225	199	213
Hardness (as CaCO3)	0.50	mg/L				47.3	48.6	104	114	118	110	112
pH	0.10	pH	6.5-9.0		6.5-8.5	7.87	7.7	8.32	8.23	8.43	8.39	8.26
Total Suspended Solids	3.0	mg/L				<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids	10	mg/L				57	74	102	136	106	98	104
Anions and Nutrients												
Acidity, Total (as CaCO3)	2.00	mg/L				<2.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0
Alkalinity, Total (as CaCO3)	1.0	mg/L				40.3	57.4	98.9	114	116	106	111
Ammonia, Total (as N)	0.0050	mg/L				0.0057	0.0108	0.007	0.013	0.0201	0.0062	0.005
Bromide (Br)	0.1000	mg/L				<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloride (Cl)	0.10	mg/L	120			<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Flouride (F)	0.02	mg/L				0.024	0.025	0.053	0.059	0.037	0.034	0.035
Nitrate (as N)	0.020	mg/L	13			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L				0.0143	0.0123	0.0154	0.0091	0.0055	0.0086	0.005
Sulfate (SO4)	0.30	mg/L				<0.30	<0.30	1.02	1.13	2.14	1.77	1.83
Cyanides												
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Strong Acid Diss	0.0020	mg/L				0.0041	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Weak Acid Diss	0.0020	mg/L				0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals												
Aluminum (Al)	0.0030	mg/L	0.005 -0.1			0.0969	0.0784	0.0417	0.0137	<0.0030	0.009	0.0206
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00049	0.00061	0.00045	0.0005	0.00016	0.00023	0.00024
Barium (Ba)	0.00010	mg/L				0.00538	0.00566	0.0128	0.015	0.00833	0.0093	0.0102
Beryllium (Be)	0.000020	mg/L			0.011-1.10	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00004 - 0.00018		0.0002	0.0000061	0.0000064	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	0.050	mg/L				12	14.3	26.8	32.2	31.8	29	32.1
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L		0.00104 - 0.00109*		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00050	mg/L	0.002 - 0.00272		0.001-0.005	0.00068	0.00063	0.00065	<0.00050	<0.00050	<0.00050	<0.00050

					Sample Location	**Martin Lake**		**Gerry Lake**		**Davis Lake**	**Sutherland Lake**	
					Sample ID	**NDR-MARLK**	**NDR-MARLK**	**NDR-GERLK**	**NDR-GERLK**	**NDR-DAVLK**	**NDR-SUTLK**	**NDR-SUTLK**
					Date Sampled	**12-Jun-2023**	**12-Jul-2023**	**10-Jun-2023**	**12-Jul-2023**	**13-Jul-2023**	**13-Jun-2023**	**14-Jul-2023**
					Time Sampled	**14:00**	**17:40**	**12:40**	**12:40**	**14:30**	**11:20**	**14:00**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**							
Iron (Fe)	0.010	mg/L	0.3		0.3	0.216	0.219	0.187	0.117	<0.010	0.017	0.025
Lead (Pb)	0.000050	mg/L	0.001 - 0.00393		0.0250	0.000068	0.000087	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	0.0012	0.0012	<0.0010	0.0011
Magnesium (Mg)	0.0050	mg/L				3.16	3.59	6.91	8.08	9.46	7.3	8.08
Manganese (Mn)	0.00010	mg/L	0.2 - 0.35			0.0116	0.0212	0.0226	0.0162	0.00516	0.0117	0.0109
Mercury (Hg)	0.00010	ug/L	0.026		0.0002	<0.0000050	0.0000253	<0.0000050	0.0000161	0.0000052	<0.0000050	0.0000078
Molybdenum (Mo)	0.000050	mg/L	0.073			0.000051	0.00006	0.000139	0.000164	<0.000050	<0.000050	0.000054
Nickel (Ni)	0.00050	mg/L	0.025 - 0.10839		0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.294	0.301	0.721	0.814	0.91	0.771	0.82
Rubidium (Rb)	0.00020	mg/L				0.00065	0.00074	0.00114	0.00131	0.00144	0.00118	0.00144
Selenium (Se)	0.000050	mg/L	0.001		0.1	0.000077	0.000079	0.00007	0.000074	<0.000050	<0.000050	<0.000050
Silicon (Si)	0.10	mg/L				0.66	0.71	1.5	1.45	1.86	1.52	1.41
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.844	0.891	2.27	2.68	1.38	1.18	1.25
Strontium (Sr)	0.00020	mg/L				0.0204	0.0248	0.0492	0.0623	0.0429	0.0356	0.0408
Sulfur (S)	0.50	mg/L				<0.50	<0.50	0.58	0.6	0.94	0.82	0.9
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00314	0.00328	0.00102	0.00039	<0.00030	<0.00030	<0.00090
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L	0.015			0.000035	0.000032	0.000037	0.000036	0.000088	0.000074	0.000082
Vanadium (V)	0.00050	mg/L		0.12		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0030	mg/L			0.03	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)	0.00020	mg/L				<0.00020	0.00023	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Metals												
Aluminum (Al)	0.0010	mg/L				0.0541	0.0375	0.0295	0.0089	<0.0010	0.0033	0.0026
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L				0.00047	0.0006	0.00045	0.00048	0.00016	0.00023	0.00024
Barium (Ba)	0.00010	mg/L				0.00525	0.00532	0.0128	0.015	0.00858	0.00906	0.00997
Beryllium (Be)	0.000020	mg/L				<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L				<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L				0.0000056	0.0000069	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)	0.050	mg/L				13.4	13.4	29.5	32.3	31.8	32	31.4
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

					Sample Location	**Martin Lake**		**Gerry Lake**		**Davis Lake**	**Sutherland Lake**	
					Sample ID	**NDR-MARLK**	**NDR-MARLK**	**NDR-GERLK**	**NDR-GERLK**	**NDR-DAVLK**	**NDR-SUTLK**	**NDR-SUTLK**
					Date Sampled	**12-Jun-2023**	**12-Jul-2023**	**10-Jun-2023**	**12-Jul-2023**	**13-Jul-2023**	**13-Jun-2023**	**14-Jul-2023**
					Time Sampled	**14:00**	**17:40**	**12:40**	**12:40**	**14:30**	**11:20**	**14:00**
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**							
Cobalt (Co)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	0.00020	mg/L				0.00058	0.00046	0.0005	0.0004	<0.00020	<0.00020	<0.00020
Iron (Fe)	0.010	mg/L				0.162	0.16	0.151	0.09	<0.010	<0.010	<0.010
Lead (Pb)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	0.0011	0.0013	0.0014	0.0011	0.0013
Magnesium (Mg)	0.0050	mg/L				3.37	3.69	7.28	8.19	9.46	7.32	8.17
Manganese (Mn)	0.00010	mg/L				0.00672	0.00474	0.0034	0.00326	0.00105	0.00099	0.00082
Molybdenum (Mo)	0.000050	mg/L				<0.000050	0.00005	0.000117	0.000159	<0.000050	<0.000050	<0.000050
Nickel (Ni)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.269	0.27	0.688	0.81	0.9	0.739	0.827
Rubidium (Rb)	0.00020	mg/L				0.00059	0.00064	0.00111	0.00122	0.00142	0.00123	0.00144
Selenium (Se)	0.000050	mg/L				0.00009	0.000102	0.000084	0.000073	<0.000050	<0.000050	0.000051
Silicon (Si)	0.050	mg/L				0.505	0.585	1.35	1.42	1.87	1.35	1.34
Silver (Ag)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.836	0.886	2.21	2.74	1.38	1.12	1.54
Strontium (Sr)	0.00020	mg/L		2.5		0.0214	0.0248	0.0507	0.0609	0.0432	0.0364	0.0398
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	0.58	0.92	0.59	0.88
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00174	0.00114	0.00063	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L				0.000033	0.00003	0.000035	0.000034	0.000084	0.00007	0.000075
Vanadium (V)	0.00050	mg/L				<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)	0.0010	mg/L				0.0024	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium (Zr)	0.00020	mg/L				<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Speciated Metals												
Methylmercury (as MeHg)	0.000020	ug/L				n/a	0.000058	n/a	0.000054	0.000025	n/a	0.00004

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

Table A3-2b: Surface Water Laboratory Results – West Buskegeau River and North Driftwood River (2023)

					Sample Location	West Buskegeau River				North Driftwood River	
					Sample ID	WBR-P-04	WBR-P-04	WBR-S-04	WBR-S-04	NDR-S-04	NDR-S-06B
					Date Sampled	08-Jun-2023	14-Jul-2023	17-Jul-2023	04-Jun-2023	01-Jun-2023	31-May-2023
					Time Sampled	16:00	11:00	15:00	14:10	14:00	14:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**						
Physical Tests											
Conductivity (EC)	1.0	uS/cm				27.5	36.9	83.3	59.3	87.8	22.9
Hardness (as CaCO3)	0.50	mg/L				20.5	23.6	48.6	40.6	46.6	15.8
pH	0.10	pH	6.5-9.0		6.5-8.5	6.73	6.7	7.55	7.32	7.32	5.95
Total Suspended Solids	3.0	mg/L				<3.0	10.1	5.9	4.1	41.7	<3.0
Total Dissolved Solids	10	mg/L				40	55	92	73	79	78
Anions and Nutrients											
Acidity, Total (as CaCO3)	2.00	mg/L				3.1	7.7	3.3	<2.0	5.4	6.6
Alkalinity, Total (as CaCO3)	1.0	mg/L				8.2	12	47.7	39.8	58.5	4.8
Ammonia, Total (as N)	0.0050	mg/L	39.4752			0.0122	0.0205	0.0284	0.0205	0.0253	0.0129
Bromide (Br)	0.1000	mg/L				<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chloride (Cl)	0.10	mg/L	120			<0.50	<0.50	<0.50	<0.50	3.51	<0.50
Flouride (F)	0.02	mg/L				<0.020	0.022	0.028	0.026	0.027	<0.020
Nitrate (as N)	0.020	mg/L	13			<0.020	<0.020	0.032	0.026	<0.020	<0.020
Nitrite (as N)	0.010	mg/L	0.06			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phosphorus (P)-Total	0.0020	mg/L	framework			0.0303	0.0421	0.039	0.0231	0.0223	0.0027
Sulfate (SO4)	0.30	mg/L				<0.30	<0.30	0.44	0.31	<0.30	<0.30
Cyanides											
Cyanide, Free	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Strong Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Cyanide, Weak Acid Diss	0.0020	mg/L				<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals											
Aluminum (Al)	0.0030	mg/L	0.005-0.1			0.188	0.346	1.01	0.789	0.825	0.0641
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L	0.005		0.1	0.00086	0.00092	0.00148	0.00121	0.00096	0.00078
Barium (Ba)	0.00010	mg/L				0.00522	0.00688	0.0123	0.0103	0.0116	0.00232
Beryllium (Be)	0.000020	mg/L			0.011-1.10	<0.000020	<0.000020	0.000052	0.000035	0.000036	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L	1.5		0.2	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L	0.00018		0.0002	0.0000175	0.0000148	0.0000257	0.0000344	0.0000341	0.0000276
Calcium (Ca)	0.050	mg/L				5.38	6.61	14.5	11.7	13.4	3.96
Cesium (Cs)	0.000010	mg/L				0.000013	0.000033	0.000101	0.000071	0.000081	0.00001
Chromium (Cr)	0.00010	mg/L				0.00067	0.00113	0.0025	0.00181	0.002	<0.00050
Cobalt (Co)	0.00010	mg/L		0.00109		0.00015	0.00027	0.00059	0.00047	0.00061	<0.00010
Copper (Cu)	0.00050	mg/L	0.003		0.001-0.005	0.0007	0.00056	0.00221	0.00219	0.00187	0.00054
Iron (Fe)	0.010	mg/L	0.3		0.3	0.482	0.607	1.51	1.07	1.12	0.207
Lead (Pb)	0.000050	mg/L	0.0010		0.0250	0.000282	0.000311	0.000674	0.000582	0.000646	0.000492
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	0.0018	0.001	0.0012	<0.0010
Magnesium (Mg)	0.0050	mg/L				1.45	1.94	3.65	3.09	4.11	1.44
Manganese (Mn)	0.00010	mg/L	0.35			0.016	0.0343	0.0807	0.0704	0.147	0.0262

					Sample Location	West Buskegeau River				North Driftwood River	
					Sample ID	WBR-P-04	WBR-P-04	WBR-S-04	WBR-S-04	NDR-S-04	NDR-S-06B
					Date Sampled	08-Jun-2023	14-Jul-2023	17-Jul-2023	04-Jun-2023	01-Jun-2023	31-May-2023
					Time Sampled	16:00	11:00	15:00	14:10	14:00	14:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**						
Mercury (Hg)	0.00010	ug/L	0.000026		0.0002	<0.0000050	0.0000141	0.0000312	<0.0000050	0.0000069	<0.0000050
Molybdenum (Mo)	0.000050	mg/L	0.073			<0.000050	0.000052	0.000101	0.000078	0.000089	<0.000050
Nickel (Ni)	0.00050	mg/L	0.025		0.025	0.00066	0.0008	0.00199	0.00145	0.00142	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	0.051	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.178	0.226	0.515	0.433	0.426	0.087
Rubidium (Rb)	0.00020	mg/L				0.00082	0.00116	0.00256	0.00197	0.00194	0.00033
Selenium (Se)	0.000050	mg/L	0.001		0.1	0.000127	0.00012	0.00015	0.00013	0.000133	0.000107
Silicon (Si)	0.10	mg/L				0.33	1.09	3.21	2.08	1.69	0.53
Silver (Ag)	0.000010	mg/L	0.00025		0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.415	0.354	1.28	1.06	3.28	0.527
Strontium (Sr)	0.00020	mg/L				0.0125	0.0155	0.0307	0.024	0.025	0.00739
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L	0.0008			<0.000010	<0.000010	0.000011	0.000011	0.000013	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	0.00018	0.00016	0.00012	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00534	0.0134	0.0394	0.0314	0.034	0.00105
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L	0.015			0.000016	0.00002	0.000088	0.000079	0.000081	<0.000010
Vanadium (V)	0.00050	mg/L		0.12		0.00053	0.00079	0.0025	0.00199	0.00204	<0.00050
Zinc (Zn)	0.0030	mg/L			0.03	0.0051	0.008	0.0072	0.0061	0.0084	0.0059
Zirconium (Zr)	0.00020	mg/L				0.00028	0.0004	0.00112	0.00081	0.00059	<0.00020
Dissolved Metals											
Aluminum (Al)	0.0010	mg/L				0.138	0.0811	0.169	0.245	0.135	0.0618
Antimony (Sb)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	0.00010	mg/L				0.00087	0.00089	0.00134	0.00119	0.00085	0.00085
Barium (Ba)	0.00010	mg/L				0.00451	0.00436	0.00635	0.00665	0.00639	0.00236
Beryllium (Be)	0.000020	mg/L				<0.000020	<0.000020	0.000023	0.000022	<0.000020	<0.000020
Bismuth (Bi)	0.000050	mg/L				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	0.010	mg/L				<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)	0.0000050	mg/L				0.000015	0.0000111	0.0000198	0.0000309	0.0000152	0.0000269
Calcium (Ca)	0.050	mg/L				5.73	6.5	13.7	11.6	13.1	4.01
Cesium (Cs)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)	0.00010	mg/L				<0.00050	<0.00050	0.00072	0.00081	<0.00050	<0.00050
Cobalt (Co)	0.00010	mg/L				0.00013	0.00014	0.00016	0.00018	0.00014	<0.00010
Copper (Cu)	0.00020	mg/L				0.00055	0.00032	0.00139	0.00216	0.00104	0.00053
Iron (Fe)	0.010	mg/L				0.362	0.289	0.537	0.505	0.308	0.193
Lead (Pb)	0.000050	mg/L				0.0002	0.000135	0.000205	0.000516	0.000138	0.000483
Lithium (Li)	0.0010	mg/L				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium (Mg)	0.0050	mg/L				1.5	1.79	3.49	2.83	3.37	1.41
Manganese (Mn)	0.00010	mg/L				0.0183	0.0241	0.0609	0.0605	0.0867	0.0251

					Sample Location	West Buskegeau River				North Driftwood River	
					Sample ID	WBR-P-04	WBR-P-04	WBR-S-04	WBR-S-04	NDR-S-04	NDR-S-06B
					Date Sampled	08-Jun-2023	14-Jul-2023	17-Jul-2023	04-Jun-2023	01-Jun-2023	31-May-2023
					Time Sampled	16:00	11:00	15:00	14:10	14:00	14:00
Parameter	**Lowest Detection Limit**	**Units**	**CCME CWQG**	**FEQG**	**PWQO**						
Molybdenum (Mo)	0.000050	mg/L				<0.000050	<0.000050	0.000082	0.000074	0.000075	<0.000050
Nickel (Ni)	0.00050	mg/L				<0.00050	<0.00050	0.0007	0.0009	0.00057	<0.00050
Phosphorus (P)	0.030	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)	0.050	mg/L				0.139	0.135	0.241	0.288	0.26	0.092
Rubidium (Rb)	0.00020	mg/L				0.00066	0.00058	0.00088	0.00099	0.00078	0.00034
Selenium (Se)	0.000050	mg/L				0.000134	0.000124	0.000151	0.00018	0.000148	0.000153
Silicon (Si)	0.050	mg/L				0.148	0.481	1.56	1.05	0.431	0.516
Silver (Ag)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	0.050	mg/L				0.367	0.358	1.21	0.996	3.12	0.523
Strontium (Sr)	0.00020	mg/L		2.5		0.0124	0.0149	0.0297	0.0233	0.023	0.00755
Sulfur (S)	0.50	mg/L				<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tellurium (Te)	0.00020	mg/L				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)	0.000010	mg/L				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)	0.00010	mg/L				<0.00010	<0.00010	0.00012	0.00013	<0.00010	<0.00010
Tin (Sn)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	0.00030	mg/L				0.00329	0.00208	0.00654	0.00918	0.0045	0.00072
Tungsten (W)	0.00010	mg/L				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)	0.000010	mg/L				0.000014	0.000012	0.000066	0.000064	0.000047	<0.000010
Vanadium (V)	0.00050	mg/L				<0.00050	<0.00050	0.00089	0.00103	0.0007	<0.00050
Zinc (Zn)	0.0010	mg/L				0.0044	0.0032	0.0023	0.0039	0.0038	0.0088
Zirconium (Zr)	0.00020	mg/L				0.00032	<0.00030	0.00069	0.00073	0.00041	<0.00030
Speciated Metals											
Methylmercury (as MeHg)	0.000020	ug/L				n/a	0.000054	0.000105	n/a	n/a	n/a

CCME CWQG; Canadian Council of Ministers of the Environment Canadian Water Quality Guidelines for the protection of aquatic life

FEQG; Federal Environmental Quality Guidelines, as per *Canadian Environmental Protection Act, 1999.*

PWQO; Provincial Water Quality Objectives

Gray shaded values indicate concentrations that exceed the CCME CWQG.

Blue shaded values indicate concentrations that exceed the FEQG.

Dark blue shaded values indicate concentrations that exceed the PWQO.

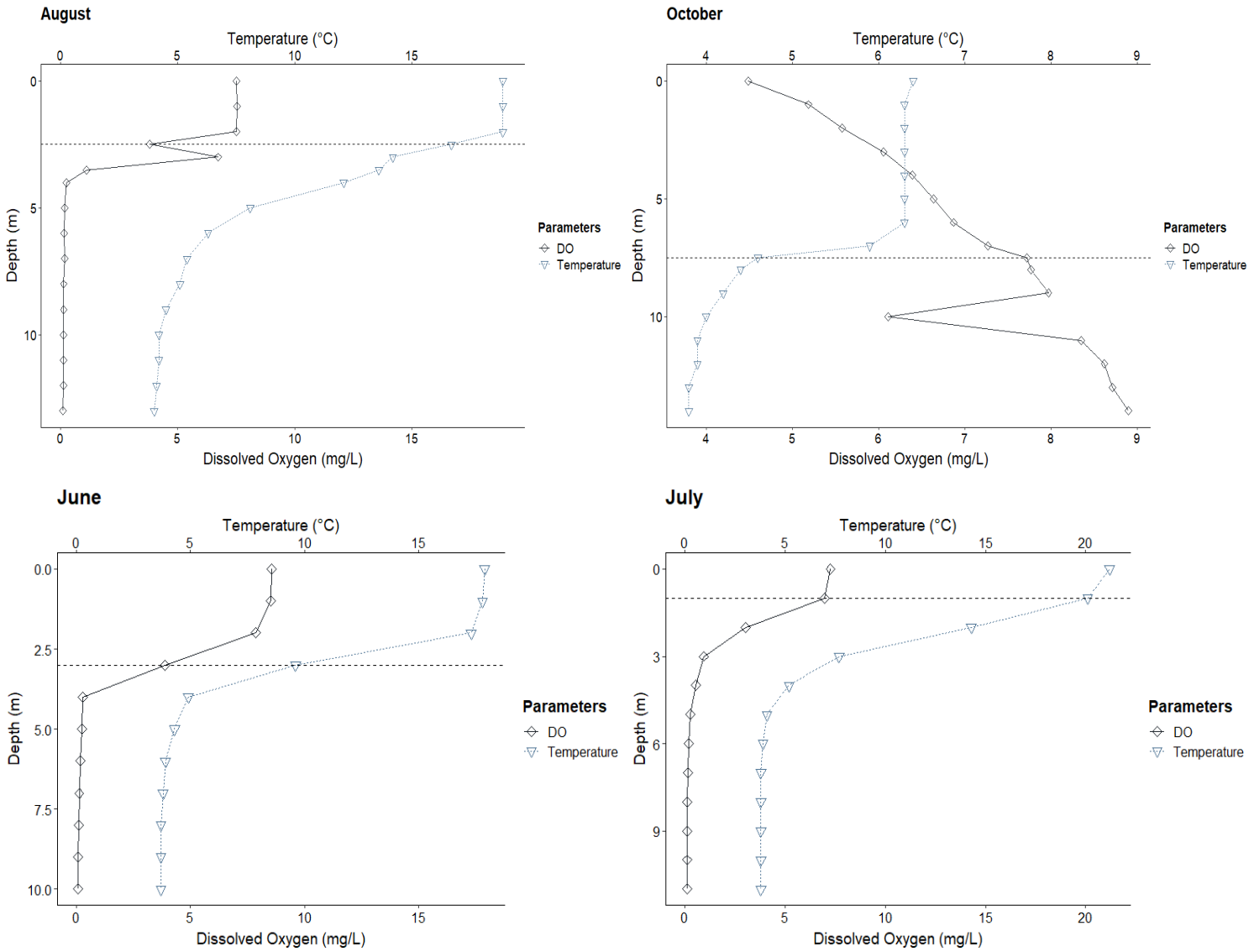


Figure A3-1: Temperature-DO Profiles for Gerry Lake (August 2022, October 2022, June 2023 and July 2023)

Dashed line represents the thermocline, defined as a change of ≥1°C within 1 m of water depth.

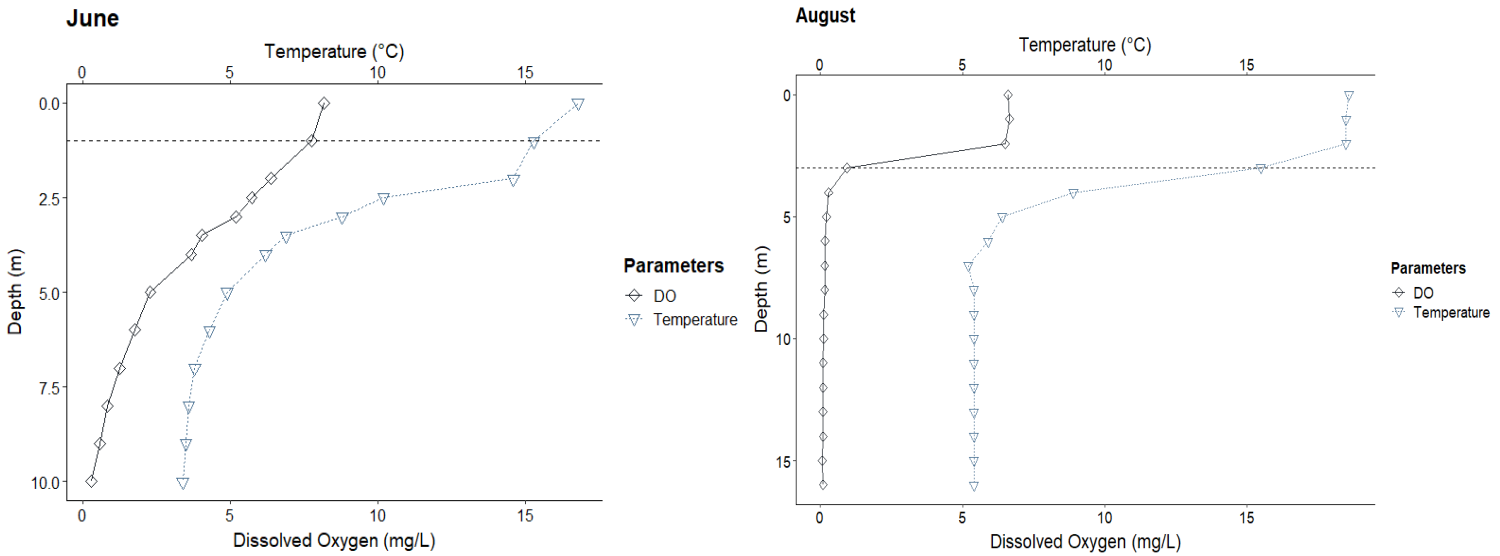


Figure A3-2: Temperature-DO Profiles for Martin Lake (August 2022 and June 2023)

Dashed line represents the thermocline, defined as a change of ≥1°C within 1 m of water depth.

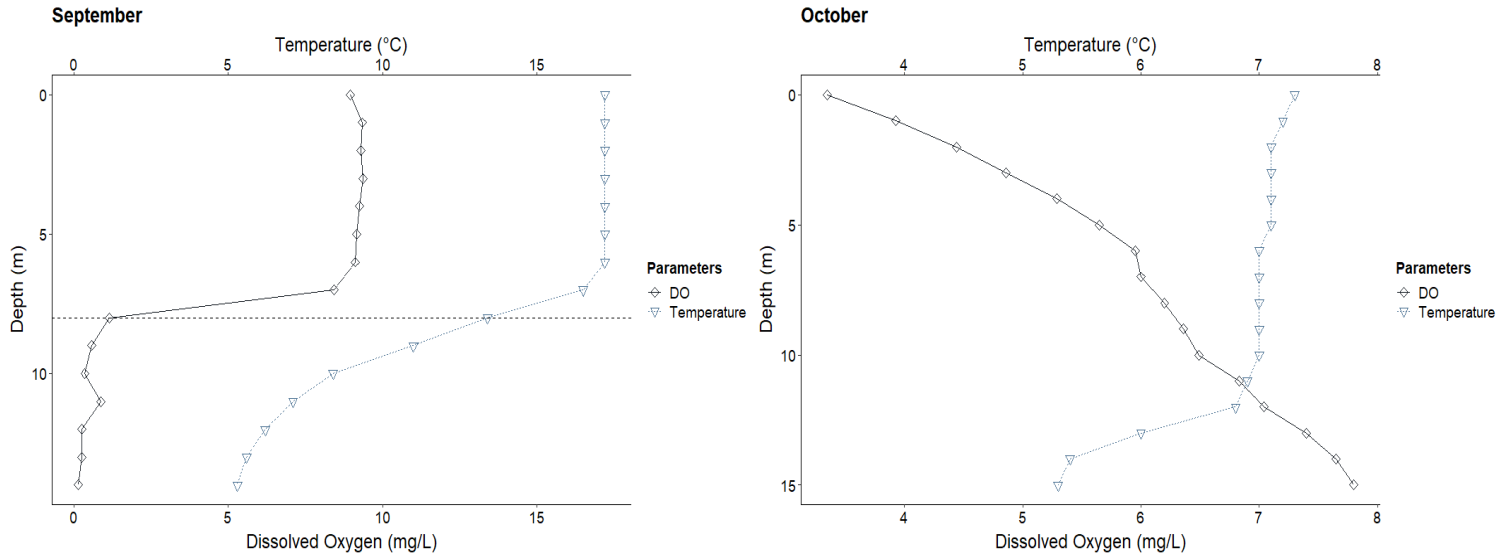


Figure A3-1: Temperature-DO Profiles for Jack Lake (September and October 2022)

Dashed line represents the thermocline, defined as a change of ≥1°C within 1 m of water depth.

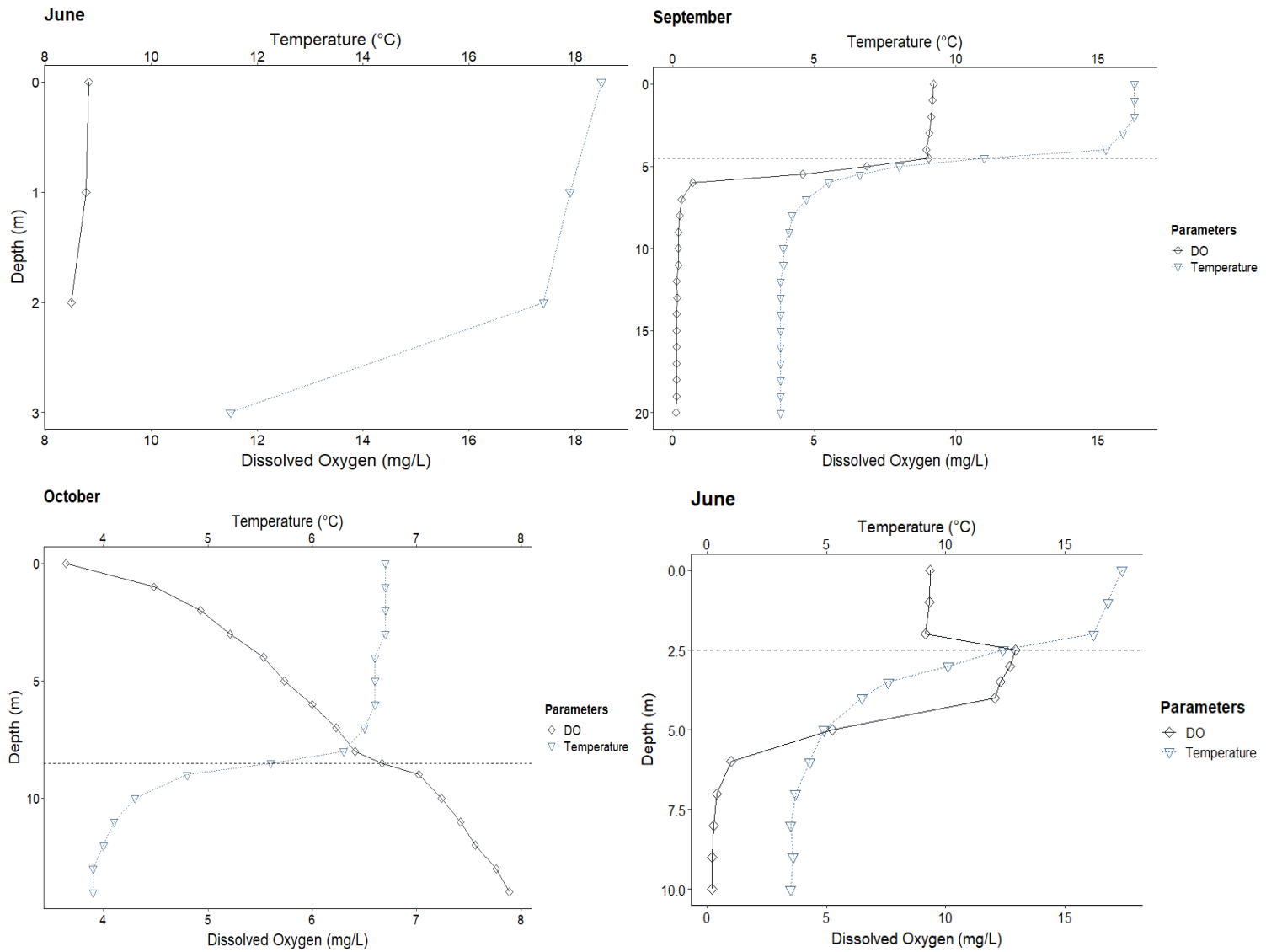


Figure A3-4: Temperature- DO Profiles for Sutherland Lake (June 2022, September 2022, October 2022 and June 2023)

Dashed line represents the thermocline, defined as a change of ≥1°C within 1 m of water depth.

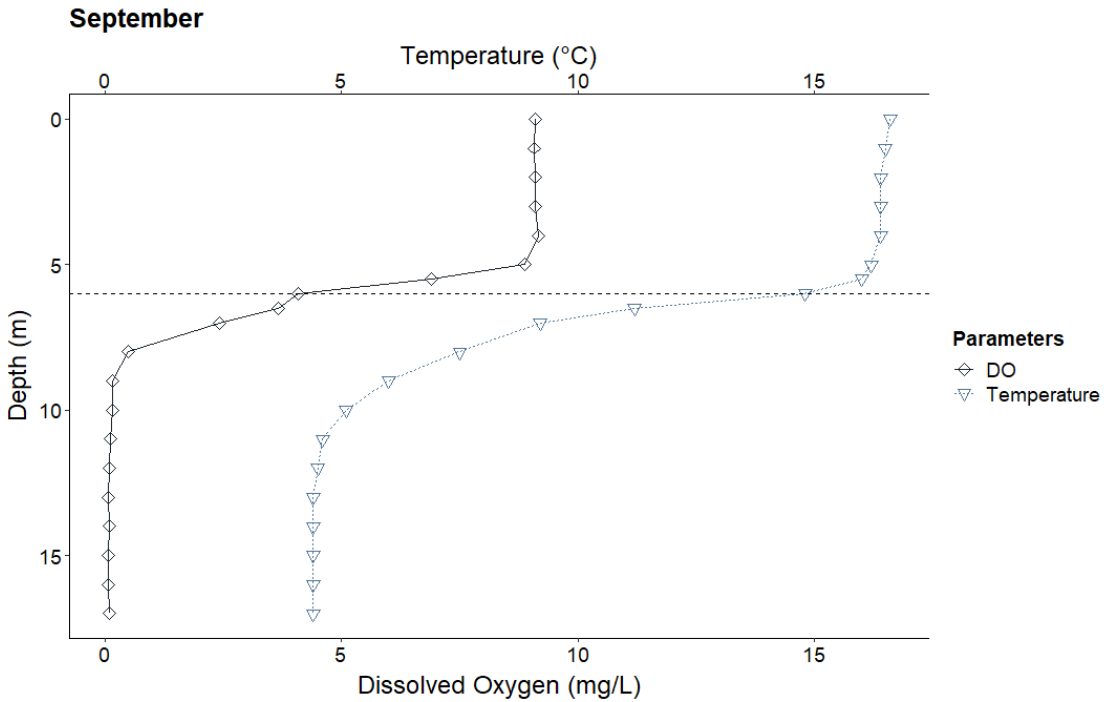


Figure A3-5: Temperature- DO Profiles for Mel Lake (September 2022)

Dashed line represents the thermocline, defined as a change of ≥1°C within 1 m of water depth.

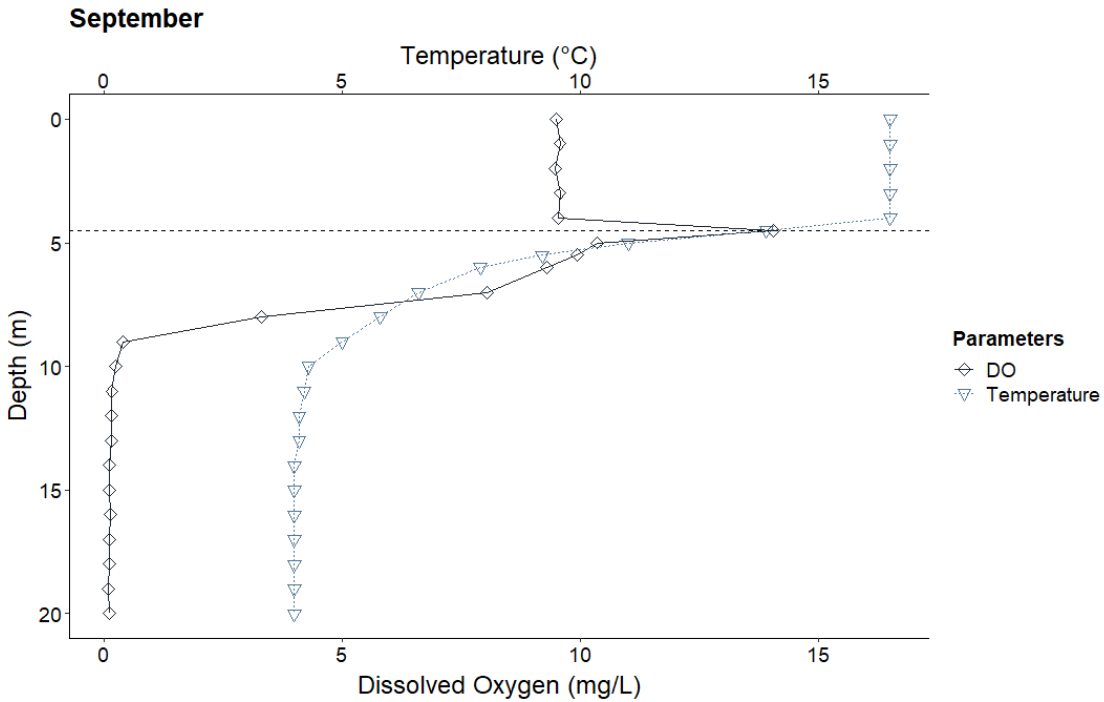


Figure A3-6: Temperature- DO Profiles for Davis Lake (September 2022)

Dashed line represents the thermocline, defined as a change of ≥1°C within 1 m of water depth.

APPENDIX B

Fish Habitat, Fish Community and Environmental DNA Data

Table B1-1: Minnow Trap Catch and CPUE Summary (2021)

Sample Location	Season	Sample ID	Lift Date (dd/mm/yy)	Traps set	Duration (hr)	Total Effort (hr)	Fish Species											Total CPUE	Total Catch
							Blacknose Shiner	Brook Stickleback	Fathead Minnow	Finescale Dace	Iowa Darter	Johnny Darter	Northern Redbelly Dace	Pearl Dace	Trout-Perch	White Sucker	Yellow Perch		
Species Catch																			
Unnamed Pond	Summer	NDR-P-01-MT1	09/08/21	10	17.00	170.00		3										-	**3**
		NDR-P-03-MT1	06/08/21	27	21.00	567.00		48	21			2	175					-	**246**
Unnamed Stream		NDR-S-01-MT1	09/08/21	14	19.50	273.00		4	2	63			15	85				-	**169**
West Buskegau River		WBR-P-01-MT1	08/08/21	14	20.00	280.00		1	1	58			27	15				-	**102**
		WBR-P-02-MT1	08/08/22	12	12.25	147.00		8		7			7	42				-	**64**
		WBR-S-04-MT1	10/08/22	10	18.83	188.33									1			-	**1**
Gerry Lake	Fall	NDR-GerLk-MT1	27/10/21	14	21.00	294.00					1						1	-	**2**
Unnamed Pond		NDR-P-01-MT1	24/10/21	18	18.75	337.50		21	1	1				8				-	**31**
		NDR-P-03-MT1	20/10/21	27	20.00	540.00	2	66	42	2	7		105	40				-	**264**
		NDR-P-03-MT2	22/10/21	16	23.17	370.67		25	27		2		56	11				-	**121**
Unnamed Stream		NDR-S-01-MT1	23/10/21	19	22.00	418.00		15	3	4			1					-	**23**
		NDR-S-02-MT1	23/10/21	16	19.75	316.00										1		-	**1**
Unnamed Tributary		NDR-TRIB-01-MT2	21/10/21	11	24.00	264.00		1										-	**1**
Species Catch Total							**2**	**192**	**97**	**135**	**10**	**2**	**386**	**201**	**1**	**1**	**1**	-	**1028**
Species CPUE																			
Unnamed Pond	Summer	NDR-P-01-MT1	09/08/21	10	17.00	170.00	0.000	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.018**	-
		NDR-P-03-MT1	06/08/21	27	21.00	567.00	0.000	0.085	0.037	0.000	0.000	0.004	0.309	0.000	0.000	0.000	0.000	**0.434**	-
Unnamed Stream		NDR-S-01-MT1	09/08/21	14	19.50	273.00	0.000	0.015	0.007	0.231	0.000	0.000	0.055	0.311	0.000	0.000	0.000	**0.619**	-
West Buskegau River		WBR-P-01-MT1	08/08/21	14	20.00	280.00	0.000	0.004	0.004	0.207	0.000	0.000	0.096	0.054	0.000	0.000	0.000	**0.364**	-
		WBR-P-02-MT1	08/08/22	12	12.25	147.00	0.000	0.054	0.000	0.048	0.000	0.000	0.048	0.286	0.000	0.000	0.000	**0.435**	-
		WBR-S-04-MT1	10/08/22	10	18.83	188.33	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	**0.005**	-
Gerry Lake	Fall	NDR-GerLk-MT1	27/10/21	14	21.00	294.00	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.003	**0.007**	-
Unnamed Pond		NDR-P-01-MT1	24/10/21	18	18.75	337.50	0.000	0.062	0.003	0.003	0.000	0.000	0.000	0.024	0.000	0.000	0.000	**0.092**	-
		NDR-P-03-MT1	20/10/21	27	20.00	540.00	0.004	0.122	0.078	0.004	0.013	0.000	0.194	0.074	0.000	0.000	0.000	**0.489**	-
		NDR-P-03-MT2	22/10/21	16	23.17	370.67	0.000	0.067	0.073	0.000	0.005	0.000	0.151	0.030	0.000	0.000	0.000	**0.326**	-
Unnamed Stream		NDR-S-01-MT1	23/10/21	19	22.00	418.00	0.000	0.036	0.007	0.010	0.000	0.000	0.002	0.000	0.000	0.000	0.000	**0.055**	-
		NDR-S-02-MT1	23/10/21	16	19.75	316.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	**0.003**	-
Unnamed Tributary		NDR-TRIB-01-MT2	21/10/21	11	24.00	264.00	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.004**	-
Species CPUE Total							**0.004**	**0.467**	**0.209**	**0.502**	**0.022**	**0.004**	**0.856**	**0.778**	**0.005**	**0.003**	**0.003**	-	-

Table B1-2: Gill Net Catch and CPUE Summary (2021)

Waterbody	Season	Sample ID	Sample Date (dd/mm/yy)	Net Length (m)	Net Height (m)	Stretched Mesh Size (mm)	Duration (hr)	Fish Species: Northern Pike	Total CPUE	Total Catch
Species Catch										
Gerry Lake	Fall	NDR-GerLk-GN1	27/10/21	15.24	1.83	Var	20.50	9	-	**9**
Martin Lake	Fall	NDR-MarLk-GN1	27/10/21	15.24	1.83	Var	43.75	3	-	**3**
Martin Lake	Fall	NDR-MarLk-GN3	27/10/21	15.24	1.83	Var	43.75	1	-	**1**
			Species Catch Total					**13**	**-**	**13**
Species CPUE										
Gerry Lake	Fall	NDR-GerLk-GN1	27/10/21	15.24	1.83	Var	20.50	0.439	**0.44**	-
Martin Lake	Fall	NDR-MarLk-GN1	27/10/21	15.24	1.83	Var	43.75	0.069	**0.07**	-
Martin Lake	Fall	NDR-MarLk-GN3	27/10/21	15.24	1.83	Var	43.75	0.023	**0.02**	-
			Species CPUE Total					**0.53**	**-**	**-**

Var; RIN Small Mesh Gillnet (25.4 to 101.6 mm)

Table B1-3: Seine Net Catch and CPUE Summary (2021)

Sample Location	Season	Sample ID	Lift Date (DD/MM/YY)	Hauls (#)	Haul Distance (m)	Net Length (m)	Net Height (m)	Mesh Size (mm)	Fish Species														Total CPUE	Total Catch
									Blacknose Shiner	Brook Stickleback	Common Shiner	Emerald Shiner	Golden Shiner	Johnny Darter	Logperch	Northern Pike	Pearl Dace	Shiner spp.	Spottail Shiner	Trout-Perch	White Sucker	YOY Cyprinid		
Species Catch																								
Unnamed Stream	Summer	NDR-S-02-SN1	10/08/21	1	15	3	1.2	3.18	2				15			1	3	20			19	21	-	81
	Summer	NDR-S-04-SN1	06/08/21	2	15	3	1.2	3.18		2			5	3							2		-	12
	Summer	NDR-S-04-SN2	06/08/21	2	15	3	1.2	3.18											7				-	7
West Buskegau River	Summer	WBR-S-03-SN1	10/08/21	2	15	3	1.2	3.18			6						1	4					-	11
	Summer	WBR-S-03-SN2	10/08/21	2	15	3	1.2	3.18				12											-	12
	Summer	WBR-S-04-SN1	09/08/21	3	15	3	1.2	3.18												3			-	3
	Summer	WBR-S-04-SN2	09/08/21	3	15	3	1.2	3.18				2			1		10						-	13
	Summer	WBR-S-04-SN3	09/08/21	3	15	3	1.2	3.18														62	-	62
Unnamed Stream	Fall	NDR-S-02-SN1	22/10/21	3	15	3	1.2	3.18				13	2										-	15
	Fall	NDR-S-02-SN1	22/10/21	3	15	3	1.2	3.18								1							-	1
	Fall	NDR-S-04-SN1	21/10/21	3	15	3	1.2	3.18				1		1									-	2
								Species Catch Total	**2**	**2**	**6**	**28**	**22**	**4**	**1**	**2**	**14**	**24**	**7**	**3**	**21**	**83**	**-**	219
Species CPUE																								
Unnamed Stream	Summer	NDR-S-02-SN1	10/08/21	1	15	3	1.2	3.18	2.00	0.00	0.00	0.00	15.00	0.00	0.00	1.00	3.00	20.00	0.00	0.00	19.00	21.00	**81.00**	-
	Summer	NDR-S-04-SN1	06/08/21	2	15	3	1.2	3.18	0.00	1.00	0.00	0.00	2.50	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	**6.00**	-
	Summer	NDR-S-04-SN2	06/08/21	2	15	3	1.2	3.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50	0.00	0.00	0.00	**3.50**	-
West Buskegau River	Summer	WBR-S-03-SN1	10/08/21	2	15	3	1.2	3.18	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.50	2.00	0.00	0.00	0.00	0.00	**5.50**	-
	Summer	WBR-S-03-SN2	10/08/21	2	15	3	1.2	3.18	0.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.00**	-
	Summer	WBR-S-04-SN1	09/08/21	3	15	3	1.2	3.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	**1.00**	-
	Summer	WBR-S-04-SN2	09/08/21	3	15	3	1.2	3.18	0.00	0.00	0.00	0.67	0.00	0.00	0.33	0.00	3.33	0.00	0.00	0.00	0.00	0.00	**4.33**	-
	Summer	WBR-S-04-SN3	09/08/21	3	15	3	1.2	3.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.67	**20.67**	-
Unnamed Stream	Fall	NDR-S-02-SN1	22/10/21	3	15	3	1.2	3.18	0.00	0.00	0.00	4.33	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**5.00**	-
	Fall	NDR-S-02-SN1	22/10/21	3	15	3	1.2	3.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	**0.33**	-
	Fall	NDR-S-04-SN1	21/10/21	3	15	3	1.2	3.18	0.00	0.00	0.00	0.33	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.67**	-
								Species CPUE Total	**2.000**	**1**	**3**	**11.3**	**18.2**	**1.8**	**0.3**	**1.3**	**6.8**	**22**	**3.5**	**1**	**20**	**41.67**	**-**	-

Table B1-4: Backpack Electrofishing Catch and CPUE Summary (2021)

Waterbody	Season	Sample ID	Lift Date (dd/mm/yy)	Effort (seconds)	Stream Length Electrofished (m)	Stream Width Electrofished (m)	Fish Species		Total CPUE	Total Catch
							Brook Stickleback	Northern Pike		
Species Catch										
Unnamed Stream	Summer	NDR-S-04-EF1	06/08/21	670	35	6.74	3	1	-	**4**
				Species Catch Total			**3**	**1**	**-**	**4**
Species CPUE										
Unnamed Stream	Summer	NDR-S-04-EF1	06/08/21	670	35	6.74	0.004	0.333	**-**	**-**
				Species CPUE Total			**0.004**	**0.333**	**-**	-

Table B1-5: Fyke Net Catch and CPUE Summary (2021)

Waterbody	Season	Sample ID	Lift Date (dd/mm/yy)	No. Nets Set	Duration (hr)	Total Effort (hr)	Fish Species						Total CPUE	Total Catch
							Burbot	Logperch	Northern Pike	Pearl Dace	Trout-Perch	White Sucker		
		Species Catch												
West Buskegau River	Summer	WBR-S-04-MFN1-US	10/08/21	1	17.50	17.50			1			3	-	**4**
West Buskegau River	Summer	WBR-S-04-MFN1-DS	10/08/21	1	17.50	17.50	1	1		1	3		-	**6**
Species Catch Total							**1**	**1**	**1**	**1**	**3**	**3**	-	**10**
		Species CPUE												
West Buskegau River	Summer	WBR-S-04-MFN1-US	10/08/21	1	17.50	17.50	0.00	0.00	0.06	0.00	0.00	0.17	**0.229**	-
West Buskegau River	Summer	WBR-S-04-MFN1-DS	10/08/21	1	17.50	17.50	0.06	0.06	0.00	0.06	0.17	0.00	**0.343**	-
Species CPUE Total							**0.06**	**0.06**	**0.06**	**0.06**	**0.17**	**0.17**	-	-

Table B1-6: Fyke Net Catch and CPUE Summary (2021)

Waterbody	Season	Sample ID	Date (dd/mm/yy)	Nets (#)	Dips (#)	Fish Species					Total CPUE	Total Catch
						Brook Stickleback	Finescale Dace	Northern Pike	Northern Redbelly Dace	YOY Cyprinid		
Species Catch												
Unnamed Pond	Summer	NDR-P-01-DN1	08/08/21	1	5		40				-	**40**
Unnamed Stream		NDR-S-02-DN1	11/08/21	1	2			1			-	**1**
		NDR-S-02-DN2	11/08/21	1	2					12	-	**12**
Unnamed Tributary		NDR-TRIB-02	11/08/21	1	1		1				-	**1**
West Buskegau River		WBR-P-02-DN1	11/08/21	1	1				6		-	**6**
		WBR-P-02-DN2	11/08/21	1	1	1			8		-	**9**
		WBR-P-02-DN3	11/08/21	1	1				8		-	**8**
Species Catch Total						**1**	**41**	**1**	**22**	**12**	-	**77**
Species CPUE												
Unnamed Pond	Summer	NDR-P-01-DN1	08/08/21	1	5	0	8	0	0	0	**8.00**	-
Unnamed Stream		NDR-S-02-DN1	11/08/21	1	2	0	0	0.5	0	0	**0.50**	-
		NDR-S-02-DN2	11/08/21	1	2	0	0	0	0	6	**6.00**	-
Unnamed Tributary		NDR-TRIB-02	11/08/21	1	1	0	1	0	0	0	**1.00**	-
West Buskegau River		WBR-P-02-DN1	11/08/21	1	1	0	0	0	6	0	**6.00**	-
		WBR-P-02-DN2	11/08/21	1	1	1	0	0	8	0	**9.00**	-
		WBR-P-02-DN3	11/08/21	1	1	0	0	0	8	0	**8.00**	-
Species CPUE Total						**1.00**	**9.00**	**0.50**	**22.00**	**6.00**	-	-

467500 470000 472500 475000 477500 480000 482500

5412500 5410000 5407500 5405000

NDR-S-04-T3
NDR-S-04-T2
NDR-S-04-T1
NDR-S-04-T5
NDR-S-04-T4
NDR-S-04-BF
North Driftwood River
CAMP 40 RD
50 m

WBR-S-04-T5
WBR-S-04-BF
WBR-S-04-T4
WBR-S-04-T3
WBR-S-04-T2
WBR-S-04-T1
West Ibstikegan River
Ibstikegan River
50 m

NDR-TRIB-02-T1
NDR-TRIB-02-T2
NDR-TRIB-02-T3
NDR-TRIB-02-BF
50 m

WBR-S-03-T5
WBR-S-03-BF
WBR-S-03-T4
WBR-S-03-T3
WBR-S-03-T2
WBR-S-03-T1
West Ibstikegan River
50 m

NDR-S-02-T5
NDR-S-02-T4
NDR-S-02-T3
NDR-S-02-T2
NDR-S-02-T1
NDR-S-02-BF
North Driftwood River
50 m

WBR-S-02-T5
WBR-S-02-T4
WBR-S-02-T3
WBR-S-02-T2
WBR-S-02-BF
WBR-S-02-T1
North Driftwood River
Prosser Creek
WBR-S-01-BF
WBR-S-01-T1
WBR-S-01-T2
WBR-S-01-T3
50 m

CAMP 40 RD
West Ibstikegan River
North Driftwood River
655
Martin Lake
Gerry Lake
Jack Lake
Jocko Creek
Prosser Creek

X:\CA\CAOAK300-OAK\MS-FS1-ProjectF\2020\Projects\OMEMA2002_Canada Nickel_Crawford Lake\11_GIS\VA\quaticBaseline_2021\MXD\Habitat_Sampling_Locs_3.mxd

LEGEND

- Property Boundary (2021)
- Utility Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Habitat Assessment Sampling Location

- Habitat Bank Full Measurement
- Habitat Transect

NOTES:
- Topographic map information extracted from Land Information Ontario (NDMNRF), Queen's Printer for Ontario, 2021
- Aerial imagery around property boundary provided by CNC, scene date, summer 2021.
- Surrounding aerial imagery extracted from ESRI ArcGIS Online Image Service, scene date is May 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 1 2 4 6 8 10 Kilometres

CANADA NICKEL COMPANY

WSP

CRAWFORD NICKEL PROJECT

Habitat Assessment Sampling Locations (2021)

PROJECT N°:OMEMA2304	**FIGURE: B1-1**
SCALE: 1:45,000	DATE: November 2023

472000 473000 474000 475000 476000 477000 478000 479000 480000

5414000 5413000 5412000 5411000

655

WBR-S-04-SN3
WBR-S-04-SN1
WBR-S-04-MFN1-US
WBR-S-04-MFN1-DS
WBR-S-04-SN1
WBR-S-04-SN2
All minnow traps shown are part of WBR-S-04-MT1
West Buskegau River
10 m

WBR-S-03-SN1
West Buskegau River
10 m

All minnow traps shown are part of WBR-P-01-MT1
50 m

WBR-P-02-DN3
WBR-P-02-DN1
WBR-P-02-DN2
All minnow traps shown are part of WBR-P-02-MT1
50 m

West Buskegau River

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LEGEND

- Property Boundary (2021)
- Utility Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Gear Type

- Dip Net
- Gillnet
- Minnow Fyke Net
- Minnow Trap
- Seine Net

Season

- Summer
- Fall

- Electrofishing (Summer)

OVERVIEW MAP
a b c d
2 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (NDMNRF), Queen's Printer for Ontario, 2021
- Aerial imagery provided by CNC, scene date, summer 2021.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2021)

PROJECT N°:OMEMA2304	**FIGURE: B1-2a**
SCALE: 1:20,000	DATE: November 2023

467000 468000 469000 470000 471000 472000 473000 474000 475000

5412000 5411000 5410000 5409000 5408000

NDR-P-03-GN3
NDR-P-03-GN4
NDR-P-03-GN2
All minnow traps shown are part of NDR-P-03-MT1 and NDR-P-03-MT2
NDR-P-03-GN1
50 m

CAMP 40 RD
North Driftwood River
NDR-TRIB-02-DN1
LOWER STURGEON DAM RD
655

All minnow traps shown are part of NDR-S-04-MT1
North Driftwood River
NDR-S-04-EF1
NDR-S-04-SN1
NDR-S-04-SN2
NDR-S-04-SN1
10 m

NDR-S-02-DN2
NDR-S-02-SN1
North Driftwood River
NDR-S-02-DN1
NDR-S-02-SN1
All minnow traps shown are part of NDR-S-02-MT1
20 m

All minnow traps shown in this waterbody are part of NDR-P-04-MT1
All minnow traps shown in this waterbody are part of NDR-P-02C-MT1
All minnow traps shown in this waterbody are part of NDR-P-02B-MT1
20 m

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LEGEND

- Property Boundary (2021)
- Utility Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

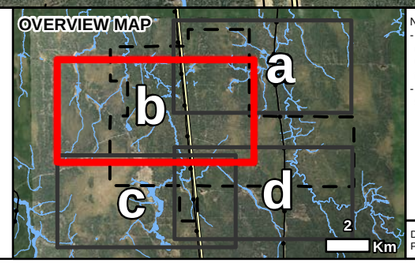
Aquatic Resource Sampling Location

Gear Type
- Dip Net
- Gillnet
- Minnow Fyke Net
- Minnow Trap
- Seine Net

Season
- Summer
- Fall

- Electrofishing (Summer)

OVERVIEW MAP



NOTES:
- Topographic map information extracted from Land Information Ontario (NDMNRF), Queen's Printer for Ontario, 2021
- Aerial imagery provided by CNC, scene date, summer 2021.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

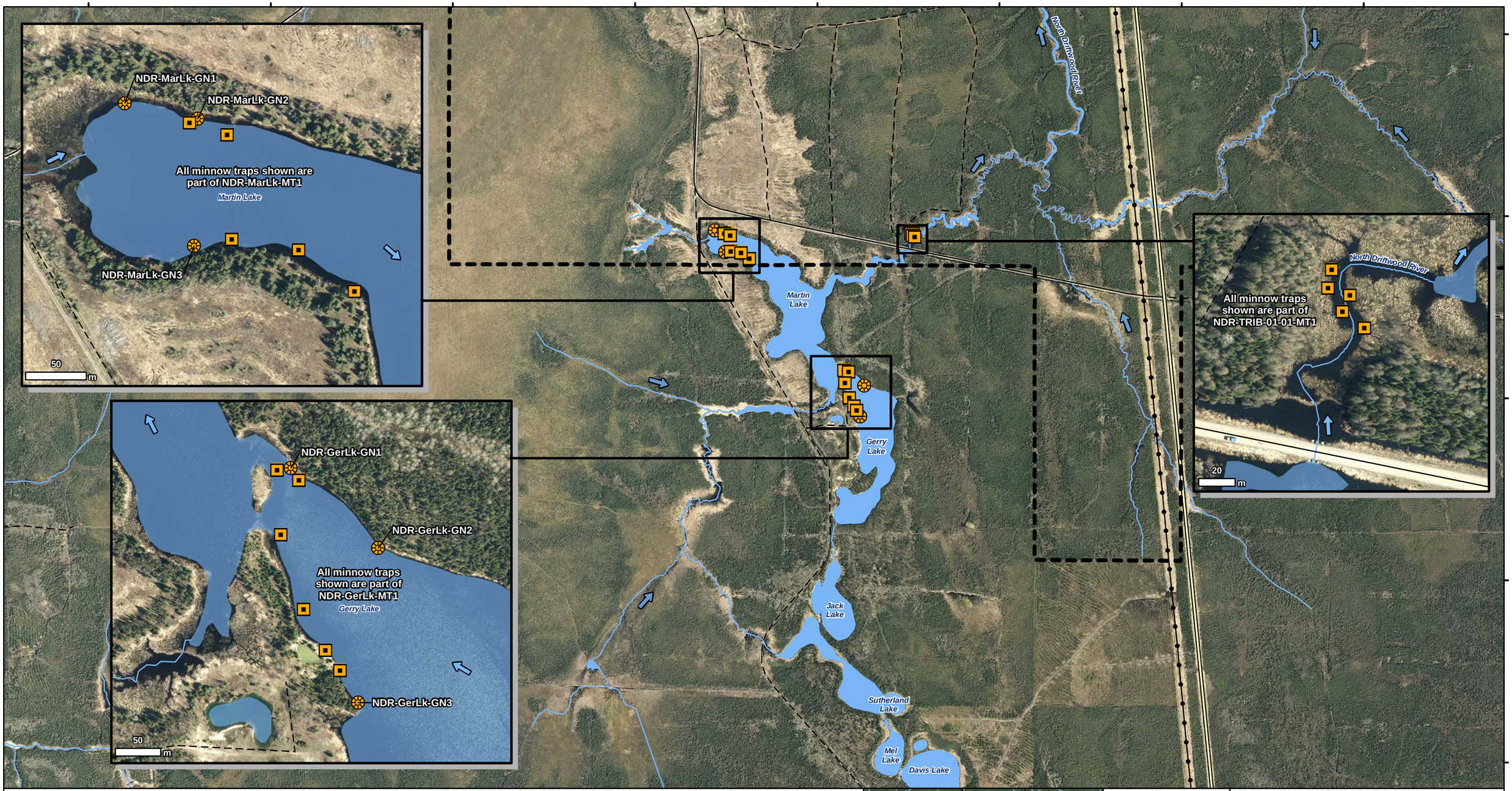
CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2021)

PROJECT N°:OMEMA2304	**FIGURE: B1-2b**
SCALE: 1:22,000	DATE: November 2023



LEGEND

- Property Boundary (2021)
- Utility Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

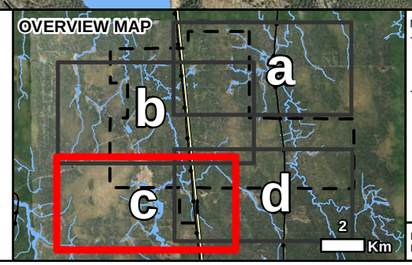
Aquatic Resource Sampling Location

Gear Type
- Dip Net
- Gillnet
- Minnow Fyke Net
- Minnow Trap
- Seine Net

Season
- Summer
- Fall

- Electrofishing (Summer)

OVERVIEW MAP



NOTES:
- Topographic map information extracted from Land Information Ontario (NDMNRF), Queen's Printer for Ontario, 2021
- Aerial imagery provided by CNC, scene date, summer 2021.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2021)

PROJECT N°:OMEMA2304	**FIGURE: B1-2c**
SCALE: 1:20,000	DATE: November 2023

472000 473000 474000 475000 476000 477000 478000 479000 480000

5408000 5407000 5406000 5405000

North Driftwood River

655

NDR-P-01-DN1

All minnow traps shown are part of NDR-P-01-MT1

50 m

All minnow traps shown are part of NDR-S-01-MT1

50 m

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LEGEND

- Property Boundary (2021)
- Utility Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Gear Type

- Dip Net
- Gillnet
- Minnow Fyke Net
- Minnow Trap
- Seine Net

Season

- Summer
- Fall

- Electrofishing (Summer)

OVERVIEW MAP

a b c d

2 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (NDMNRF), Queen's Printer for Ontario, 2021
- Aerial imagery provided by CNC, scene date, summer 2021.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

CANADA NICKEL COMPANY

WSP

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2021)

PROJECT N°:OMEMA2304 | **FIGURE: B1-2d**

SCALE: 1:20,000 | DATE: November 2023

Table B2-1: Minnow Trap Catch and CPUE Summary (2022)

Sample Location	Season	Sample ID	Lift Date (dd/mm/yy)	Traps set	Duration	Total Effort (hr)	Fish Species																	Site Catch Total (n)	Total CPUE
							Brook Stickleback	Common Shiner	Fathead Minnow	Finescale Dace	Golden Shiner	Johnny Darter	Iowa Darter	Lake Chub	Northern Redbelly Dace	Northern Pearl Dace	Bluntnose Minnow	Blacknose Shiner	Juv. Phoxinus sp.	Trout Perch	White Sucker	Yellow Perch	Mottled Sculpin	Burbot		
Jocko Creek	Spring	JC-S-01-MT1	29/05/2022	10	19.00	190.00	84		17					284	288						5				678	3.57
	Summer		18/08/2022	20	27.50	550.00	176							172		497					9				854	1.55
	Fall		19/10/22	25	18.25	456.25	36			12				247	4										299	0.66
Davis Lake	Spring	NDR-DavLK-MT1	02/06/2022	16	23.33	373.33			4	124	60		17									182			387	1.04
	Summer		16/09/22	30	22.50	675.00	1	1	3	12			23			6						5			51	0.08
Gerry Lake	Spring	NDR-GerLk-MT1	03/06/2022	17	18.68	317.62																43			43	0.14
	Summer		31/08/2022	30	19.25	577.50							1									28			29	0.05
	Fall		20/10/22	25	25.25	631.25	no catch																		0	0.00
Jack Lake	Spring	NDR-JacLK-MT1	03/06/2022	10	19.17	191.67	88		9	4	2		13									3			119	0.62
	Summer		16/09/2022	26	26.00	676.00	4			28			1							18					51	0.08
	Fall		22/10/22	23	24.00	552.00	13	4							1			1				1			20	0.04
Martin Lake	Spring	NDR-MarLk-MT1	30/05/2022	15	16.92	253.75																13			13	0.05
	Summer		31/08/2022	30	23.07	692.00																22			22	0.03
	Fall		20/10/22	25	25.50	637.50	no catch																		0	0.00
Sutherland Lake	Summer	NDR-SutLk-MT1	16/09/2022	30	25.42	762.50	10	2					8									3			23	0.03
	Fall		21/10/22	25	22.83	570.83							1		1										2	0.00
Mel Lake	Summer	NDR-MelLk-MT1	16/09/22	30	26.00	780.00	10	4	2	35	10		15			1						33			110	0.14
North Driftwood River	Spring	NDR-P-01-MT1	28/05/2022	10	24.25	242.50	60	1	96	539				4			1				1				702	2.89
	Summer		18/08/2022	20	20.92	418.33	13		26	353						22									414	0.99
	Fall		14/10/22	25	22.58	564.58			25	110															135	0.24
	Spring	NDR-P-02-MT1	30/05/2022	18	29.08	523.50	no catch																		0	0.00
	Summer		01/09/22	22	19.00	418.00	no catch																		0	0.00
	Fall		13/10/22	10	18.58	185.83	no catch																		0	0.00
	Spring	NDR-P-03-MT1	01/06/2022	10	22.37	223.67	3		1882										141						2026	9.06
	Summer		30/08/2022	6	17.27	103.60	15								83										98	0.95
	Summer	NDR-P-03-MT2	31/08/2022	24	22.85	548.40	49		143	338		1				4									535	0.98
	Fall	NDR-P-03-MT1	14/10/22	25	20.75	518.75	71		18				4		322										415	0.80
	Spring	NDR-P-04-MT1	30/05/2022	9	29.00	261.00	no catch																		0	0.00
	Summer		01/09/22	30	19.75	592.50	no catch																		0	0.00
	Spring	NDR-P-05-MT1	04/06/2022	7	25.83	180.83	90		6					1					179						276	1.53
	Summer		18/09/22	30	23.00	690.00	3		2	3						7									15	0.02
	Spring	NDR-P-06-MT1	31/05/2022	12	16.17	194.00	51		23	464															538	2.77
	Summer		30/08/2022	26	20.33	528.67	15		1	222															238	0.45
	Fall		15/10/22	25	22.50	562.50	1		18	48					2										69	0.12
	Summer	NDR-P-07-MT1	30/08/2022	30	20.33	610.00	27			10				18	2	5					1				63	0.10

Sample Location	Season	Sample ID	Lift Date (dd/mm/yy)	Traps set	Duration	Total Effort (hr)	Fish Species																		Site Catch Total (n)	Total CPUE
							Brook Stickleback	Common Shiner	Fathead Minnow	Finescale Dace	Golden Shiner	Johnny Darter	Iowa Darter	Lake Chub	Northern Redbelly Dace	Northern Pearl Dace	Bluntnose Minnow	Blacknose Shiner	Juv. Phoxinus sp.	Trout Perch	White Sucker	Yellow Perch	Mottled Sculpin	Burbot		
	Fall		15/10/22	10	20.25	202.50	10			20				2	2	2									36	0.18
	Spring		28/05/2022	10	24.00	240.00	168		12	50				19	178							1			428	1.78
	Summer	NDR-S-01-MT1	18/08/2022	20	21.50	430.00	9		1						10										20	0.05
	Fall		23/10/22	25	67.00	1675.00	23			1						1									25	0.01
	Spring		07/06/2022	10	21.42	214.17	7																		7	0.03
	Summer	NDR-S-02-MT1	31/08/22	30	16.00	480.00	no catch																		0	0.00
	Fall		17/10/22	10	21.50	215.00	1																		1	0.00
	Spring		30/05/2022	9	27.42	246.75	42												3	1					46	0.19
	Summer	NDR-S-04-MT1	30/08/2022	30	21.00	630.00	1	2																	3	0.00
	Fall		13/10/22	10	19.25	192.50		1							1										2	0.01
	Spring		31/05/2022	10	15.23	152.33	11		8					2					424						445	2.92
	Summer	NDR-S-05-MT1	30/08/2022	30	20.92	627.50	11			6															17	0.03
	Fall		15/10/22	25	22.25	556.25	85		14	71					29										199	0.36
	Spring		06/06/2022	7	27.67	193.67	1																		1	0.01
	Summer	NDR-Trib-01-MT1	02/09/22	30	18.33	550.00	no catch																		0	0.00
	Fall		19/10/22	10	22.25	222.50	1																		1	0.00
	Spring	NDR-Trib-02-MT1	08/06/2022	10	18.75	187.50	77			7				9											93	0.50
	Fall		17/10/22	25	19.00	475.00	25			3						10									38	0.08
West Buskegau River	Spring	WBR-P-01-MT1	08/06/2022	8	23.25	186.00	57		42					3					546		1				649	3.49
	Fall	WBR-P-03-MT1	24/10/22	23	23.50	540.50	87		20	111					40	4									262	0.48
	Summer	WBR-P-04-MT1	18/09/2022	30	22.25	667.50	9		3	194					8	11									225	0.34
	Fall		24/10/22	20	19.50	390.00	55		10	127					60										252	0.65
	Spring	WBR-S-01-MT1	06/06/2022	7	19.58	137.08	1													1			1	1	4	0.03
	Summer		02/09/22	26	17.75	461.50														3					3	0.01
	Spring	WBR-S-03-MT1	06/06/2022	7	25.25	176.75														10				2	12	0.07
	Summer		02/09/22	30	20.67	620.00						1								4			1	3	9	0.01
	Spring	WBR-S-04-MT1	06/06/2022	7	27.00	189.00														3			1		4	0.02
	Summer		02/09/22	26	18.67	485.33														2				2	4	0.01
Species Catch Total							**1,501**	**15**	**2,385**	**1,425**	**72**	**2**	**83**	**589**	**1,021**	**570**	**1**	**1**	**2,942**	**42**	**17**	**334**	**3**	**8**	**-**	**-**

Table B2-2: Gillnet Catch and CPUE Summary (2022)

Sample Location	Effort ID	Season	Lift Date (dd/mm/yy)	Duration	Net Length (m)	Net Height (m)	Stretched Mesh Size (mm)	Fish Species									Site Catch Total (n)	Site CPUE Total
								Finescale Dace	Lake Chub	Northern Pearl Dace	Northern Redbelly Dace	White Sucker	Yellow Perch	Fathead Minnow	Common Shiner	Northern Pike		
North Driftwood River	NDR-S-04-GN1	Summer	29/08/22	4.25	15.24	1.83	Var						1		2		3	0.71
	NDR-S-04-GN2	Summer	29/08/22	4.25	15.24	1.83	Var	no catch									0	0.00
	NDR-S-04-GN3	Summer	29/08/22	4.25	15.24	1.83	Var	no catch									0	0.00
	NDR-S-05-GN1	Summer	08-30-22	0.13	15.24	1.83	Var	1	2								3	24.00
	NDR-P-03-GN1	Summer	30/08/22	3.00	NR	NR	NR			3							3	1.00
	NDR-P-04-GN1	Summer	31/08/22	4:00	NR	NR	NR	no catch									0	0.00
	NDR-P-06-GN1	Summer	30/08/22	3.50	15.24	1.83	Var			2		4		1			7	2.00
	NDR-P-07-GN1	Summer	08-30-22	18.75	15.24	1.83	Var	10	8	1	1	10					30	1.60
	NDR-TRIB-01-GN1	Summer	01/09/22	2.3	NR	NR	NR						2			1	3	1.30
Gerry Lake	GER-LK-GN1	Summer	31/08/22	3:00	NR	NR	76.20	no catch									0	0.00
	GER-LK-GN2	Summer	31/08/22	3:00	NR	NR	114.30	no catch									0	0.00
	GER-LK-GN3	Summer	31/08/22	3:00	NR	NR	76.20	no catch									0	0.00
	NDR-GERLK-GN1	Fall	20/10/22	1.5	25.00	NR	25.4	no catch									0	0.00
	NDR-GERLK-GN2	Fall	20/10/22	1.5	25.00	NR	50.8	no catch									0	0.00
Martin Lake	MAR-LK-GN1	Summer	31/08/22	3:00	15.24	1.83	Var						4			1	5	40.00
	NDR-MARLK-GN1	Fall	20/10/22	3	25.00	NR	25.40	no catch									0	0.00
	NDR-MARLK-GN2	Fall	20/10/22	3	25.00	NR	50.8									1	1	0.33
Sutherland Lake	SUT-LK-GN1	Summer	16/09/22	3:00	NR	NR	101.60						2			2	4	32.00
	SUT-LK-GN2	Summer	16/09/22	3:00	NR	NR	114.30	no catch									0	0.00
	SUT-LK-GN3	Summer	16/09/22	3:00	NR	NR	25.40	no catch									0	0.00
	NDR-SUTLK-GN1	Fall	21/10/22	2.75	25.00	NR	NR									2	2	0.73
Jack Lake	JK-LK-GN1	Summer	15/09/22	3:00	15.24	1.83	25.40	no catch									0	0.00
	JK-LK-GN2	Summer	15/09/23	3:00	15.24	1.83	114.30	no catch									0	0.00
	JK-LK-GN3	Summer	15/09/24	3:00	15.24	1.83	101.60	no catch									0	0.00
	NDR-JACLK-GN1	Fall	22/10/22	2	15.24	1.83	Var									1	1	0.50
Davis Lake	NDR-DAVLK-GN1	Summer	16/09/22	2:00	NR	NR	NR	no catch									0	0.00
Mel Lake	NDR-MELLAK-GN1	Summer	16/09/22	2.5	NR	NR	NR				1		21				22	8.80
West Buskegau River	WBR-P-04-GN1	Summer	17/09/22	3:00	NR	NR	25.40	no catch									0	0.00
	WBR-P-04-GN2	Summer	17/09/22	3:00	NR	NR	101.60											
	WBR-P-04-GN3	Summer	17/09/22	3:00	NR	NR	114.30											
	WBR-S-04-GN1	Summer	01/09/22	3:00	NR	NR	NR					4				2	6	48.00
							Species Catch Total (n)	**11**	**10**	**6**	**2**	**18**	**30**	**1**	**2**	**10**	**90**	**-**

NR; Not Recorded,
Var; RIN Small Mesh Gillnet (25.4 to 101.6 mm)

Table B2-3: Seine Net Catch and CPUE Summary (2022)

Waterbody	Season	Sample ID	Lift Date dd/mm/yy)	Haul Dist. (m)	Fish Species										Site Catch Total (n)	Total CPUE
					Blacknose Shiner	Bluntnose Minnow	Brook Stickleback	Common Shiner	Golden Shiner	Johnny Darter	Logperch	Northern Redbelly Dace	White Sucker	Yellow Perch		
North Driftwood River	Summer	NDR-S-04-SN1	29/08/22	30			1	19			1			1	22	22
		NDR-S-04-SN2	29/08/22	30	22		9	61		1	3		1		97	97
		NDR-S-04-SN3	29/08/22	30	25	1	1	131	6	2		14	1		181	181
West Buskegau River		WBR-S-04-SN1	31/08/22	15	no catch										0	0
		WBR-S-04-SN2	31/08/22	15	no catch										0	0
		WBR-S-04-SN3	31/08/22	15	no catch										0	0
		WBR-S-04-SN4	31/08/22	15	no catch										0	0
Species Catch Total					**47**	**1**	**11**	**211**	**6**	**3**	**4**	**14**	**2**	**1**	**300**	**-**

One (1) haul per sample ID
Net length 3 m
Net height 1.2 m
Mesh size 3.10 mm

Table B2-4: Backpack Electrofishing Catch and CPUE Summary (2022)

Waterbody	Season	Sample ID	Lift Date (dd/mm/yy)	# Seconds	Stream Length Electrofished (m)	Stream Width Electrofished (m)	Fish Species						Site Catch Total (n)	Total CPUE
							Brook Stickleback	Fathead Minnow	Finescale Dace	Northern Pearl Dace	Northern Pike	White Sucker		
North Driftwood River	Summer	NDR-S-04-EF1	06/08/21	670	35	6.74	3				1		4	0.01
Jocko Creek		JS-01-EF1	30/08/22	1006	35	2	12	2		17		5	36	0.04
		JS-01-EF2	30/08/22	1006	35	2	7	1		27		1	36	0.04
		JS-01-EF3	30/08/22	1006	35	2	8		7	10			25	0.02
						Total	**30**	**3**	**7**	**54**	**1**	**6**	**101**	**-**

460000 462500 465000 467500 470000 472500 475000 477500 480000 482500

5412500 5410000 5407500 5405000 5402500

MatR-02-T
MatR-01-T
NDR-S-04-T
NDR-P-07-T
NDR-S-05-T
NDR-P-06-T
NDR-TRIB-02-T
NDR-P-03-T
NDR-S-02-T
NDR-TRIB-01-T
NDR-Mar-LK-T
NDR-P-01-T
NDR-S-01-T
NDR-Ger-LK-T
NDR-JCK-LK-T
NDR-SDR-LK-T
JC-S-01-T
WBR-P-04-T
WBR-S-05-T
WBR-P-03-T
WBR-S-04-T
WBR-S-03-T
WBR-S-01-T

NDR-P-04-T
NDR-P-02-T
50 m

Nesbitt Creek
Nettagami River
CAMP 40 RD
North Driftwood River
LOWER STURGEON DAM RD
655
Martin Lake
Gerry Lake
Jock Creek
Mel Lake
Davis Lake
Zed Lake
West Bloskegan River
Prosser Creek
Prosser Lake

X:\CA\CAOAK300-OAK\MS-FS1-Project\F\2020\Projects\OMEMA2002_Canada Nickel_Crawford Lake\11_GIS\VAquaticBaseline_2022\MXD\Habitat_Sampling_Locs_2.mxd

LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Habitat Assessment Sampling Locations

- Spring
- Summer
- Fall

OVERVIEW MAP
Enlarged Area
10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 1 2 4 6 8 10 Kilometres

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Habitat Assessment Sampling Locations (2022)

PROJECT N°:OMEMA2304 | **FIGURE: B2-1**

SCALE: 1:58,000 | DATE: November 2023

472000 473000 474000 475000 476000 477000 478000 479000 480000

5414000 5413000 5412000 5411000

655

West Buskegau River

WBR-P-04-MT5
WBR-P-04-GN3
WBR-P-04-MT4
WBR-P-04-MT3
WBR-P-04-GN1
WBR-P-04-MT4
WBR-P-04-MT3
WBR-P-04-MT2
WBR-P-04-GN2
WBR-P-04-MT2
WBR-P-04-MT1
WBR-P-04-MT1
50 m

WBR-P-01-MT1

WBR-P-03-MT3
WBR-P-03-MT2
WBR-P-03-MT1
WBR-P-03-MT4
WBR-P-03-MT5
50 m

West Buskegau River
WBR-S-04-GN4
WBR-S-04-MT1
WBR-S-04-MT1
10 m

West Buskegau River
WBR-S-03-MT1
WBR-S-03-MT1
WBR-S-03-MT2
WBR-S-03-MT3
WBR-S-03-MT4
50 m

West Buskegau River

X:\CA\CAOAK300-OAK\MS-FS1-ProjectFI\2020\Projects\OMEMA2002_Canada Nickel_Crawford Lake\11_GIS\AquaticBaseline_2022\MXD\AquaticResources_MapA_2.mxd

LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Gear Type	Season
Gillnet	Spring
Minnow Trap	Summer
Seine Net	Fall

OVERVIEW MAP
a b c d
10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2022)

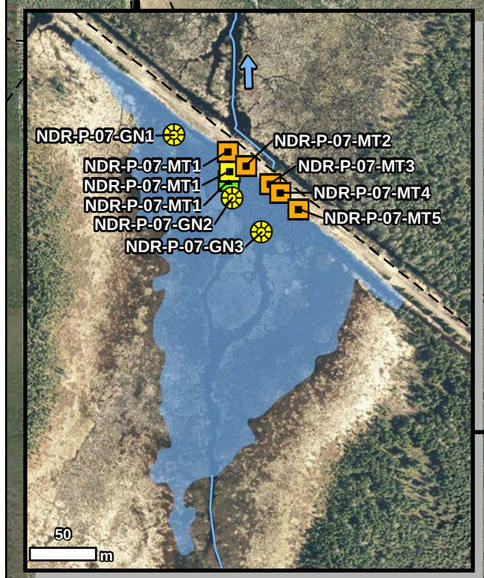
PROJECT N°:OMEMA2304 | **FIGURE: B2-2a**

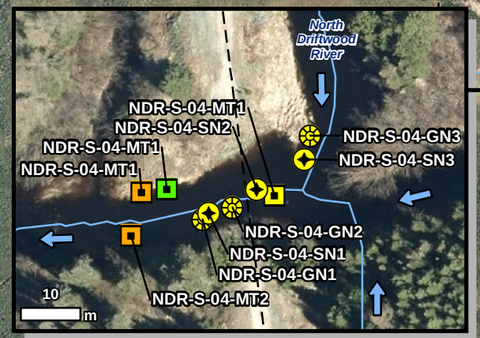
SCALE: 1:20,000 | DATE: November 2023

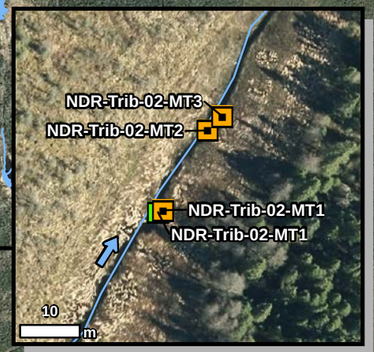
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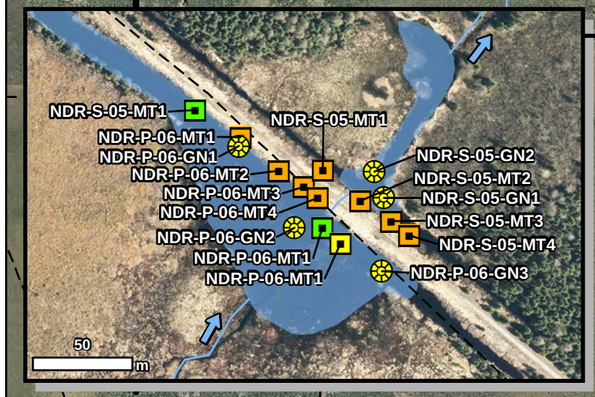
5412000 5411000 5410000 5409000

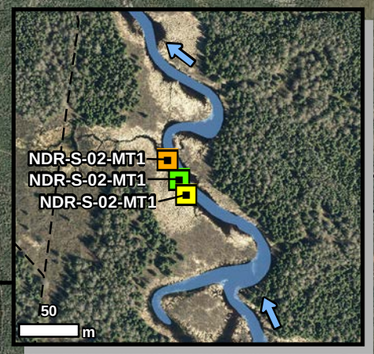
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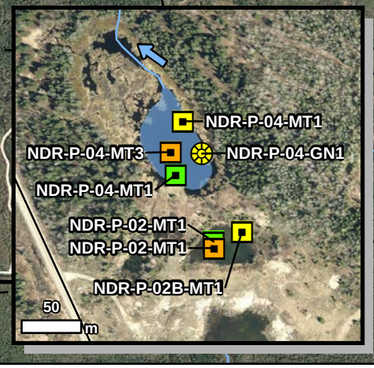












NDR-S-05-MT1

NDR-P-03-MT2
NDR-P-03-MT3
NDR-P-03-MT1
NDR-P-03-MT4
NDR-P-03-MT1
NDR-P-03-MT5
NDR-P-03-GN1
NDR-P-03-MT6

CAMP 40 RD

North Driftwood River

655

LOWER STURGEON DAM RD

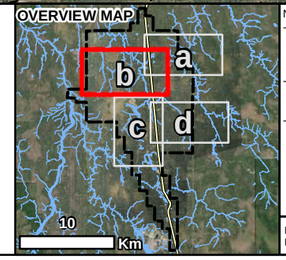
LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Gear Type	Season
Gillnet	Spring
Minnow Trap	Summer
Seine Net	Fall

OVERVIEW MAP



NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

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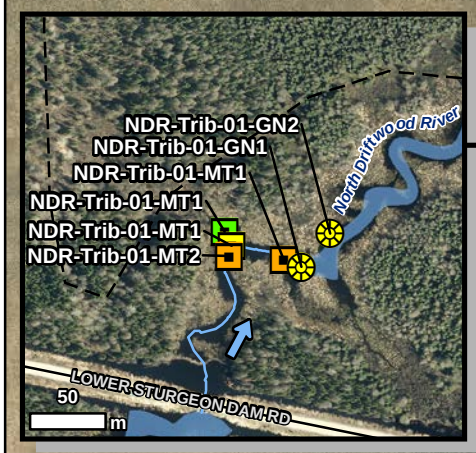
Aquatic Resource Sampling Locations (2022)

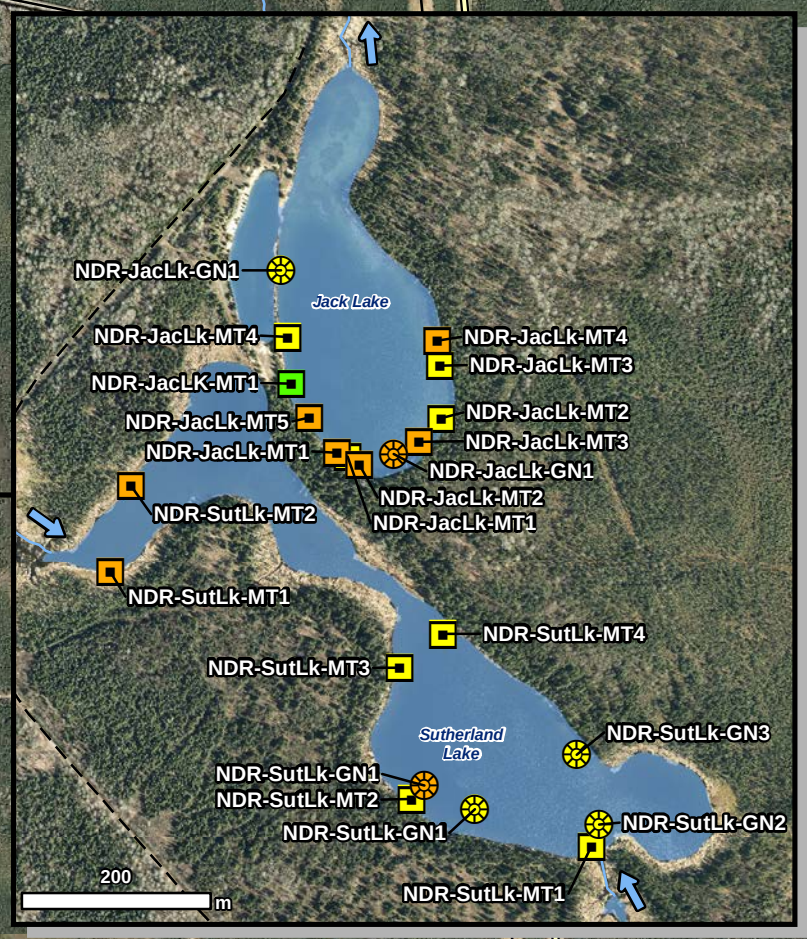
PROJECT N°:OMEMA2304 | **FIGURE: B2-2b**

SCALE: 1:22,000 | DATE: November 2023

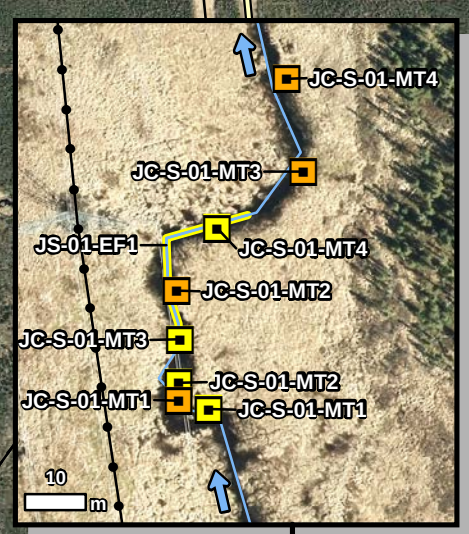
469000 470000 471000 472000 473000

5407000 5406000 5405000 5404000 5403000 5402000 5401000











Jack Lake
Sutherland Lake
Mel Lake
Davis Lake
Zed Lake
Martin Lake
Gerry Lake
North Driftwood River
655
NDR-MarLk-MT1
NDR-MarLk-GN1
NDR-MarLk-MT1
NDR-MarLk-MT1
NDR-MarLk-GN1
NDR-GerLk-MT1
NDR-GerLk-MT1
NDR-GerLk-GN1
NDR-Gerlk-GN1
NDR-GerLk-MT1
JC-S-01-MT1

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LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Gear Type	Season
Gillnet	Spring
Minnow Trap	Summer
Seine Net	Fall
Electrofishing (Summer)	

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 0.25 0.5 1 1.5 2 Kilometres

N W E S

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CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations

PROJECT N°:OMEMA2304 | **FIGURE: B2-2c**

SCALE: 1:20,000 | DATE: November 2023

473000 474000 475000 476000 477000 478000 479000 480000

5407000 5406000 5405000 5404000 5403000

655

NDR-P-01-MT3 NDR-P-01-MT2 NDR-P-01-MT1 NDR-P-01-MT1 NDR-P-01-MT5 NDR-P-01-MT4 NDR-P-01-MT1 NDR-P-01-MT2

50 m

NDR-S-01-MT1 NDR-S-01-MT1 NDR-S-01-MT3 NDR-S-01-MT2 NDR-S-01-MT2 NDR-S-01-MT1 NDR-S-01-MT3

50 m

WBR-S-01-MT1 WBR-S-01-MT4

Wesleyville Creek

Prosser Creek

NDR-P-05-MT2 NDR-P-05-MT1 NDR-P-05-MT3 NDR-P-05-MT4 NDR-P-05-MT1

50 m

Prosser Lake

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LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Gear Type	Season
Gillnet	Spring
Minnow Trap	Summer
Seine Net	Fall

OVERVIEW MAP

a b c d

10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

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CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2022)

PROJECT N°:OMEMA2304 | **FIGURE: B2-2d**

SCALE: 1:20,000 | DATE: November 2023

Table B3-1: Minnow Trap Catch and CPUE Summary (2023)

Waterbody	Season	Effort ID	# Traps Set	Lift Date (dd/mm/yy)	Lift Time (Military)	Duration (hours)	Fish Species																		Site Catch Total (n)	Site CPUE Total
							Blacknose Shiner	Bluntnose Minnow	Brook Stickleback	Burbot	Common Shiner	Chrosomus Hybrid	Fathead Minnow	Fathead Minnow	Finescale Dace	Golden Shiner	Iowa Darter	Lake Chub	Logperch	Northern Pearl Dace	Northern Redbelly Dace	Spottail Shiner	Trout-Perch	White Sucker	Yellow Perch		
Gerry Lake	Spring	NDR-GERLK-MT1	18	12/6/23	10:30	42.0																			19	19	0.03
	Summer	NDR-GERLK-MT1	22	12/7/23	15:30	23.0											1								119	120	0.24
Sutherland Lake	Spring	NDR-SUTLK-MT1	25	13/06/23	9:00	15.5		1	40					8	11	2	12				29				10	113	0.29
	Summer	NDR-SUTLK-MT1	20	14/07/23	16:30	25.0	1		3							4	2								1	11	0.02
Davis Lake	Summer	NDR-DVSLK-MT1	20	14/07/23	12:00	25.0			7						9		14								4	34	0.07
Martin Lake	Spring	NDR-MARLK-MT1	17	11/06/23	11:10	18.2																			16	16	0.05
	Summer	NDR-MARLK-MT1	22	12/07/23	17:00	25.0																			63	63	0.11
West Buskegau River	Spring	WBR-P-04-MT1	23	10/06/23	8:00	40.0			89				106		276					14	470					955	1.04
West Buskegau River	Summer	WBR-P-04-MT1	19	15/07/23	16:30	29.8			19				7		396					1	363					786	1.39
West Buskegau River	Spring	WBR-S-04-MT1	25	08/06/23	13:30	24.3				1									1				7			9	0.01
Jocko Creek	Spring	JCRK-01-MT1	25	03/06/23	16:39	26.2			905				124		1,483					488	19			11		3,030	4.63
	Summer		20	14/07/23	16:00	27.0			334				1		316			25		213	3					892	1.65
North Driftwood River	Spring	NDR-S-04-MT1	32	31/05/23	16:40	26.2			43												1			1		45	0.05
	Summer		20	12/07/23	17:00	25.0					18											38		4	9	69	0.14
	Spring	NDR-S-06B-MT1	27	02/06/23	10:30	65.0			386			1	5		938					119	56			7		1,512	0.86
Species Catch Total							**1**	**1**	**1,826**	**1**	**18**	**1**	**243**	**8**	**3,429**	**6**	**29**	**25**	**1**	**835**	**941**	**38**	**7**	**23**	**241**	**7,674**	**-**

Table B3-2: Gillnet Catch and CPUE Summary (2023)

Waterbody Name	Effort ID	Season	# of Nets Set	Lift Date DD/MM/YY	Lift Time	Duration (hours)	Net Length (m)	Net Height (m)	Stretched Mesh Size (mm)	Fish Species						Site Catch Total (n)	Site CPUE Total
										Finescale Dace	Golden Shiner	Northern Pearl Dace	Northern Pike	White Sucker	Yellow Perch		
Gerry Lake	NDR-GERLK-GN1	Spring	1	06/10/23	15:15	3.0	NR	NR	101.6	No Catch						0	0.00
	NDR-GERLK-GN2	Spring	1	06/10/23	15:15	3.0	15.24	1.83	Var		3		2		2	7	2.33
	NDR-GERLK-GN3	Spring	1	06/10/23	15:15	3.0	NR	NR	101.6	No Catch						0	0.00
	NDR-GERLK-GN4	Spring	1	06/10/23	15:55	3.7	15.24	1.83	Var				3		1	4	1.09
	NDR-GERLK-GN5	Spring	1	06/10/23	16:10	3.9	15.24	1.83	Var	No Catch						0	0.00
	NDR-GERLK-GN1	Summer	1	11/07/23	14:20	3.0	NR	NR	NR	No Catch						0	0.00
	NDR-GERLK-GN2	Summer	1	11/07/23	14:20	3.0	NR	NR	NR	No Catch						0	0.00
	NDR-GERLK-GN3	Summer	1	11/07/23	14:20	3.0	NR	NR	NR	No Catch						0	0.00
	NDR-GERLK-GN4	Summer	1	11/07/23	14:20	3.0	NR	NR	NR				2			2	0.67
	NDR-GERLK-GN5	Summer	1	11/07/23	14:20	3.0	NR	NR	NR				1			1	0.33
Sutherland Lake	NDR-SUTLK-GN1	Summer	1	13/07/23	17:00	3.0	NR	NR	NR	No Catch						0	0.00
	NDR-SUTLK-GN2	Summer	1	13/07/23	17:00	3.0	NR	NR	NR				1			1	0.33
	NDR-SUTLK-GN3	Summer	1	13/07/23	17:00	3.0	NR	NR	NR	No Catch						0	0.00
	NDR-SUTLK-GN4	Summer	1	13/07/23	17:00	3.0	NR	NR	NR	No Catch						0	0.00
	NDR-SUTLK-GN5	Summer	1	13/07/23	17:00	3.0	NR	NR	NR				3		1	4	1.33
Davis Lake	NDR-DVSLK-GN1	Summer	1	13/07/23	15:00	4.0	NR	NR	NR	No Catch						0	0.00
	NDR-DVSLK-GN2	Summer	1	13/07/23	15:00	4.0	NR	NR	NR	No Catch						0	0.00
	NDR-DVSLK-GN3	Summer	1	13/07/23	15:00	4.0	NR	NR	NR	No Catch						0	0.00
	NDR-DVSLK-GN4	Summer	1	13/07/23	15:00	4.0	NR	NR	NR	No Catch						0	0.00
	NDR-DVSLK-GN5	Summer	1	13/07/23	15:00	4.0	NR	NR	NR	No Catch						0	0.00
Martin Lake	NDR-MARLK-GN1	Spring	5	12/06/23	-	3.0	NR	NR	NR				9		1	10	0.67
	NDR-MARLK-GN1	Summer	1	13/07/23	16:00	5.5	NR	NR	76.2	No Catch						0	0.00
	NDR-MARLK-GN2	Summer	1	13/07/23	16:00	5.5	NR	NR	101.6	No Catch						0	0.00
	NDR-MARLK-GN3	Summer	1	13/07/23	16:00	5.5	NR	NR	50.8				2		2	4	0.73
	NDR-MARLK-GN4	Summer	1	13/07/23	16:00	5.5	NR	NR	63.5	No Catch						0	0.00
	NDR-MARLK-GN5	Summer	1	13/07/23	16:00	5.5	NR	NR	88.9	No Catch						0	0.00
Jocko Creek	JCRK-01-GN1	Spring	1	02/06/23	16:25	2.6	3.0*	0.65*	NR	No Catch						0	0.00
	JCRK-01-GN2	Spring	1	02/06/23	16:30	2.6	2.8*	0.64*	NR	No Catch						0	0.00
	JCRK-01-GN3	Spring	1	02/06/23	16:30	2.8	3.5*	0.65*	101.6	No Catch						0	0.00
	JCRK-01-GN4	Spring	1	02/06/23	16:40	3.3	2.0*	0.7*	25.4	No Catch						0	0.00
	JCRK-01-GN5	Spring	1	02/06/23	16:50	3.3	3.0*	0.5*	38.1	No Catch						0	0.00

Waterbody Name	Effort ID	Season	# of Nets Set	Lift Date DD/MM/YY	Lift Time	Duration (hours)	Net Length (m)	Net Height (m)	Stretched Mesh Size (mm)	Fish Species						Site Catch Total (n)	Site CPUE Total
										Finescale Dace	Golden Shiner	Northern Pearl Dace	Northern Pike	White Sucker	Yellow Perch		
North Driftwood River	NDR-S-06B-GN1	Spring	1	01/06/23	13:30	4.0	NR	0.85	NR	No Catch						0	0.00
	NDR-S-06B-GN2	Spring	1	01/06/23	13:20	3.7	NR	0.82*	Var			2		6		8	2.18
	NDR-S-06B-GN3	Spring	1	01/06/23	13:05	3.3	7.0*	0.65*	101.6	No Catch						0	0.00
	NDR-S-06B-GN4	Spring	1	01/06/23	12:48	2.6	15.24	1.83	Var	No Catch						0	0.00
	NDR-S-06B-GN5	Spring	1	01/06/23	12:40	2.6	15.24	1.83	Var	No Catch						0	0.00
	NDR-S-04-GN1	Spring	1	31/05/23	16:05	3.1	NR	NR	NR	No Catch						0	0.00
	NDR-S-04-GN2	Spring	1	31/05/23	16:05	3.1	NR	NR	NR	No Catch						0	0.00
	NDR-S-04-GN3	Spring	1	31/05/23	16:05	3.1	NR	NR	NR	No Catch						0	0.00
	NDR-S-04-GN4	Spring	1	31/05/23	16:05	3.1	NR	NR	NR	No Catch						0	0.00
	NDR-S-04-GN5	Spring	1	31/05/23	16:05	3.1	NR	NR	NR	No Catch						0	0.00
West Buskegau River	WBR-S-04-GN1	Spring	1	08/06/23	17:00	4.0	NR	NR	NR	1			1			1	0.05
Species Catch Total										**1**	**3**	**2**	**24**		**7**	**42**	**-**

NR; Not Recorded
Var; RIN Small Mesh Gillnet (25.4 to 101.6 mm)
*; Net has been shortened based on watercourse width and depth

Table B3-3: Seine Net Catch and CPUE Summary (2023)

Waterbody Name	Effort ID	Season	Lift Date DD/MM/YYYY	Haul Dist. (m)	Fish Species				Site Catch Total (n)	Site CPUE Total
					Brook Stickleback	Fathead Minnow	Logperch	Trout Perch		
West Buskegau River	WBR-S-04-SN1	Summer	14/07/2023	15			1	30	31	31
	WBR-S-04-SN2	Summer	14/07/2023	15	No Catch				0	0
North Driftwood River	NDR-S-04-SN1	Spring	31/05/2023	15	7	1			8	8
Species Catch Total									**39**	**39**

One (1) haul per sample ID
Net length 3 m
Net height 1.2 m
Mesh size 3.10 mm

Table B3-4: Backpack Electrofishing Catch and CPUE Summary (2023)

Waterbody Name	Effort ID	Season	Date (dd/mm/yy)	# Seconds	Stream Length Electrofished (m)	Stream Width Electrofished (m)	Fish Species																Site Catch Total (n)	Site CPUE Total
							Blacknose Dace	Brook Stickleback	Burbot	Common Shiner	Cyprinid Sp.	Fathead Minnow	Finescale Dace	Johnny Darter	Logperch	Longnose Dace	Mottled Sculpin	Northern Pearl Dace	Northern Pike	Northern Redbelly Dace	Trout Perch	White Sucker		
West Buskegau River	WBR-S-04-EF1	Spring	08/06/23	1,453	50	11		1			2					1			2		10		16	0.0002
	WBR-S-04-EF1	Summer	14/07/23	853	50	11	7		1							1	1				7	2	19	0.0004
	WBR-S-04-EF2	Summer	14/07/23	702	50	11			1					1	3	4	2				10		21	0.0005
	WBR-S-04-EF3	Summer	14/07/23	441	50	11	1									3					4		8	0.0003
Jocko Creek	JCRK-01-EF1	Spring	03/06/23	1,196	110	3		52					4							1			57	0.0008
	JCRK-01-EF1	Summer	13/07/23	300	100	2		37					2					2		4			45	0.0025
	JCRK-01-EF2	Summer	13/07/23	295	100	2		30										5		3			38	0.0022
	JCRK-01-EF3	Summer	13/07/23	312	100	2		22					9					2		1			34	0.0018
North Driftwood River	NDR-S-04-EF1	Summer	11/07/23	373	120	8		8		1		1	1										11	0.0005
	NDR-S-04-EF2	Summer	11/07/23	361	130	8		1		1													2	0.0001
	NDR-S-04-EF3	Summer	11/07/23	385	130	8		1				1											2	0.0001
	NDR-S-06B-EF1	Summer	11/07/23	342	130	2		23					5										28	0.0014
	NDR-S-06B-EF2	Summer	11/07/23	333	130	2		8					1										9	0.0005
	NDR-S-06B-EF3	Summer	11/07/23	320	130	2		1															1	0.0001
Species Catch Total							**8**	**184**	**2**	**2**	**2**	**2**	**22**	**1**	**3**	**9**	**3**	**9**	**2**	**9**	**31**	**2**	**291**	**-**

462500 465000 467500 470000 472500 475000 477500

5420000 5417500 5415000 5412500 5410000 5407500 5405000 5402500 5400000 5397500

NDR-S-06
WBR-S-07
CAMP 40 RD
Nesbitt Creek
655
WBR-S-04
NDR-S-04
MAT-R-02
WBR-P-04
WBR-S-03
RDAL-06
NDR-S-06b
NDR-S-06b
North Driftwood River
WBR-S-06
Mattagami River
LOWER STURGEON DAM RD
MAT-R-01
West Buskegau River
NDR-MARLK
Martin Lake
NDR-GERLK
Gerry Lake
NDR-GERLK
Jocko Creek
RDAL-04
Jack Lake
Sutherland Lake
NDR-SUTLK
Mel Lake
NDR-DAVLK
Prosser Creek
Prosser Lake
Zed Lake
JC-S-01
RDAL-02
JC-S-03
RDAL-01
Kidd Creek

OVERVIEW MAP
Mattagami River
Buskegau River
Enlarged Area
655
5 Km

X:\CA\CAOAK300-OAK\MIS-FS1-Project\FI2023\Projects\OMEMA2304S_WSP_Canada_Inc_Crawford_Impact_Assessment\13_0_GIS\Aquatic\Baseline_2023\MXD\Habitat_Sampling_Locs_2.mxd

LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Habitat Sampling Location

- Spring
- Summer
- Spring / Summer

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

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WSP

CRAWFORD NICKEL PROJECT

Habitat Assessment Sampling Locations (2023)

Datum: NAD83
Projection: UTM Zone 17N

N W E S

0 1 2 4 6 8 10 Kilometres

PROJECT N°:OMEMA2304 **FIGURE: B3-1**

SCALE: 1:70,000 DATE: November 2023

465000 466000 467000 468000 469000 470000 471000 472000 473000

5432000 5431000 5430000 5429000 5428000

NDR-US-TC

Nesbitt Creek

North Driftwood River

Lemoux Creek

655

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LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Season
- Spring
- Summer

Gear Type
- Electrofishing
- Gillnet
- Minnow Trap
- Seine Net
- Zooplankton
- eDNA

OVERVIEW MAP

a b c d e f

10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by Google Earth Professional 2005.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

CANADA NICKEL COMPANY

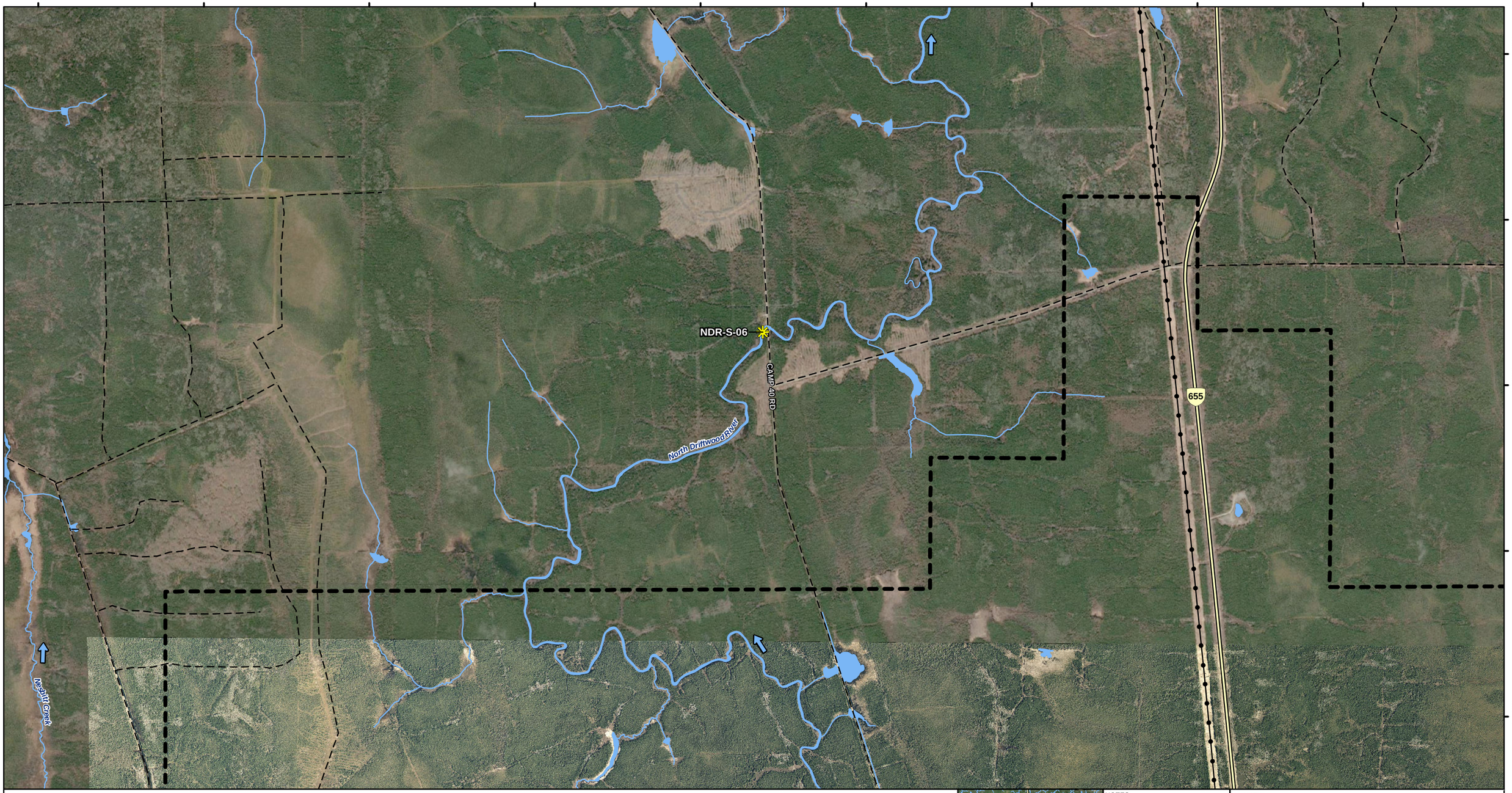
wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2023)

PROJECT N°:OMEMA2304 | **FIGURE: B3-2a**

SCALE: 1:22,000 | DATE: November 2023



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LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

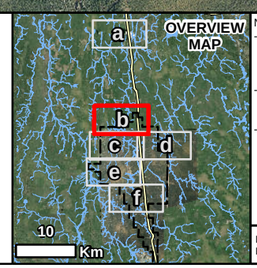
Aquatic Resource Sampling Location

Season

- Spring
- Summer

Gear Type

- Electrofishing
- Gillnet
- Minnow Trap
- Seine Net
- Zooplankton
- eDNA



NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2023)

PROJECT N°:OMEMA2304 | **FIGURE: B3-2b**

SCALE: 1:22,000 | DATE: November 2023

465000 466000 467000 468000 469000 470000 471000 472000 473000

5413000 5412000 5411000 5410000

NDR-S-06b

50 m

NDR-S-04

North Driftwood River

10 m

North Driftwood River

CAMP 40 RD

655

NDR-S-06b

25 m

Norbert Creek

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LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Season
- Spring
- Summer

Gear Type
- Electrofishing
- Gillnet
- Minnow Trap
- Seine Net
- Zooplankton
- eDNA

0 0.5 1 2 3 4 5 Kilometres

OVERVIEW MAP

a b c d e f

10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

N W E S

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2023)

PROJECT N°:OMEMA2304	**FIGURE: B3-2c**
SCALE: 1:22,000	DATE: November 2023

472000 473000 474000 475000 476000 477000 478000 479000 480000

5413000 5412000 5411000 5410000

WBR-P-04

50 m

655

WBR-S-04

West Bustegau River

25 m

WBR-S-03

West Bustegau River

10 m

West Bustegau River

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LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Season

- Spring
- Summer

Gear Type

- Electrofishing
- Gillnet
- Minnow Trap
- Seine Net
- Zooplankton
- eDNA

0 0.5 1 2 3 4 5 Kilometres

OVERVIEW MAP

a b c d e f

10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

N W E S

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2023)

PROJECT N°:OMEMA2304 | **FIGURE: B3-2d**

SCALE: 1:22,000 | DATE: November 2023

464000 465000 466000 467000 468000 469000 470000 471000 472000

5409000 5408000 5407000 5406000 5405000

Mattagami River

Jocko Creek

Martin Lake
NDR-MARLK

North Driftwood River

Gerry Lake
NDR-GERLK

200 m

Martin Lake

North Driftwood River

Gerry Lake

Jack Lake

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LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Season
- Spring
- Summer

Gear Type
- Electrofishing
- Gillnet
- Minnow Trap
- Seine Net
- Zooplankton
- eDNA

OVERVIEW MAP

a b c d e f

10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 2 3 4 5 Kilometres

N W E S

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2023)

PROJECT N°:OMEMA2304	**FIGURE: B3-2e**
SCALE: 1:22,000	DATE: November 2023

468000 469000 470000 471000 472000 473000 474000 475000 476000

5405000 5404000 5403000 5402000 5401000

Jack Lake
NDR-SUTLK
Sutherland Lake
100 m
Jack Lake
Sutherland Lake
Mel Lake
Davis Lake
Zed Lake
Jocko Creek
655
Mel Lake
Davis Lake
NDR-DAVLK
100 m
655
JC-S-01
50 m

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LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction

Aquatic Resource Sampling Location

Season
- Spring
- Summer

Gear Type
- Electrofishing
- Gillnet
- Minnow Trap
- Seine Net
- Zooplankton
- eDNA

0 0.5 1 2 3 4 5 Kilometres

a OVERVIEW MAP b c d e f
10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

N W E S

CANADA NICKEL COMPANY

wsp

CRAWFORD NICKEL PROJECT

Aquatic Resource Sampling Locations (2023)

PROJECT N°:OMEMA2304 | **FIGURE: B3-2f**

SCALE: 1:22,000 | DATE: November 2023

Table B4-1: Environmental DNA Data - Lake Sturgeon Detection Results from NDR-S-06 and NDR-US-TC (2023)

NMID[1]	Kit ID	Sample ID	Lake Sturgeon (n/12)[2]
32507	PSI-01-01098	NDR-S-06-QPCR-01	Negative (0/12)
32508	PSI-01-01026	NDR-S-06-QPCR-02	Negative (0/12)
32509	PSI-01-01040	NDR-S-06-QPCR-03	Negative (0/12)
32510	PSI-01-01042	NDR-NC-01	Negative (0/12)
32511	PSI-01-01046	NDR-NC-02	Negative (0/12)
32512	PSI-01-01201	NDR-NC-03	Negative (0/12)
32513*	PSI-01-01160	NDR-US-TC-QPCR-01	Negative (0/12)
32514*	PSI-01-01095	NDR-US-TC-QPCR-02	Negative (0/12)
32515*	PSI-01-01107	NDR-US-TC-QPCR-03	Negative (0/12)

"*" : Samples were diluted 4-fold due to the inhibition

"Positive: Target DNA has been detected in this sample, meaning that at least one of the 12 replicates has been amplified.

This is not a quantitative test, so you should not interpret a high eDNA score (e.g. 12/12) as necessarily indicating a larger population than a low eDNA score (e.g. 1/12).

Negative: No target DNA has been detected in this sample, and the internal and external controls worked as expected. This tells us that if there had been target DNA in the sample, we would have detected it, so we can be confident in its absence from the sample provided.

Inconclusive: No target DNA has been detected in this sample, but the internal positive control showed significant PCR inhibition after sample treatment and sample dilution. Thus, the negative species assay may also have been impacted by inhibition.

NDR-NC are control samples

Table B4-2: Environmental DNA Data - Freshwater fish species detected in the Mattagami River (2023)

NMSeqID	Family	Genus	Species	Common Name	Number of samples in which OTU occurs	eDNA-NegativeControl-02 (%)	eDNA-NegativeControl-02 (Read Count)	eDNA-Negative Control-03 (%)	eDNA-NC-03 (Read Count)	Matt-Meta-01 (%)	Matt-Meta-01 (Read Counts)[2]	Matt-Meta-02 (%)	Matt-Meta-02 (Read Counts)[2]	Matt-Meta-03 (%)	Matt-Meta-03 (Read Counts)[2]
IM-3C86Z1	Acipenseridae	*Acipenser*	*Acipenser fulvescens*	Lake Sturgeon	3	-	-	-	-	35.62	43,775	40.17	48,261	56.17	74,067
IM-LQH83I	Catostomidae	*Catostomus*	*Catostomus catostomus*	Longnose Sucker	3	-	-	-	-	2.69	3,307	3.59	4,309	4.89	6,450
IM-6YR2BI	Catostomidae	*Catostomus*	*Catostomus commersonii*	White Sucker	3	-	-	-	-	17.34	21,305	21.14	25,397	7.67	10,121
IM-8I2L1C*	Cyprinidae	*Chrosomus*	*Chrosomus neogaeus*	Finescale Dace	1	-	-	-	-	1.91	2,345	-	0	-	0
IM-8H469F	Cyprinidae	*Couesius*	*Couesius plumbeus*	Lake Chub	1	-	-	-	-	-	0	-	0	0.72	945
IM-M3I8IE	Cyprinidae	*Luxilus*			1	-	-	-	-	-	0	1.41	1,698	-	0
IM-LQ65L8*	Cyprinidae	*Margariscus*			2	-	-	-	-	3.24	3,980	-	0	3.11	4,101
IM-R661JV	Cyprinidae	*Notropis*	*Notropis atherinoides*	Emerald Shiner	1	-	-	-	-	-	0	-	0	1.29	1,701
IM-LCED61	Cyprinidae	*Notropis*	*Notropis hudsonius*	Spottail Shiner	1	-	-	-	-	1.06	1,305	-	0	-	0
IM-I3V833	Cyprinidae	*Rhinichthys*			3	-	-	-	-	2.65	3,255	1.30	1,566	0.30	399
IM-N9ON0P	Esocidae	*Esox*	*Esox lucius*	Northern Pike	3	-	-	-	-	10.15	12,478	6.31	7,581	10.64	14,028
IM-9420OE	Lotidae	*Lota*	*Lota lota*	Burbot	3	-	-	-	-	1.32	1,618	0.02	28	0.14	185
IM-8P4IIR	Centrarchidae	*Ambloplites*	*Ambloplites rupestris*	Rock Bass	1	-	-	-	-	-	0	1.76	2,115	-	0
IM-8RLI8U	Centrarchidae	*Lepomis*	*Lepomis cyanellus*	Green Sunfish	3	-	-	-	-	1.57	1,933	3.05	3,662	1.60	2,111
IM-2OA1M7*	Percidae	*Etheostoma*	*Etheostoma exile*	Iowa Darter	1	-	-	-	-	-	0	-	0	0.82	1,083
IM-75F90J	Percidae	*Perca*	*Perca flavescens*	Yellow Perch	3	-	-	-	-	0.88	1,077	2.15	2,578	3.23	4,257
IM-7543RJ	Percidae	*Percina*			3	-	-	-	-	4.76	5,855	10.55	12,672	4.61	6,078
IM-38BXO3	Percidae	*Sander*	*Sander vitreus*	Walleye	4	-	-	66.20	75071.00	5.77	7,095	4.89	5,881	0.42	551
IM-7GEVM8*	Percidae				2	-	-	-	-	0.44	535	-	0	0.46	605
IM-W8400Y	Percopsidae	*Percopsis*	*Percopsis omiscomaycus*	Trout-Perch	2	-	-	-	-	0.79	973	-	0	0.67	889
IM-77Z4R8	Salmonidae				5	100.00	113112.00	33.80	38325.00	0.87	1,069	0.49	589	0.55	723
IM-X74R3L	Cottidae	*Cottus*			3	-	-	-	-	8.93	10,978	3.17	3,814	2.71	3,576

"*" denotes: Lower support for this taxonomic identification as it is based on fewer than three matches to sequences in the reference database, and/or limited geographic occurrence records for the taxon.

Read Counts: the number of DNA sequences assigned to a species

APPENDIX C

Fish Tissue and Age Data

Table C1-1: Contaminants of Potential Concern within Northern Pike Tissue (2021)

Waterbody	Sample ID	Total Length (mm)	Total Weight (g)	Age	Moisture (%)	Aluminum	Arsenic	Cadmium	Copper	Iron	Mercury	Methylmercury	Selenium
Gerry Lake	NDR-GERLK-GN1-F1-NPK	362	283.50	1	81.7	10.1	0.114	<0.005	0.96	24.8	2.31	3.01	0.561
	NDR-GERLK-GN1-F2-NPK	354	283.50	1	81.6	4.6	0.237	<0.005	0.81	23.8	1.63	1.69	0.569
	NDR-GERLK-GN1-F3-NPK	390	283.50	1	79.4	4.9	0.124	<0.005	1.00	17.9	2.67	3.34	0.565
	NDR-GERLK-GN1-F4-NPK	460	510.29	2	79.5	<2.0	0.308	<0.005	0.71	7.4	1.87	2.00	0.634
	NDR-GERLK-GN1-F5-NPK	530	793.79	3	79.8	3.8	0.206	<0.005	0.71	11.2	3.69	3.33	0.626
	NDR-GERLK-GN1-F6-NPK	620	907.19	5	80.6	3.6	0.249	<0.005	0.65	13.3	9.81	14.20	0.505
	NDR-GERLK-GN1-F7-NPK	850	5,020.13	7	79.7	4.0	0.369	<0.005	0.51	8.9	10.20	11.20	0.451
	NDR-GERLK-GN1-F8-NPK	1,068	7,484.27	10	81.9	6.2	0.630	<0.005	0.65	16.9	33.30	34.50	0.560
Martin Lake	NDR-MARLK-GN1-F1-NPK	566	963.88	4	79.8	6.1	0.357	<0.005	0.83	12.4	2.98	3.59	0.584
	NDR-MARLK-GN1-F2-NPK	551	937.80	4	78.4	4.8	0.261	<0.005	0.66	11.2	2.29	2.44	0.514
	NDR-MARLK-GN1-F3-NPK	630	1,391.39	5	80.9	4.2	0.383	<0.005	0.65	13.6	3.26	2.76	0.648
	NDR-MARLK-GN1-F4-NPK	771	3,146.80	6	78.8	<2.0	0.784	<0.005	0.63	5.5	6.12	7.63	0.697

Aluminum, arsenic, cadmium, copper, iron, mercury, methylmercury and selenium are displayed in mg/kg dry weight (dwt).

Table C1-2a: Contaminants of Potential Concern within Forage Fish Tissue (2021)

Species	Sample ID	No. Individuals per Sample	Total Length Range (mm)	Mean Total Length (mm)	Individual Total Weight Range (g)	Mean Individual Total Weight (g)	Moisture (%)	Aluminum	Arsenic	Cadmium	Copper	Iron	Mercury	Methylmercury	Selenium
Northern Pearl Dace	NDR-S-01-PD-COMP-01	5	98-110	102.60	9.75-13.59	10.88	76.2	4.2	0.125	0.074	7.82	85.7	0.402	0.474	1.17
	NDR-S-01-PD-COMP-02	4	109-119	115.75	13.17-15.99	14.68	75.7	11.2	0.092	0.046	4.24	85.9	0.282	0.300	1.05
	NDR-S-01-PD-COMP-03	4	106-125	114.75	10.30-20.58	14.90	75.3	4.3	0.093	0.113	8.52	79.3	0.520	0.533	1.24
Northern Redbelly Dace	NDR-P-03-NRDB-COMP-01	23	57-67	61.00	1.85-3.02	2.24	76.1	8.6	0.059	0.054	15.60	144.0	0.143	0.150	1.08
	NDR-P-03-NRDB-COMP-02	28	53-61	57.29	1.28-2.20	1.73	75.0	20.8	0.063	0.043	14.10	166.0	0.153	0.151	1.10
	NDR-P-03-NRDB-COMP-03	22	60-68	63.64	1.89-3.17	2.53	74.5	9.9	0.082	0.116	22.80	138.0	0.180	0.186	1.52

Aluminum, arsenic, cadmium, copper, iron, mercury, methylmercury and selenium are displayed in mg/kg dry weight (dwt).

Table C1-2b: Composite Forage Fish Age Assessment Summary (2021)

Watershed	Species	Sample ID	Total Length (cm)	Total Weight (g)	Ageing Structure	Age
North Driftwood River	Northern Redbelly Dace	NDR-P-03-MT1-NRBD-1	51	1.03	Otolith	1
		NDR-P-03-MT1-NRBD-2	62	2.19	Otolith	4
		NDR-P-03-MT1-NRBD-3	62	2.21	Otolith	3
		NDR-P-03-MT1-NRBD-4	63	2.46	Otolith	4
		NDR-P-03-MT1-NRBD-5	68	2.98	Otolith	4
		NDR-P-03-MT1-NRBD-6	68	3.37	Otolith	3
		NDR-P-03-MT1-NRBD-7	64	2.23	Otolith	3
		NDR-P-03-MT1-NRBD-8	56	1.83	Otolith	4
		NDR-P-03-MT1-NRBD-9	57	1.60	Otolith	2
		NDR-P-03-MT1-NRBD-10	55	1.62	Otolith	4
	Northern Pearl Dace	NDR-S-01-MT1-PD-1	137	20.93	Otolith	5
		NDR-S-01-MT1-PD-2	113	9.63	Otolith	4
		NDR-S-01-MT1-PD-3	49	1.07	Otolith	1
		NDR-S-01-MT1-PD-4	60	2.08	Otolith	1
		NDR-S-01-MT1-PD-5	79	5.27	Otolith	2
		NDR-S-01-MT1-PD-6	130	19.66	Otolith	8
		NDR-S-01-MT1-PD-7	53	1.37	Otolith	1
		NDR-S-01-MT1-PD-8	86	7.04	Otolith	3
		NDR-S-01-MT1-PD-9	90	6.92	Otolith	3
		NDR-S-01-MT1-PD-10	133	22.48	Otolith	4

Table C2-1: Contaminants of Potential Concern within Northern Pike Tissue (2022)

Waterbody	Sample ID	Total Length (mm)	Total Weight (g)	Age	Aluminum	Arsenic	Cadmium	Copper	Iron	Mercury	Selenium	Methylmercury
Martin Lake	NDR-MarLk-GN1-NRPK-F1	265	900	1	0.4	0.0238	0.001	0.141	1.91	0.25	0.103	0.174
Sutherland Lake	NDR-SutLk-GN1-NRPK-F1	552	1050	2	0.4	0.0093	0.001	0.182	2.13	0.204	0.083	0.135
	NDR-SutLk-GN1-NRPK-F2	672	1710	3	0.4	0.0108	0.001	0.167	1.58	0.301	0.098	0.177
Jack Lake	NDR-JacLk-GN1-NRPK-F1	639	1140	3	0.81	0.0071	0.001	0.124	2.17	0.325	0.09	0.235

Aluminum, arsenic cadmium, copper, iron, mercury, methylmercury and selenium concentrations are displayed in mg/kg wwt.

Table C2-2a: Contaminants of Potential Concern within Forage Fish Tissue (2022)

Watershed	Species	Location ID	Sample ID	No. Individuals per Sample	Total Length Range (mm)	Mean Individual Total Length (mm)	Individual Weight Range (g)	Mean Individual Weight (g)	Moisture (%)	Aluminum	Arsenic	Cadmium	Copper	Iron	Selenium	Selenium	Mercury	Methylmercury (µg/kg wwt)
West Buskegau River	Finescale Dace	WBR-P-04	WBR-P-04-MT1-FSDC-COMP1	8	62-74	68.00	2.17-4.06	23.00	80.5	1.67	0.026	0.014	0.67	35.9	0.156	0.80	0.018	16.9
			WBR-P-04-MT1-FSDC-COMP2	2	101-101	101.00	9.75-10.48	20.19	78.3	2.40	0.037	0.025	1.27	56.8	0.225	1.04	0.064	50.6
			WBR-P-04-MT1-FSDC-COMP3	7	67-78	71.71	3.03-4.52	25.50	82.5	1.27	0.034	0.016	0.79	33.9	0.164	0.94	0.021	17.4
			WBR-P-04-MT1-FSDC-COMP4	22	49-59	53.59	0.78-1.78	27.80	79.8	3.14	0.048	0.007	0.64	35.1	0.142	0.70	0.016	12.5
			WBR-P-04-MT1-FSDC-COMP5	8	66-71	68.63	2.41-3.47	24.30	81.6	1.63	0.028	0.014	0.65	35.3	0.152	0.83	0.018	16.6
		WBR-P-03	WBR-P-03-MT1-FSDC-COMP1	9	60-76	68.56	2.06-3.45	24.75	79.6	2.85	0.023	0.011	0.97	41.7	0.144	0.71	0.032	28.8
			WBR-P-03-MT1-FSDC-COMP2	21	44-62	51.19	0.74-2.48	24.26	80.1	6.67	0.047	0.006	0.71	42.3	0.128	0.64	0.021	13.8
			WBR-P-03-MT1-FSDC-COMP3	7	68-81	72.14	2.52-5	23.23	81.8	1.59	0.021	0.014	1.02	35.2	0.136	0.75	0.033	31.5
			WBR-P-03-MT1-FSDC-COMP4	14	47-60	52.79	0.9-1.84	17.90	79.5	7.55	0.034	0.007	0.66	37.4	0.140	0.68	0.020	13.2
	Brook Stickleback	WBR-P-03	WBR-P-03-MT1-BSB-COMP1	34	43-55	49.41	0.52-1.06	25.80	79.8	14.20	0.032	0.022	1.34	54.3	0.186	0.92	0.027	22.0
			WBR-P-03-MT1-BSB-COMP2	13	43-62	51.31	43-62	12.08	80.9	21.20	0.037	0.020	1.22	66.0	0.193	1.01	0.029	30.7
		WBR-P-04	WBR-P-04-MT1-BSB-COMP1	22	46-59	51.64	0.57-1.39	21.68	79.7	9.88	0.042	0.014	1.52	46.6	0.214	1.05	0.027	30.0
			WBR-P-04-MT1-BSB-COMP2	5	43-63	58.00	0.64-1.87	7.51	78.1	6.27	0.034	0.012	1.35	49.6	0.188	0.86	0.024	22.9
North Driftwood River	Northern Redbelly Dace	NDR-P-03	NDR-P-03-MT1-NRDC-COMP1	20	46-56	50.00	1.03-1.99	24.34	81.6	3.52	0.019	0.014	1.40	29.3	0.273	1.48	0.023	19.8
			NDR-P-03-MT1-NRDC-COMP2	18	47-54	50.20	0.99-1.65	22.95	80.8	3.76	0.018	0.011	1.21	29.5	0.256	1.33	0.019	17.8
			NDR-P-03-MT1-NRDC-COMP3	20	49-59	53.20	1.06-2.04	26.65	80.5	2.41	0.020	0.017	1.86	30.0	0.347	1.78	0.027	20.9
			NDR-P-03-MT1-NRDC-COMP4	20	50-62	55.95	1.08-2.21	32.12	78.8	3.90	0.019	0.013	1.95	38.3	0.252	1.19	0.032	23.5
			NDR-P-03-MT1-NRDC-COMP5	10	60-68	63.90	2.05-2.91	25.04	79.6	4.41	0.027	0.037	3.56	36.8	0.408	2.00	0.051	42.0
	Fathead Minnow	NDR-P-03	NDR-P-03-MT1-FTMN-COMP1	11	58-78	67.30	2.16-4.33	31.01	78.2	9.45	0.030	0.012	0.72	41.9	0.315	1.44	0.016	12.1
			NDR-P-03-MT1-FTMN-COMP2	8	54-74	63.25	1.81-4.06	21.48	80.1	12.80	0.035	0.042	0.68	47.0	0.394	1.98	0.021	17.0
	Finescale Dace	NDR-P-01	NDR-P-01-MT1-FSDC-COMP1	11	54-60	59.55	1.34-2.38	20.42	78.3	1.76	0.014	0.007	0.61	34.5	0.144	0.66	0.019	15.8
			NDR-P-01-MT1-FSDC-COMP2	5	86-98	94.80	7.28-10.27	24.66	77.5	0.70	0.024	0.013	0.75	40.7	0.200	0.89	0.060	65.5
			NDR-P-01-MT1-FSDC-COMP3	11	66-77	70.64	2.67-4.25	36.33	78.7	0.99	0.024	0.009	0.93	39.1	0.149	0.70	0.030	29.9
			NDR-P-01-MT1-FSDC-COMP4	18	53-63	57.44	1.2-2.24	31.27	79.5	1.30	0.016	0.007	0.64	36.9	0.130	0.63	0.021	18.6

Watershed	Species	Location ID	Sample ID	No. Individuals per Sample	Total Length Range (mm)	Mean Individual Total Length (mm)	Individual Weight Range (g)	Mean Individual Weight (g)	Moisture (%)	Aluminum	Arsenic	Cadmium	Copper	Iron	Selenium	Selenium	Mercury	Methylmercury (µg/kg wwt)
			NDR-P-01-MT1-FSDC-COMP5	5	85-95	89.40	6.24-8.28	34.66	78.1	0.83	0.019	0.009	0.78	38.6	0.191	0.87	0.037	34.4
		NDR-P-06	NDR-P-06-MT1-FSDC-COMP1	15	53-63	58.27	1.27-2.47	24.69	79.6	1.13	0.014	0.010	1.00	41.1	0.160	0.78	0.023	21.5
			NDR-P-06-MT1-FSDC-COMP2	7	70-76	72.57	3-4.04	23.61	79.6	1.84	0.010	0.008	1.13	39.0	0.164	0.80	0.031	29.0
			NDR-P-06-MT1-FSDC-COMP3	5	86-99	92.00	5.62-8.58	35.10	75.8	1.24	0.016	0.011	1.16	51.0	0.209	0.86	0.055	61.1
			NDR-P-06-MT1-FSDC-COMP4	6	71-84	76.00	3.36-5.7	23.16	78.7	1.94	0.010	0.008	0.94	45.8	0.159	0.75	0.031	33.7
			NDR-P-06-MT1-FSDC-COMP5	5	75-80	78.20	3.86-5.27	22.17	76.6	2.18	0.017	0.013	0.95	49.0	0.214	0.91	0.050	48.9
	Brook Stickleback	NDR-S-05	NDR-S-05-MT1-BRST-COMP1	22	43-54	50.68	0.59-1.3	21.10	78.8	5.81	0.029	0.007	0.96	39.8	0.152	0.72	0.009	6.2
			NDR-S-05-MT1-BRST-COMP2	17	50-65	56.29	0.97-2.02	23.34	77.2	5.69	0.035	0.010	1.25	41.2	0.157	0.69	0.012	8.3
	Finescale Dace		NDR-S-05-MT1-FSDC-COMP1	5	84-95	90.60	5.6-8.01	35.73	74.2	1.26	0.029	0.007	1.35	46.2	0.218	0.84	0.044	38.0
			NDR-S-05-MT1-FSDC-COMP2	9	56-77	66.89	1.4-4.11	24.78	76	7.06	0.020	0.010	1.14	45.2	0.174	0.73	0.025	23.1
	Northern Redbelly Dace		NDR-S-05-MT1-NRDC-COMP1	7	71-83	75.86	71-83	26.84	74.9	0.94	0.022	0.012	1.15	44.7	0.192	0.76	0.046	41.9
			NDR-S-05-MT1-NRDC-COMP2	10	63-74	70.45	2.11-3.58	28.61	76.2	1.18	0.019	0.008	1.06	38.4	0.164	0.69	0.027	26.5
	Brook Stickleback	NDR-TRIB-02	NDR-Trib-02-MT1-BRST-COMP1	21	47-58	53.00	0.68-1.41	21.50	76.8	7.23	0.031	0.029	1.13	38.3	0.214	0.92	0.036	29.3
	Northern Pearl Dace		NDR-Trib-02-MT1-NPDC-COMP1	5	91-110	100.00	6.19-11.7	40.83	73.3	3.08	0.027	0.024	3.61	22.1	0.241	0.90	0.062	49.0
	Brook Stickleback	JAC LK	NDR-JacLk-MT1-BRST-COMP1	13	38-57	50.62	0.67-1.36	12.23	79.3	5.67	0.035	0.026	1.45	27.9	0.219	1.06	0.074	54.9
		NDR-S-01	NDR-S-01-MT1-BRST-COMP1	23	42-58	50.65	0.57-1.36	20.89	78.4	5.14	0.024	0.017	1.08	35.8	0.225	1.04	0.038	32.4
Jocko Creek	Lake Chub	JC-S-01	JC-S-01-MT1-LKCH-COMP1	7	66-78	73.71	2.3-4.01	23.11	78.9	3.47	0.011	0.025	0.85	18.6	0.176	0.83	0.062	58.6
			JC-S-01-MT1-LKCH-COMP2	7	73-80	75.00	2.96-4.28	24.78	77.4	1.99	0.013	0.025	1.16	20.1	0.180	0.80	0.056	49.5
			JC-S-01-MT1-LKCH-COMP3	5	81-95	87.20	4.82-7.26	30.43	77.4	1.87	0.017	0.038	1.32	22.0	0.214	0.95	0.109	118.0
			JC-S-01-MT1-LKCH-COMP4	5	91-102	97.00	6.93-9.84	41.08	75.4	2.41	0.022	0.053	1.59	26.0	0.253	1.03	0.131	152.0
			JC-S-01-MT1-LKCH-COMP5	5	80-86	83.20	4.36-5.5	24.61	76.9	1.89	0.013	0.027	1.00	20.0	0.218	0.94	0.074	77.3
	Brook Stickleback		JC-S-01-MT1-BRST-COMP1	19	50-57	54.00	0.88-1.5	22.22	80.2	1.52	0.018	0.025	1.14	23.0	0.176	0.89	0.063	60.8
			JC-S-01-MT1-BRST-COMP2	15	50-64	56.60	0.97-1.98	21.07	79.9	1.74	0.019	0.023	1.12	24.2	0.193	0.96	0.079	55.0

Aluminum, arsenic cadmium, copper, iron, mercury and selenium concentrations are displayed in mg/kg wwt.

Table C2-2b: Composite Forage Fish Age Assessment Summary (2022)

Watershed	Species	Location ID	Sample ID	Total Length (mm)	Weight (g)	Age
North Driftwood River	Finescale Dace	NDR-P-01	NDR-P01-MT1-FSDC-F51	88.00	6.45	3
			NDR-P01-MT1-FSDC-F52	89.00	6.34	3
			NDR-P01-MT1-FSDC-F53	75.00	4.29	2
			NDR-P01-MT1-FSDC-F54	75.00	3.79	2
			NDR-P01-MT1-FSDC-F55	67.00	3.00	2
			NDR-P01-MT1-FSDC-F56	75.00	3.71	2
			NDR-P01-MT1-FSDC-F57	74.00	3.89	2
			NDR-P01-MT1-FSDC-F58	65.00	2.18	1
			NDR-P01-MT1-FSDC-F59	59.00	2.80	1
			NDR-P01-MT1-FSDC-F60	43.00	1.34	0
		NDR-P-06	NDR-P-06-MT1-FSDC-F39	82.00	4.54	3
			NDR-P-06-MT1-FSDC-F40	95.00	6.91	4
			NDR-P-06-MT1-FSDC-F41	70.00	3.26	2
			NDR-P-06-MT1-FSDC-F42	64.00	2.40	1
			NDR-P-06-MT1-FSDC-F43	53.00	1.31	0
			NDR-P-06-MT1-FSDC-F44	60.00	1.99	1
			NDR-P-06-MT1-FSDC-F45	50.00	1.12	0
			NDR-P-06-MT1-FSDC-F46	61.00	2.03	1
			NDR-P-06-MT1-FSDC-F47	60.00	2.35	1
			NDR-P-06-MT1-FSDC-F48	43.00	0.73	0
Jocko Creek	Lake Chub	JC-S-01	JC-S-01-MT1-LKCH-F30	77.00	4.36	2
			JC-S-01-MT1-LKCH-F31	68.00	2.18	1
			JC-S-01-MT1-LKCH-F32	86.00	5.55	2
			JC-S-01-MT1-LKCH-F33	91.00	6.46	3
			JC-S-01-MT1-LKCH-F34	76.00	3.94	2
			JC-S-01-MT1-LKCH-F35	73.00	3.51	2
			JC-S-01-MT1-LKCH-F36	82.00	4.46	2
			JC-S-01-MT1-LKCH-F37	90.00	5.95	3
			JC-S-01-MT1-LKCH-F38	102.00	9.89	4
			JC-S-01-MT1-LKCH-F39	70.00	2.75	1

APPENDIX D

Lower Trophic Level Data

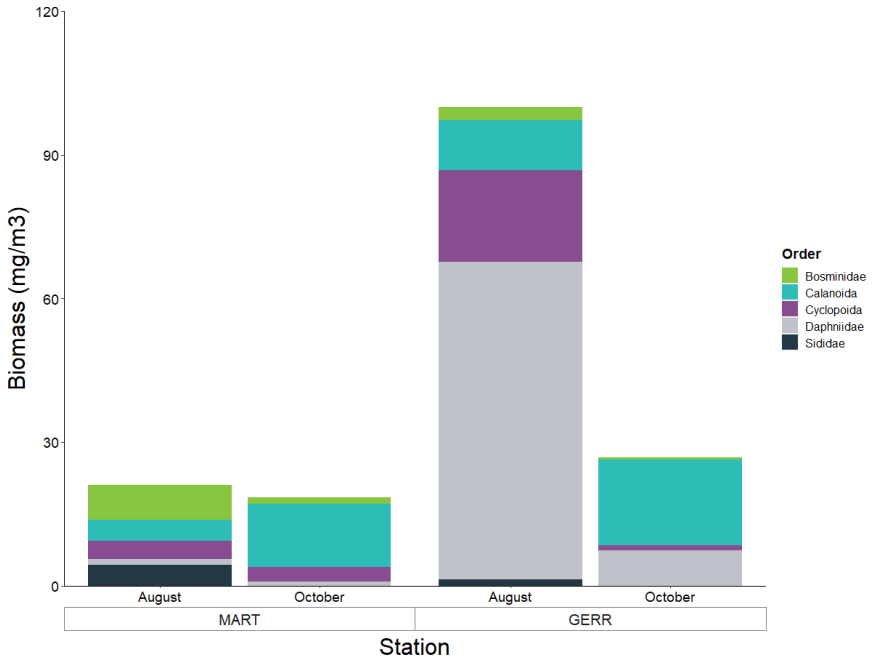


Figure D1-1: Total zooplankton biomass (mg/m³) by taxonomic group for Martin and Gerry Lake, 2021

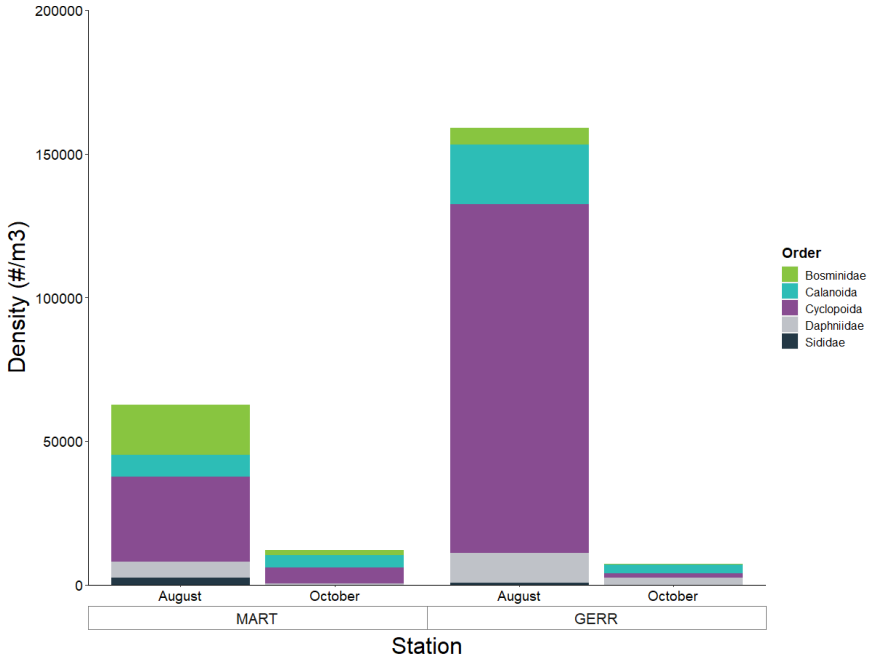


Figure D1-2: Total zooplankton density (#/m³) by taxonomic group for Martin and Gerry Lake, 2021

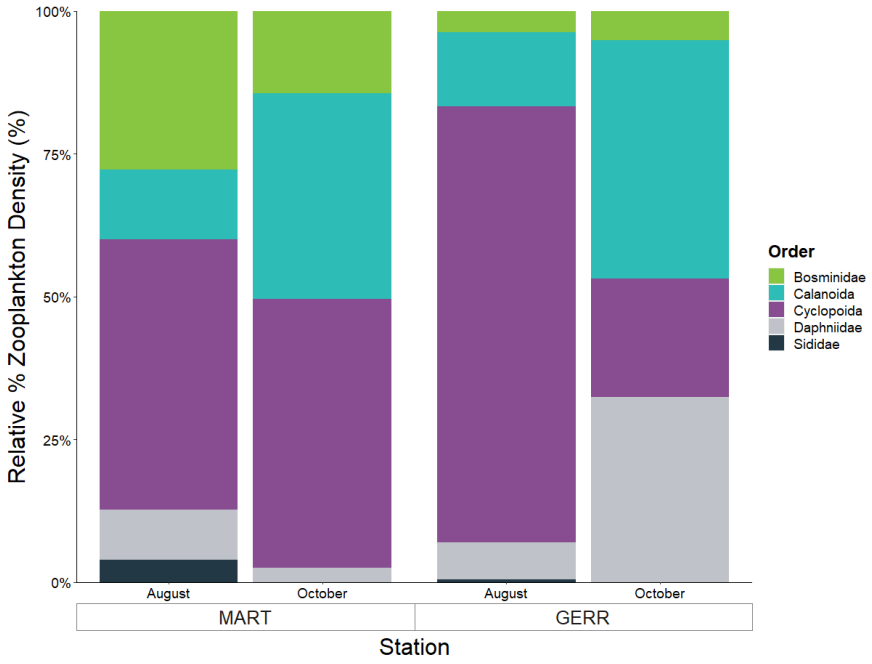


Figure D1-3: Relative zooplankton density (%) by taxonomic group for Martin and Gerry Lake, 2021

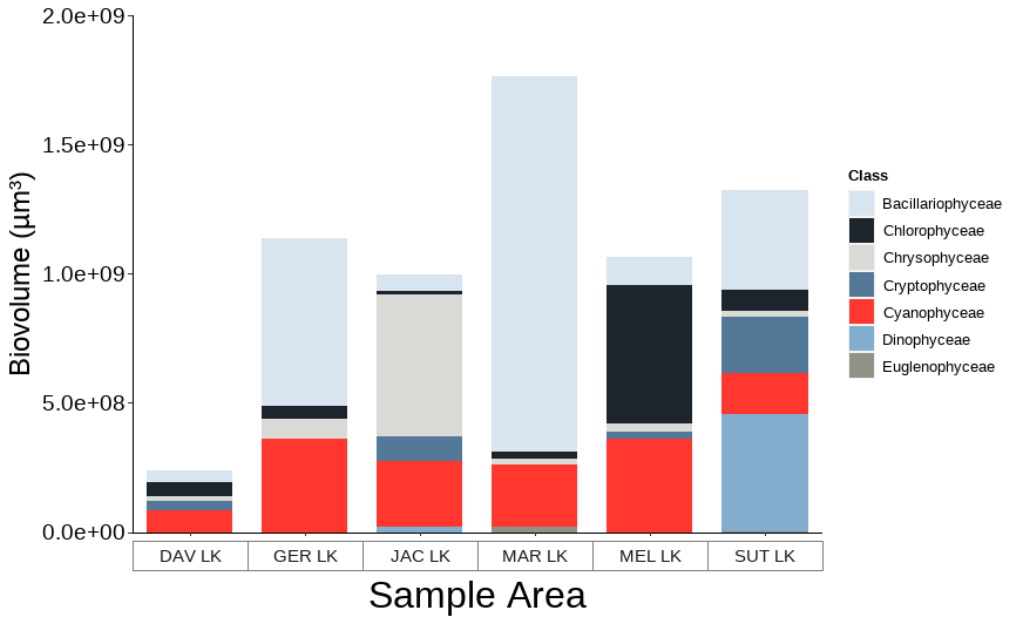


Figure D2-1: Total Phytoplankton Biovolume (µm³) by Taxonomic Group and Lake (2022)

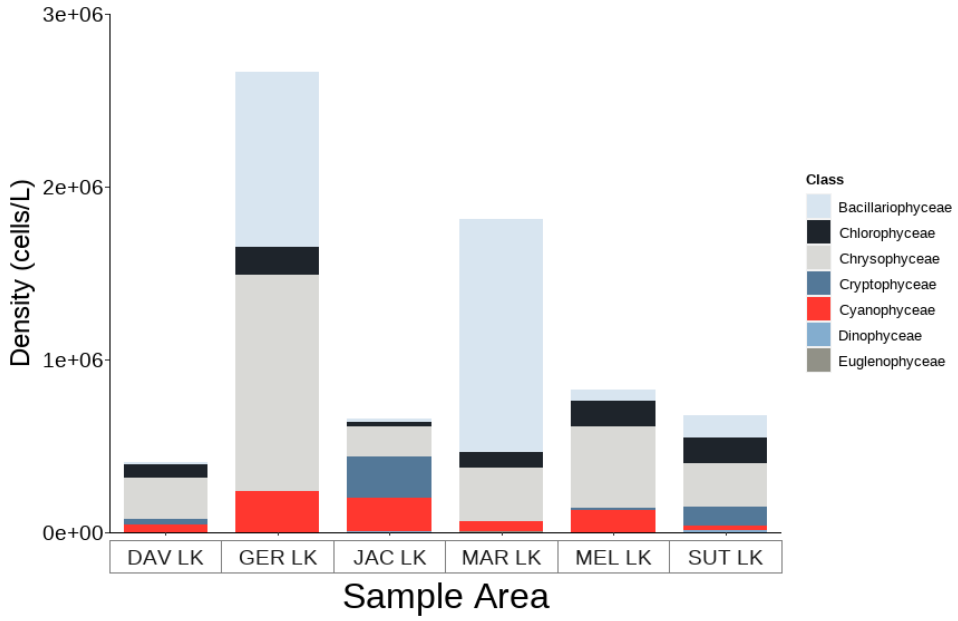


Figure D2-2: Total Phytoplankton Density (cells/L) by Taxonomic Group and Lake (2022)

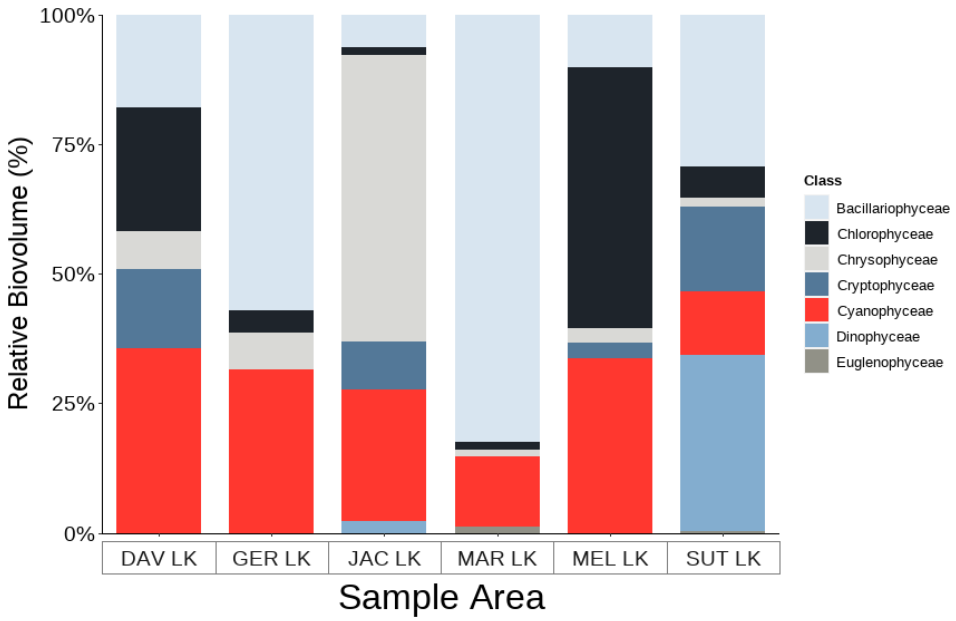


Figure D2-3: Relative Phytoplankton Biovolume (%) by Taxonomic Group and Lake (2022)

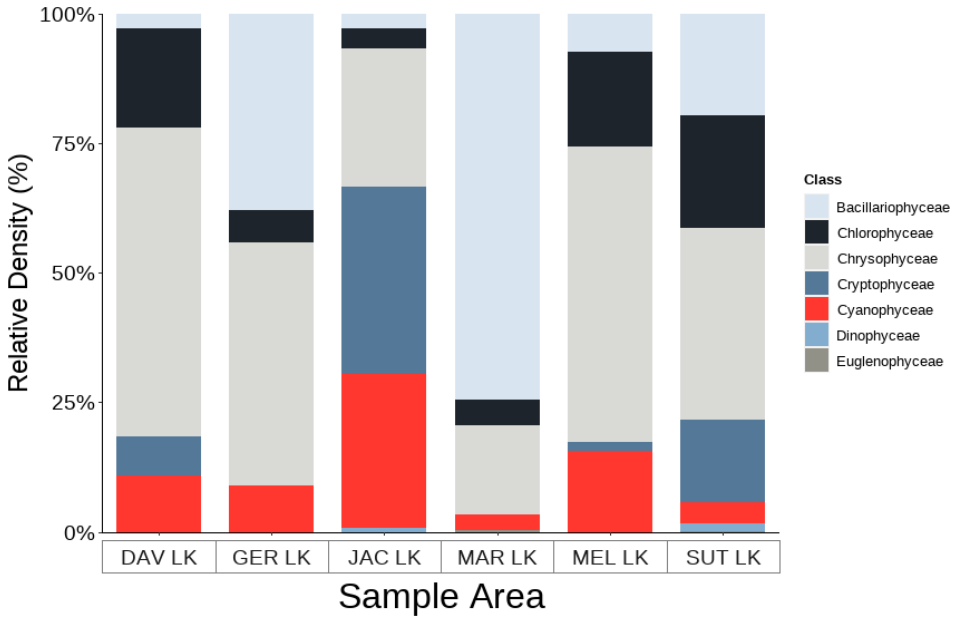


Figure D2-4: Relative Phytoplankton Density (%) by Taxonomic Group and Lake (2022)

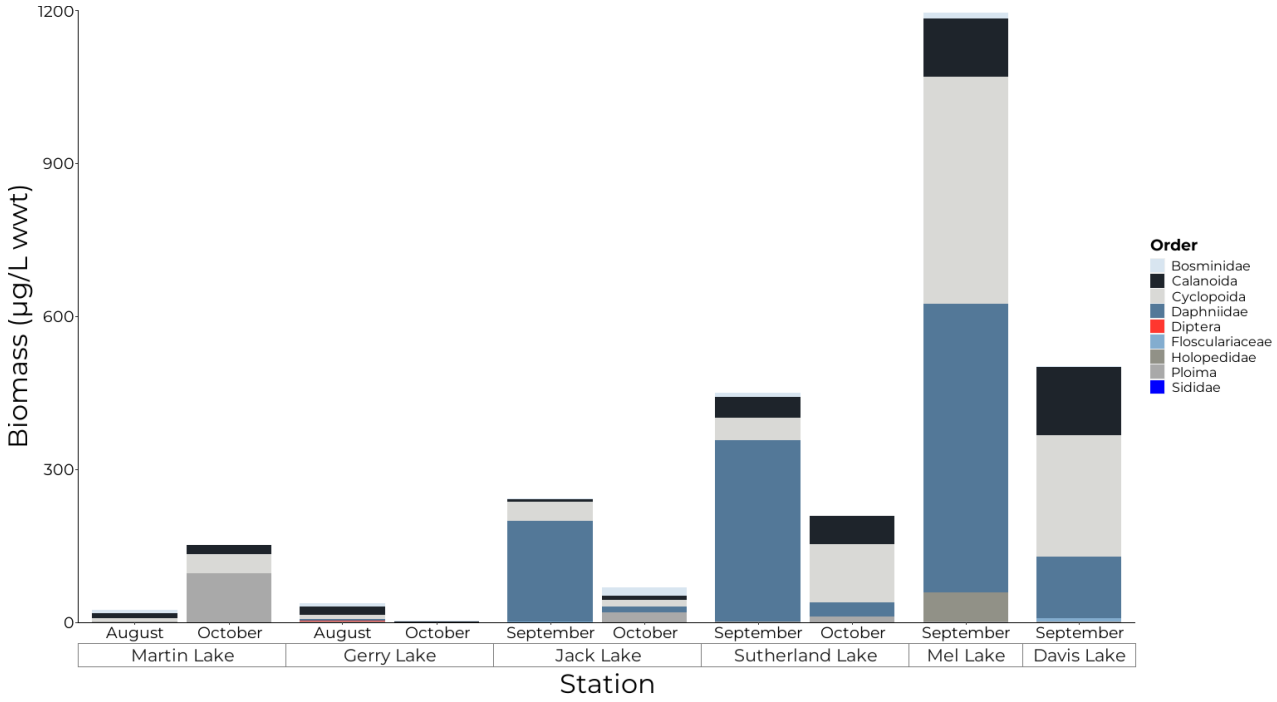


Figure D2-5: Zooplankton Biomass (ug/L wwt) by Station and Season (2022)

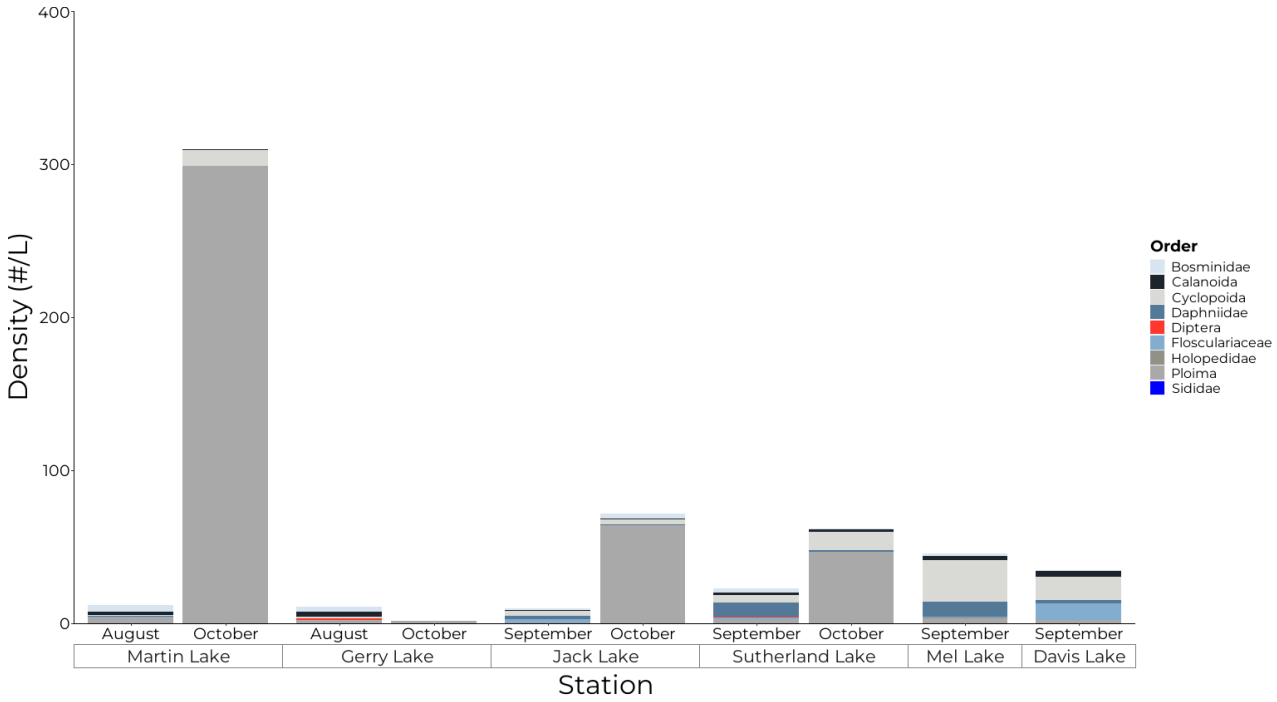


Figure D2-6: Zooplankton Density (#/L) by Station and Season (2022)

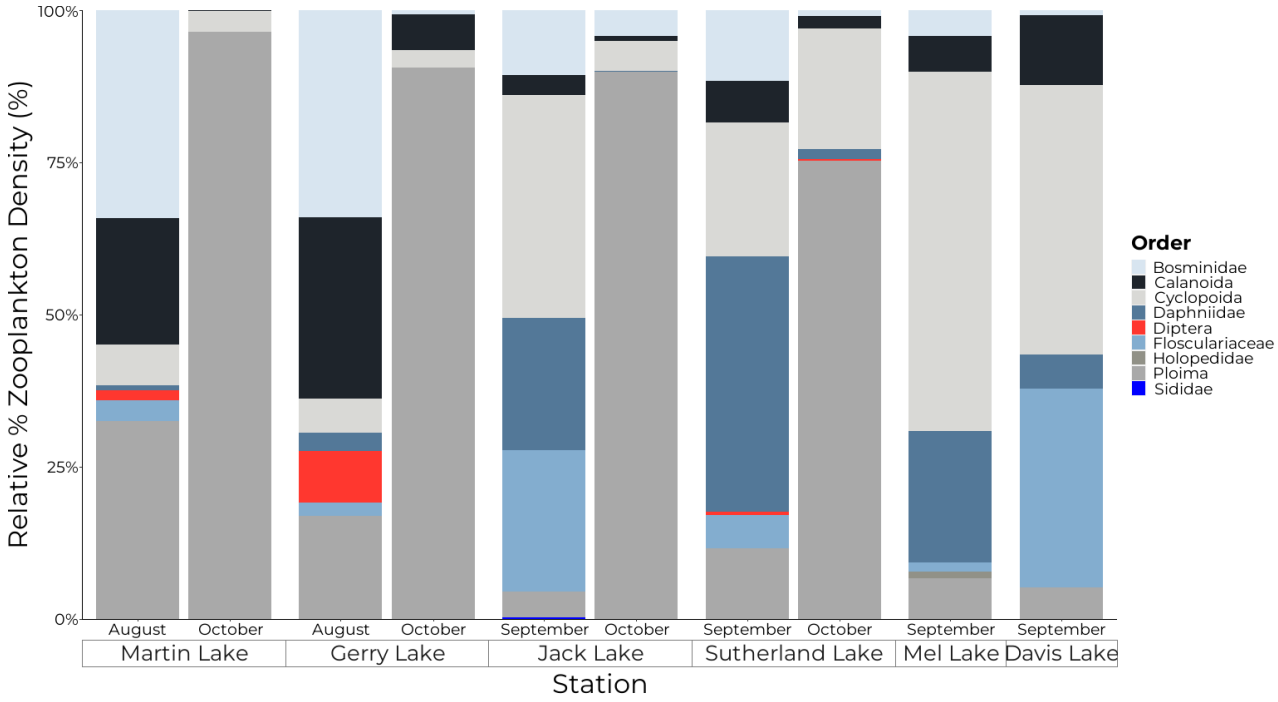


Figure D2-7: Relative Percent Zooplankton Density by Station and Season (2022)

APPENDIX E

Sediment Quality Data

Table E1-1a: Sediment Quality Laboratory Results – Martin Lake and Gerry Lake (2021)

						Watershed	**North Driftwood River**					
						Waterbody	**Martin Lake**			**Gerry Lake**		
						Client Sample ID	**NDR-MARLK-S1**	**NDR-MARLK-S2**	**NDR-MARLK-S3**	**NDR-GERLK-S1**	**NDR-GERLK-S2**	**NDR-GERLK-S3**
						Date Sampled	**27-Oct-21**	**27-Oct-21**	**27-Oct-21**	**27-Oct-21**	**27-Oct-21**	**27-Oct-21**
						Time Sampled	**15:00**	**15:20**	**16:00**	**10:50**	**11:15**	**12:00**
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**						
Physical Tests (Soil)												
pH	0.10	pH units					5.88	5.7	5.77	6.68	6.18	6.1
Particle Size (Soil)												
Gravel (4.75mm - 3in.)	1.0	%					<1.0	<1.0	<1.0	<1.0	<1.0	1.9
Medium Sand (0.425mm - 2.0mm)	1.0	%					3.3	1	4.6	3.7	1.5	31.4
Coarse Sand (2.0mm - 4.75mm)	1.0	%					<1.0	<1.0	1.7	1.8	<1.0	2.7
Fine Sand (0.075mm - 0.425mm)	1.0	%					12.2	3.7	17.2	8.6	7	36.2
Silt (0.002mm - 0.075mm)	1.0	%					73.9	72.6	66.1	64.7	80	22.7
Silt (0.005mm - 0.075mm)	1.0	%					66.4	63.2	59.5	51.5	73.2	20
Clay (<0.002mm)	1.0	%					10.6	22.7	10.3	20.4	11.6	5.1
Clay (<0.005mm)	1.0	%					18	32.1	16.9	33.6	18.4	7.8
Leachable Anions & Nutrients (Soil)							0.72	0.83	0.48	0.443	0.667	0.45
Total Kjeldahl Nitrogen	0.12	%			550	4800						
Organic / Inorganic Carbon (Soil)												
Fraction Organic Carbon	0.0010	g/g					0.151	0.207	0.0921	0.0736	0.13	0.0936
Total Organic Carbon	0.10	%			1	10	15.1	20.7	9.21	7.36	13	9.36
Metals (Soil)												
Aluminum (Al)	50	mg/kg					11600	18000	10000	15200	10100	6320
Antimony (Sb)	0.10	mg/kg					0.16	0.21	0.13	0.15	0.13	0.13
Arsenic (As)	0.10	mg/kg	5.9	17	6	33	4.1	5.84	3.04	3.74	4.44	3.21
Barium (Ba)	0.50	mg/kg					82.2	133	65.4	112	133	59.6
Beryllium (Be)	0.10	mg/kg					0.4	0.62	0.38	0.6	0.36	0.23
Bismuth (Bi)	0.20	mg/kg					<0.20	0.27	<0.20	<0.20	<0.20	<0.20
Boron (B)	5.0	mg/kg					6.4	10.1	6.2	11.5	7.6	6.7
Cadmium (Cd)	0.020	mg/kg	0.6	3.5	0.6	10	0.728	0.971	0.589	0.304	0.947	0.538
Calcium (Ca)	50	mg/kg					12600	13600	9010	35800	16900	20000
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	27	41.1	30	44.4	24.1	20.5
Cobalt (Co)	0.10	mg/kg					6.98	11.1	6.51	9.61	11.4	5.84
Copper (Cu)	0.50	mg/kg	35.7	197	16	110	15.9	24	12.9	20.5	14.3	13
Iron (Fe)	50	mg/kg			20000	40000	14200	21900	12900	21600	17200	12300
Lead (Pb)	0.50	mg/kg	35	91.3	31	250	12.9	19.6	11.4	10.4	14.5	9.48
Lithium (Li)	2.0	mg/kg					17.4	25.6	17.3	23.5	13.9	8.4
Magnesium (Mg)	20	mg/kg					4770	7640	4630	16500	6150	6340
Manganese (Mn)	1.0	mg/kg			460	1100	884	1070	529	805	1660	522
Mercury (Hg)	0.0050	mg/kg	0.17	0.486	0.2	2	0.1	0.112	0.0848	0.0605	0.109	0.0834
Molybdenum (Mo)	0.10	mg/kg					0.36	0.49	0.53	0.6	0.5	0.36

						Watershed	North Driftwood River					
						Waterbody	Martin Lake			Gerry Lake		
						Client Sample ID	NDR-MARLK-S1	NDR-MARLK-S2	NDR-MARLK-S3	NDR-GERLK-S1	NDR-GERLK-S2	NDR-GERLK-S3
						Date Sampled	27-Oct-21	27-Oct-21	27-Oct-21	27-Oct-21	27-Oct-21	27-Oct-21
						Time Sampled	15:00	15:20	16:00	10:50	11:15	12:00
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**						
Nickel (Ni)	0.50	mg/kg			16	75	17.3	26.5	18	25.8	15.1	15.9
Phosphorus (P)	50	mg/kg					539	645	526	476	656	375
Potassium (K)	100	mg/kg					1400	2410	1350	2270	1330	720
Selenium (Se)	0.20	mg/kg					0.55	0.7	0.42	0.25	0.45	0.42
Silver (Ag)	0.10	mg/kg					<0.10	0.12	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	50	mg/kg					123	199	127	212	145	105
Strontium (Sr)	0.50	mg/kg					29.1	31	23.9	39	33.3	27.6
Sulfur (S)	1000	mg/kg					1700	1900	1100	1200	2300	1900
Thallium (Tl)	0.050	mg/kg					0.131	0.197	0.122	0.163	0.146	0.125
Tin (Sn)	1.0	mg/kg					<1.0	1.1	<1.0	1.3	<1.0	<1.0
Titanium (Ti)	1.0	mg/kg					484	648	546	796	412	349
Tungsten (W)	0.50	mg/kg					<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.050	mg/kg					1.1	1.03	0.833	0.714	0.657	0.422
Vanadium (V)	0.20	mg/kg					24.8	39.3	23.1	35.7	22.7	16.2
Zinc (Zn)	2.0	mg/kg	123	315	120	820	114	171	90.6	68.3	126	73.5
Zirconium (Zr)	1.0	mg/kg					8	8.9	6.6	13.6	4.4	4.3

PSQG; Provincial Sediment Quality Guidelines for the protection and management of aquatic sediment quality in Ontario
CSQG; Canadian Council of Ministers of the Environment Canadian Sediment Quality Guidelines for the protection of aquatic life
All values expressed as mg/kg unless otherwise indicated
Dark blue shaded values indicate concentrations that exceed the PSQG LEL
Gray shaded values indicate concentrations that exceed the PSQG SEL and LEL
Blue shaded values indicate concentrations that exceed the CCME ISQG
Light blue shaded values indicate concentrations that exceed the CCME ISQG and PEL

Table E1-1b: Sediment Quality Laboratory Results – NDR Unnamed Tributaries and Ponds (2021)

						Watershed	North Driftwood River								
						Waterbody	NDR Unnamed Tributaries			NDR Unnamed Ponds					
						Client Sample ID	NDR-TRIB-01-S1	NDR-TRIB-01-S2	NDR-TRIB-01-S3	NDR-P-01-S1	NDR-P-01-S2	NDR-P-01-S3	NDR-P-03-S1	NDR-P-03-S2	NDR-P-03-S3
						Date Sampled	19-Oct-21	19-Oct-21	19-Oct-21	23-Oct-21	23-Oct-21	23-Oct-21	20-Oct-21	20-Oct-21	20-Oct-21
						Time Sampled	13:45	14:20	14:35	17:15	17:45	18:10	8:55	9:40	10:30
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**									
Physical Tests (Soil)															
pH	0.10	pH units					6.71	6.06	5.91	5.67	6.09	6.12	6.07	6.06	6
Particle Size (Soil)															
Gravel (4.75mm - 3in.)	1.0	%					3.9	<1.0	1.3	<1.0	4.1	<1.0	<1.0	<1.0	<1.0
Medium Sand (0.425mm - 2.0mm)	1.0	%					1.1	2.9	5.6	2.1	4.5	2.4	<1.0	<1.0	<1.0
Coarse Sand (2.0mm - 4.75mm)	1.0	%					<1.0	<1.0	2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fine Sand (0.075mm - 0.425mm)	1.0	%					18.1	24.9	12.5	3.1	4.7	3.9	<1.0	<1.0	<1.0
Silt (0.002mm - 0.075mm)	1.0	%					57.5	58.9	67.1	81.4	70	75.6	94.4	96.4	98.9
Silt (0.005mm - 0.075mm)	1.0	%					50.2	53.8	60	74.7	57.9	64.1	93.6	95.3	97.4
Clay (<0.002mm)	1.0	%					18.9	12.9	11.5	13.4	16.1	17.3	5.4	3.3	<1.0
Clay (<0.005mm)	1.0	%					26.3	18	18.6	20	28.2	28.9	6.2	4.3	2.1
Leachable Anions & Nutrients (Soil)							0.52	0.38	0.46	1.11	0.7	0.77	2.65	2.42	2.6
Total Kjeldahl Nitrogen	0.12	%			550	4800									
Organic / Inorganic Carbon (Soil)															
Fraction Organic Carbon	0.0010	g/g					0.0848	0.0468	0.0923	0.201	0.134	0.143	0.272	0.243	0.296
Total Organic Carbon	0.10	%			1	10	8.48	4.68	9.23	20.1	13.4	14.3	27.2	24.3	29.6
Metals (Soil)															
Aluminum (Al)	50	mg/kg					11500	9610	10300	8990	10900	10800	8980	9920	8250
Antimony (Sb)	0.10	mg/kg					0.12	0.12	0.12	0.12	0.12	0.12	0.45	0.38	0.55
Arsenic (As)	0.10	mg/kg	5.9	17	6	33	3.2	2.77	3.03	2.57	2.59	2.65	4.82	4.52	5.32
Barium (Ba)	0.50	mg/kg					85	64.8	72.5	59.3	60.6	62.1	81	79.5	80.2
Beryllium (Be)	0.10	mg/kg					0.43	0.33	0.34	0.36	0.39	0.39	0.35	0.38	0.38
Bismuth (Bi)	0.20	mg/kg					<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.32	0.3	0.29
Boron (B)	5.0	mg/kg					7.9	6	6.1	6.2	7.1	6.8	8.7	9	10.1
Cadmium (Cd)	0.020	mg/kg	0.6	3.5	0.6	10	0.582	0.595	0.692	0.705	0.62	0.7	1.26	0.89	0.934
Calcium (Ca)	50	mg/kg					19900	10300	10200	17700	17300	17300	11400	11700	14200
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	29.4	25.5	28	22	27.4	26.4	22.7	26.8	21
Cobalt (Co)	0.10	mg/kg					7.94	7.6	8.15	7.14	7.84	7.61	5.54	5.64	4.61
Copper (Cu)	0.50	mg/kg	35.7	197	16	110	21.1	20.4	12.3	14.7	16.8	15.4	23.7	22.8	22.4
Iron (Fe)	50	mg/kg			20000	40000	15100	13300	14200	11200	13000	12500	9420	12300	11100
Lead (Pb)	0.50	mg/kg	35	91.3	31	250	10.3	9.75	10.5	13.9	15.1	15.9	37.6	31.8	33.5
Lithium (Li)	2.0	mg/kg					18.3	15.2	15.2	12.4	15.8	15.2	11.4	13.1	9.7
Magnesium (Mg)	20	mg/kg					7790	5970	5530	4650	8260	7930	3900	4280	3570
Manganese (Mn)	1.0	mg/kg			460	1100	543	594	717	497	431	420	135	175	161
Mercury (Hg)	0.0050	mg/kg	0.17	0.486	0.2	2	0.0609	0.0622	0.0717	0.111	0.0923	0.108	0.112	0.106	0.106
Molybdenum (Mo)	0.10	mg/kg					0.41	0.29	0.35	0.37	0.28	0.28	1.08	0.99	1.08

						Watershed	North Driftwood River								
						Waterbody	NDR Unnamed Tributaries			NDR Unnamed Ponds					
						Client Sample ID	NDR-TRIB-01-S1	NDR-TRIB-01-S2	NDR-TRIB-01-S3	NDR-P-01-S1	NDR-P-01-S2	NDR-P-01-S3	NDR-P-03-S1	NDR-P-03-S2	NDR-P-03-S3
						Date Sampled	19-Oct-21	19-Oct-21	19-Oct-21	23-Oct-21	23-Oct-21	23-Oct-21	20-Oct-21	20-Oct-21	20-Oct-21
						Time Sampled	13:45	14:20	14:35	17:15	17:45	18:10	8:55	9:40	10:30
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**									
Nickel (Ni)	0.50	mg/kg			16	75	17.6	14.8	15.4	14	17.1	16.4	18.3	19.4	16.3
Phosphorus (P)	50	mg/kg					606	583	646	650	608	572	1010	971	973
Potassium (K)	100	mg/kg					1620	1230	1280	1090	1420	1290	1130	1350	1100
Selenium (Se)	0.20	mg/kg					0.25	0.28	0.32	0.64	0.46	0.54	1.4	1.19	1.5
Silver (Ag)	0.10	mg/kg					<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.13	0.13	0.12
Sodium (Na)	50	mg/kg					229	158	155	134	154	139	125	147	173
Strontium (Sr)	0.50	mg/kg					29.8	22.6	26.3	33.8	30.3	29.8	30.4	32.1	38.4
Sulfur (S)	1000	mg/kg					<1000	<1000	1000	1500	1100	1100	5200	5200	6100
Thallium (Tl)	0.050	mg/kg					0.135	0.112	0.12	0.11	0.142	0.134	0.132	0.126	0.121
Tin (Sn)	1.0	mg/kg					1.2	<1.0	<1.0	1	<1.0	1	1.7	1.3	1.4
Titanium (Ti)	1.0	mg/kg					581	534	512	377	534	488	235	302	234
Tungsten (W)	0.50	mg/kg					<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.050	mg/kg					0.789	0.843	1.02	1.07	1.08	1.07	0.957	0.904	0.975
Vanadium (V)	0.20	mg/kg					27	23.1	24.2	21.1	24.9	24.1	19.3	21.9	19.9
Zinc (Zn)	2.0	mg/kg	123	315	120	820	107	99.1	106	94.2	93	87.1	128	106	103
Zirconium (Zr)	1.0	mg/kg					4.9	3.6	4.5	7	7.1	7.3	5.5	6	6.1

PSQG; Provincial Sediment Quality Guidelines for the protection and management of aquatic sediment quality in Ontario
CSQG; Canadian Council of Ministers of the Environment Canadian Sediment Quality Guidelines for the protection of aquatic life
All values expressed as mg/kg unless otherwise indicated
Dark blue shaded values indicate concentrations that exceed the PSQG LEL
Gray shaded values indicate concentrations that exceed the PSQG SEL and LEL
Blue shaded values indicate concentrations that exceed the CCME ISQG
Light blue shaded values indicate concentrations that exceed the CCME ISQG and PEL

Table E1-1c: Sediment Quality Laboratory Results – NDR Unnamed Streams (2021)

						Watershed	**North Driftwood River**								
						Waterbody	**NDR Unnamed Streams**								
						Client Sample ID	**NDR-S-01-S1**	**NDR-S-01-S2**	**NDR-S-01-S3**	**NDR-S-02-S1**	**NDR-S-02-S2**	**NDR-S-02-S3**	**NDR-S-04-S1**	**NDR-S-04-S2**	**NDR-S-04-S3**
						Date Sampled	**23-Oct-21**	**23-Oct-21**	**23-Oct-21**	**22-Oct-21**	**22-Oct-21**	**22-Oct-21**	**21-Oct-21**	**21-Oct-21**	**21-Oct-21**
						Time Sampled	**12:30**	**13:00**	**13:30**	**12:30**	**13:15**	**14:00**	**14:25**	**15:10**	**15:40**
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**									
Physical Tests (Soil)															
pH	0.10	pH units					5.46	6.07	5.29	5.46	5.43	5.83	6.63	6.21	6.47
Particle Size (Soil)															
Gravel (4.75mm - 3in.)	1.0	%					<1.0	<1.0	<1.0	<1.0	<1.0	2	4.4	2.7	8.8
Medium Sand (0.425mm - 2.0mm)	1.0	%					<1.0	<1.0	<1.0	<1.0	1.4	1.9	12.9	15.2	15.1
Coarse Sand (2.0mm - 4.75mm)	1.0	%					<1.0	<1.0	<1.0	<1.0	<1.0	1.7	8	4.3	6
Fine Sand (0.075mm - 0.425mm)	1.0	%					<1.0	2.6	4.7	25.5	21.3	26	26.7	37.6	36.2
Silt (0.002mm - 0.075mm)	1.0	%					94.3	86.7	86	68.7	68.2	63.2	40	33.2	28.5
Silt (0.005mm - 0.075mm)	1.0	%					90.7	80.1	79.6	62.3	61.1	57.4	33.7	28.3	24.6
Clay (<0.002mm)	1.0	%					5.3	10.7	8.9	5.2	7.9	5.1	8	7.1	5.3
Clay (<0.005mm)	1.0	%					8.8	17.3	15.4	11.6	15	10.9	14.2	11.9	9.2
Leachable Anions & Nutrients (Soil)							1.1	0.76	0.88	0.34	0.32	0.28	0.158	0.139	0.153
Total Kjeldahl Nitrogen	0.12	%			550	4800									
Organic / Inorganic Carbon (Soil)															
Fraction Organic Carbon	0.0010	g/g					0.155	0.0991	0.0925	0.0409	0.0205	0.0549	0.0329	0.0283	0.035
Total Organic Carbon	0.10	%			1	10	15.5	9.91	9.25	4.09	2.05	5.49	3.29	2.83	3.5
Metals (Soil)															
Aluminum (Al)	50	mg/kg					9700	10500	11100	8460	9190	8550	9230	7040	6530
Antimony (Sb)	0.10	mg/kg					0.11	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)	0.10	mg/kg	5.9	17	6	33	1.9	1.98	2.35	2.3	2.52	2.38	2.88	1.96	2.47
Barium (Ba)	0.50	mg/kg					52.5	57.2	57.3	54.4	62.2	57	63.7	43.8	60.5
Beryllium (Be)	0.10	mg/kg					0.23	0.27	0.25	0.27	0.26	0.26	0.3	0.23	0.25
Bismuth (Bi)	0.20	mg/kg					<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	5.9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium (Cd)	0.020	mg/kg	0.6	3.5	0.6	10	0.699	0.537	0.95	0.526	0.611	0.538	0.314	0.202	0.234
Calcium (Ca)	50	mg/kg					10300	11900	7650	5310	5330	4870	5670	4930	6290
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	21	23.6	24	21.8	23.8	22.4	29.1	21.2	53.1
Cobalt (Co)	0.10	mg/kg					4.15	4.61	4.97	7.26	8.18	7.9	9.2	6.68	7.76
Copper (Cu)	0.50	mg/kg	35.7	197	16	110	9.85	8.43	9.21	6.95	7.72	7.1	7.06	5.73	5.98
Iron (Fe)	50	mg/kg			20000	40000	7450	8430	8820	11000	11700	11400	14500	10200	13800
Lead (Pb)	0.50	mg/kg	35	91.3	31	250	10.4	8.07	13.9	8.75	9.53	8.43	6.49	5.22	4.91
Lithium (Li)	2.0	mg/kg					9.9	10.6	13.9	13.8	13.3	12.6	12.7	10.3	10.4
Magnesium (Mg)	20	mg/kg					2850	4630	2980	3500	3780	3720	4290	3920	4060
Manganese (Mn)	1.0	mg/kg			460	1100	275	269	364	713	927	888	1470	1040	1650
Mercury (Hg)	0.0050	mg/kg	0.17	0.486	0.2	2	0.138	0.113	0.118	0.058	0.0628	0.0514	0.0367	0.0267	0.0269
Molybdenum (Mo)	0.10	mg/kg					0.39	0.36	0.38	0.2	0.23	0.16	0.36	0.23	2.97
Nickel (Ni)	0.50	mg/kg			16	75	9.9	10.8	10.5	11.5	13	12.2	15.4	11.4	28.4

						Watershed	North Driftwood River								
						Waterbody	NDR Unnamed Streams								
						Client Sample ID	NDR-S-01-S1	NDR-S-01-S2	NDR-S-01-S3	NDR-S-02-S1	NDR-S-02-S2	NDR-S-02-S3	NDR-S-04-S1	NDR-S-04-S2	NDR-S-04-S3
						Date Sampled	23-Oct-21	23-Oct-21	23-Oct-21	22-Oct-21	22-Oct-21	22-Oct-21	21-Oct-21	21-Oct-21	21-Oct-21
						Time Sampled	12:30	13:00	13:30	12:30	13:15	14:00	14:25	15:10	15:40
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**									
Phosphorus (P)	50	mg/kg					765	693	691	461	533	546	487	393	593
Potassium (K)	100	mg/kg					880	920	1090	960	1050	980	1060	840	790
Selenium (Se)	0.20	mg/kg					0.49	0.42	0.5	<0.20	0.22	<0.20	<0.20	<0.20	<0.20
Silver (Ag)	0.10	mg/kg					<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	50	mg/kg					82	96	105	123	123	139	130	99	98
Strontium (Sr)	0.50	mg/kg					29.8	27.7	23.6	18	18.2	16.5	18.7	13.7	14.8
Sulfur (S)	1000	mg/kg					1800	<1000	1400	<1000	<1000	<1000	<1000	<1000	<1000
Thallium (Tl)	0.050	mg/kg					0.116	0.113	0.147	0.121	0.124	0.113	0.1	0.075	0.08
Tin (Sn)	1.0	mg/kg					<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Titanium (Ti)	1.0	mg/kg					242	319	398	482	520	484	538	458	403
Tungsten (W)	0.50	mg/kg					<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.050	mg/kg					1.03	1.23	0.806	0.637	0.737	0.63	0.787	0.541	0.574
Vanadium (V)	0.20	mg/kg					16.5	18.9	19.6	20.5	22.4	20.9	25	19.6	19
Zinc (Zn)	2.0	mg/kg	123	315	120	820	71.1	46	92.7	84.5	90.5	83.8	60.4	49.4	50.7
Zirconium (Zr)	1.0	mg/kg					2.1	2.2	1.7	2.4	2.5	2.7	3.6	3.1	2.2

PSQG; Provincial Sediment Quality Guidelines for the protection and management of aquatic sediment quality in Ontario
CSQG; Canadian Council of Ministers of the Environment Canadian Sediment Quality Guidelines for the protection of aquatic life
All values expressed as mg/kg unless otherwise indicated
Dark blue shaded values indicate concentrations that exceed the PSQG LEL
Gray shaded values indicate concentrations that exceed the PSQG SEL and LEL
Blue shaded values indicate concentrations that exceed the CCME ISQG
Light blue shaded values indicate concentrations that exceed the CCME ISQG and PEL

Table E1-1d: Sediment Quality Laboratory Results – WBR Unnamed Streams and Ponds (2021)

Watershed							**West Buskegau River**											
Waterbody							**Unnamed Streams**									**Unnamed Ponds**		
Client Sample ID							**WBR-S-02-S1**	**WBR-S-02-S2**	**WBR-S-02-S3**	**WBR-S-03-S1**	**WBR-S-03-S2**	**WBR-S-03-S3**	**WBR-S-04-S1**	**WBR-S-04-S2**	**WBR-S-04-S3**	**WBR-P-01-S1**	**WBR-P-01-S2**	**WBR-P-01-S3**
Date Sampled							**25-Oct-21**	**25-Oct-21**	**25-Oct-21**	**24-Oct-21**	**24-Oct-21**	**25-Oct-21**	**24-Oct-21**	**24-Oct-21**	**24-Oct-21**	**26-Oct-21**	**26-Oct-21**	**26-Oct-21**
Time Sampled							**14:15**	**14:40**	**15:10**	**11:00**	**11:20**	**11:45**	**14:45**	**15:25**	**16:10**	**10:15**	**10:45**	**11:10**
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**												
Physical Tests (Soil)																		
pH	0.10	pH units					6.55	7.08	6.92	6.53	6.77	6.44	7.2	6.16	6.19	5.08	5.35	5.3
Particle Size (Soil)																		
Gravel (4.75mm - 3in.)	1.0	%					5.3	25.1	5.6	2.4	8.8	13.1	1.9	<1.0	<1.0	<1.0	<1.0	<1.0
Medium Sand (0.425mm - 2.0mm)	1.0	%					9.2	24	22.6	24.6	10.4	16.3	31.6	27.6	47.1	<1.0	<1.0	<1.0
Coarse Sand (2.0mm - 4.75mm)	1.0	%					1.8	10.9	2.9	4.3	2.1	7.1	5.2	<1.0	3.7	<1.0	<1.0	<1.0
Fine Sand (0.075mm - 0.425mm)	1.0	%					35.8	21.9	20.6	19.8	22.5	24.2	47	55.1	35.5	<1.0	<1.0	<1.0
Silt (0.002mm - 0.075mm)	1.0	%					38.2	11.6	33.5	34.5	37.7	28.5	11.9	11.7	8.4	95.6	84	97
Silt (0.005mm - 0.075mm)	1.0	%					32.4	9.1	26.4	27.9	29.3	22.1	10.1	9.7	6.2	92.4	80.4	94.1
Clay (<0.002mm)	1.0	%					9.7	6.4	14.9	14.3	18.6	10.8	2.4	4.9	5.2	3.5	15.1	2.5
Clay (<0.005mm)	1.0	%					15.5	8.9	22.1	21	27	17.2	4.2	6.9	7.4	6.7	18.8	5.4
Leachable Anions & Nutrients (Soil)							0.207	0.1	0.109	0.189	0.31	0.123	0.154	0.134	0.054	1.41	1.81	1.67
Total Kjeldahl Nitrogen	0.12	%			550	4800												
Organic / Inorganic Carbon (Soil)																		
Fraction Organic Carbon	0.0010	g/g					0.0665	0.0278	0.0659	0.0535	0.048	0.0301	0.015	0.0207	0.0146	0.191	0.134	0.187
Total Organic Carbon	0.10	%			1	10	6.65	2.78	6.59	5.35	4.8	3.01	1.5	2.07	1.46	19.1	13.4	18.7
Metals (Soil)																		
Aluminum (Al)	50	mg/kg					9750	6600	9170	12600	10900	9010	4640	4540	4270	8480	8510	8970
Antimony (Sb)	0.10	mg/kg					<0.10	<0.10	0.12	0.11	0.1	0.11	<0.10	<0.10	<0.10	0.13	0.15	0.15
Arsenic (As)	0.10	mg/kg	5.9	17	6	33	2.99	2.15	2.81	4.02	3.48	2.7	1.51	1.65	1.72	2.68	3.87	3.25
Barium (Ba)	0.50	mg/kg					60.5	35.2	55.7	74.6	59.2	48.3	23.8	24.7	22.7	71.2	83.7	70.7
Beryllium (Be)	0.10	mg/kg					0.33	0.22	0.35	0.45	0.42	0.31	0.15	0.16	0.14	0.23	0.2	0.22
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	0.2	0.24
Boron (B)	5.0	mg/kg					5.6	<5.0	7.4	6.6	8.2	5.2	<5.0	<5.0	<5.0	5.1	5.1	<5.0
Cadmium (Cd)	0.020	mg/kg	0.6	3.5	0.6	10	0.439	0.188	0.251	0.339	0.342	0.231	0.156	0.167	0.141	1.11	1.66	1.51
Calcium (Ca)	50	mg/kg					10500	11400	37300	9460	25900	8370	3430	2860	2290	7950	8800	7800
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	27	21.6	38.9	34.4	30.2	26.1	14.9	14.2	13.8	19.6	17.6	19.9
Cobalt (Co)	0.10	mg/kg					8.67	6.13	7.35	11	8.57	7.25	4.52	4.7	4.22	9.35	11.1	8.81
Copper (Cu)	0.50	mg/kg	35.7	197	16	110	9.42	6.32	10.6	11.3	11.2	8.99	4.41	4.22	3.48	9.31	14.3	12.6
Iron (Fe)	50	mg/kg			20000	40000	14800	10700	14300	19100	15900	15000	7820	7550	7360	9130	9680	8580
Lead (Pb)	0.50	mg/kg	35	91.3	31	250	7.54	4.27	5.99	8.98	7.55	5.95	3.38	3.72	3.17	21.8	25.7	33.3
Lithium (Li)	2.0	mg/kg					14.5	10.4	15.5	18.7	17.8	13.4	6.5	6.8	6.8	10	9.2	10
Magnesium (Mg)	20	mg/kg					5790	4860	12000	7070	9610	5560	2750	2310	2370	2660	3000	2780

						Watershed	West Buskegau River											
						Waterbody	Unnamed Streams									Unnamed Ponds		
						Client Sample ID	WBR-S-02-S1	WBR-S-02-S2	WBR-S-02-S3	WBR-S-03-S1	WBR-S-03-S2	WBR-S-03-S3	WBR-S-04-S1	WBR-S-04-S2	WBR-S-04-S3	WBR-P-01-S1	WBR-P-01-S2	WBR-P-01-S3
						Date Sampled	25-Oct-21	25-Oct-21	25-Oct-21	24-Oct-21	24-Oct-21	25-Oct-21	24-Oct-21	24-Oct-21	24-Oct-21	26-Oct-21	26-Oct-21	26-Oct-21
						Time Sampled	14:15	14:40	15:10	11:00	11:20	11:45	14:45	15:25	16:10	10:15	10:45	11:10
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**												
Manganese (Mn)	1.0	mg/kg			460	1100	1070	512	805	1080	823	732	373	360	333	1130	2050	1100
Mercury (Hg)	0.0050	mg/kg	0.17	0.486	0.2	2	0.0389	0.0168	0.0239	0.0368	0.0303	0.0217	0.0134	0.0159	0.0129	0.11	0.124	0.133
Molybdenum (Mo)	0.10	mg/kg					0.16	<0.10	0.75	0.2	0.17	0.3	<0.10	<0.10	<0.10	0.62	0.91	0.93
Nickel (Ni)	0.50	mg/kg			16	75	15.1	12.5	21.1	20.2	17.6	13.8	8.3	7.94	7.7	9.84	11.3	10.5
Phosphorus (P)	50	mg/kg					482	336	459	513	465	425	307	327	255	688	1110	862
Potassium (K)	100	mg/kg					1220	800	1510	1690	1650	1040	510	520	430	1090	1350	1140
Selenium (Se)	0.20	mg/kg					<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.49	0.63	0.54
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					130	91	164	153	161	105	66	61	54	127	155	101
Strontium (Sr)	0.50	mg/kg					21.1	15	37	23	30.6	15.5	10.9	9.44	9.34	26.8	26.2	24
Sulfur (S)	1000	mg/kg					<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	1800	2000	2100
Thallium (Tl)	0.050	mg/kg					0.108	0.06	0.113	0.129	0.114	0.081	<0.050	<0.050	<0.050	0.152	0.139	0.172
Tin (Sn)	1.0	mg/kg					<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0
Titanium (Ti)	1.0	mg/kg					531	449	600	667	652	529	308	314	298	247	125	198
Tungsten (W)	0.50	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					0.756	0.417	0.735	0.714	0.661	0.496	0.331	0.321	0.268	0.694	0.61	0.695
Vanadium (V)	0.20	mg/kg					25.5	19.7	25.5	32.4	29.4	28.9	13.7	13.4	12.4	19	18.6	19.4
Zinc (Zn)	2.0	mg/kg	123	315	120	820	69.2	42.7	49.9	68.3	60.6	50.6	30.9	33	30.9	107	132	134
Zirconium (Zr)	1.0	mg/kg					3.6	2.6	5.5	5.5	7	2.8	1.7	1.9	1.5	1.4	<1.0	1.2

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CSQG; Canadian Council of Ministers of the Environment Canadian Sediment Quality Guidelines for the protection of aquatic life
All values expressed as mg/kg unless otherwise indicated
Dark blue shaded values indicate concentrations that exceed the PSQG LEL
Gray shaded values indicate concentrations that exceed the PSQG SEL and LEL
Blue shaded values indicate concentrations that exceed the CCME ISQG
Light blue shaded values indicate concentrations that exceed the CCME ISQG and PEL

467500 470000 472500 475000 477500 480000 482500

5412500 5410000 5407500 5405000

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CAMP 40 RD

NDR-S-04-B3
NDR-S-04-B2
NDR-S-04-B1

North Driftwood River

100 m

NDR-S-02-B1
NDR-S-02-B2
NDR-S-02-B3

North Driftwood River

100 m

LOWER STURGEON DAM RD

North Driftwood River

NDR-TRIB-01-B3
NDR-TRIB-01-B2
NDR-TRIB-01-B1

100 m

Jocko Creek

NDR-P-03-B3
NDR-P-03-B2
NDR-P-03-B1

North Driftwood River

655

NDR-MarLk-B2
NDR-MarLk-B3
NDR-MarLk-B1

Martin Lake

NDR-GerLk-B1
NDR-GerLk-B2
NDR-GerLk-B3

Gerry Lake

Jack Lake

NDR-P-01-B1
NDR-P-01-B2
NDR-P-01-B3

NDR-S-01-B1
NDR-S-01-B2
NDR-S-01-B3

West Buskegau River

WBR-S-04-B3
WBR-S-04-B2
WBR-S-04-B1

WBR-S-03-B3
WBR-S-03-B2
WBR-S-03-B1

West Buskegau River

WBR-P-01-B3
WBR-P-01-B2
WBR-P-01-B1

200 m

West Buskegau River

WBR-S-02-B2
WBR-S-02-B1
WBR-S-02-B3

Prosser Creek

100 m

West Buskegau River

Prosser Creek

LEGEND

- Property Boundary (2021)
- Utility Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction
- Sediment Sampling Location

0 1 2 4 6 8 10 Kilometres

NOTES:
- Topographic map information extracted from Land Information Ontario (NDMNRF), Queen's Printer for Ontario, 2021
- Aerial imagery around property boundary provided by CNC, scene date, summer 2021.
- Surrounding aerial imagery extracted from ESRI ArcGIS Online Image Service, scene date is May 2019.

Datum: NAD83
Projection: UTM Zone 17N

N W E S

[redacted]

CRAWFORD NICKEL PROJECT

Sediment Sampling Locations (2021)

PROJECT N°:OMEMA2304 | **FIGURE: E1-1**

SCALE: 1:45,000 | DATE: November 2023

460000 462500 465000 467500 470000 472500 475000 477500 480000 482500

5412500 5410000 5407500 5405000 5402500

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Nesbitt Creek
CAMP 40 RD
North Driftwood River
LOWER STURGEON DAM RD
655
West Buskegau River
Prosser Creek
Martin Lake
Gerry Lake
Sutherland Lake
Mel Lake
Davis Lake
Zed Lake
Prosser Lake

NDR-P-07-01
NDR-P-07-02
NDR-S-05-02
NDR-S-05-01
200 m

NDR-P-03-01
NDR-P-03-03
NDR-P-03-02

NDR-Trib-01-01
NDR-Trib-01-02
NDR-Trib-01-03
50 m

NDR-MarLK-02
NDR-MarLk-01
NDR-GerLK-01
NDR-JacLK-03
NDR-JacLK-02
NDR-JacLK-01
NDR-SutLk-03

NDR-P-01-01
NDR-P-01-02
NDR-P-01-03

WBR-P-04-01
WBR-P-04-02
WBR-P-04-03
WBR-P-03-03
WBR-P-03-01
WBR-P-03-02
200 m

NDR-S-02-02
NDR-S-02-03
50 m

NDR-S-01-03
NDR-S-01-01
100 m

LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction
- Sediment Sampling Locations

0 1 2 4 6 8 10 Kilometres

OVERVIEW MAP
Enlarged Area
10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

[redacted]

CRAWFORD NICKEL PROJECT

Sediment Sampling Locations (2022)

Datum: NAD83
Projection: UTM Zone 17N

N W E S

PROJECT N°:OMEMA2304 | **FIGURE: E1-2**

SCALE: 1:58,000 | DATE: November 2023

Table E2-1a: Sediment Quality Laboratory Results – Gerry Lake, Martin Lake, Jake Lake, Sutherland Lake (2022)

						Watershed	**North Driftwood River**					
						Waterbody	**Gerry Lake**			**Martin Lake**		
						Client Sample ID	**NDR-GERLK-01**	**NDR-GERLK-02**	**NDR-GERLK-03**	**NDR-MARLK-01**	**NDR-MARLK-02**	**NDR-MARLK-03**
						Date Sampled	**19-Oct-2022**	**19-Oct-2022**	**19-Oct-2022**	**19- Oct-2022**	**19-Oct-2022**	**19-Oct-2022**
						Time Sampled	**12:30**	**13:00**	**13:30**	**16:00**	**16:30**	**17:00**
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**						
Physical Tests												
Moisture	0.25	%					81	81	83	69	78	78
pH (1:2 soil:water)	0.10	pH units					6.50	6.23	6.55	6	5.82	6.08
Particle Size												
Coarse Sand/Gravel (>2mm)	1.0	%					<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Medium Sand (0.5mm-2.0mm)	1.0	%					<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fine Sand (0.63mm-0.5mm)	1.0	%					11.8	15.8	10.9	14.7	11.1	10.0
Silt (0.004mm-0.063mm)	1.0	%					37.4	50.9	39.9	70.2	35.8	46.1
Clay (<0.004mm)	1.0						50.7	32.8	49.0	14.4	53.1	42.9
Nutrients & Organics												
Fraction Organic Carbon	0.0010	g/g										
Total Kjeldahl Nitrogen	0.020	%			0.055	0.48	0.45	0.54	0.49	0.3	0.45	0.40
Total Organic Carbon	0.050	%			1	10	8.95	11.9	10.7	6.05	7.75	7.02
Metals												
Aluminum (Al)	50	mg/kg					21400	17000	20900	10800	24700	22400
Antimony (Sb)	0.10	mg/kg					0.22	0.18	0.24	0	0.23	0.24
Arsenic (As)	0.10	mg/kg	5.9	17	6	33	6.72	4.43	5.50	2.92	4.54	4.56
Barium (Ba)	0.50	mg/kg					177.0	168.0	200.0	82.60	156.0	132.0
Beryllium (Be)	0.10	mg/kg					0.67	0.61	0.71	0.4	0.75	0.72
Bismuth (Bi)	0.20	mg/kg					0.3	0.26	0.33	<0.20	0.35	0.3
Boron (B)	5.0	mg/kg					11.1	12	13.9	6.1	12.5	12.3
Cadmium (Cd)	0.020	mg/kg	0.6	3.5	0.6	10	0.69	1.00	0.87	0.686	0.74	0.60
Calcium (Ca)	50	mg/kg					27400	25600	26200	7290.00	11100	13800
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	51.0	43.1	51.5	28	59.1	56.8
Cobalt (Co)	0.10	mg/kg					11.70	11.80	12.10	8.3	14.30	13.30
Copper (Cu)	0.50	mg/kg	35.7	197	16	110	28.6	21.2	28.0	10.10	21.3	30.4
Iron (Fe)	50	mg/kg			20000	40000	37900	38100	37100	16200.0	33400	28000
Lead (Pb)	0.50	mg/kg	35	91.3	31	250	25.0	20.2	25.0	12	27.1	21.8
Lithium (Li)	2.0	mg/kg					28.4	25.4	30.3	15.7	34.8	32.4
Magnesium (Mg)	20	mg/kg					15800	15200	15400	4830.0	10700	12400
Manganese (Mn)	1.0	mg/kg			460	1100	887	914	606	1220	623	468
Mercury (Hg)	0.0050	mg/kg	0.17	0.486	0.2	2						

						Watershed	North Driftwood River					
						Waterbody	Gerry Lake			Martin Lake		
						Client Sample ID	NDR-GERLK-01	NDR-GERLK-02	NDR-GERLK-03	NDR-MARLK-01	NDR-MARLK-02	NDR-MARLK-03
						Date Sampled	19-Oct-2022	19-Oct-2022	19-Oct-2022	19- Oct-2022	19-Oct-2022	19-Oct-2022
						Time Sampled	12:30	13:00	13:30	16:00	16:30	17:00
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**						
Molybdenum (Mo)	0.10	mg/kg					0.63	0.39	0.80	0.210	0.34	0.50
Nickel (Ni)	0.50	mg/kg			16	75	33.2	28.6	31.8	16.20	34.9	34.2
Phosphorus (P)	50	mg/kg					853	1110	861	656.0	912	702
Potassium (K)	100	mg/kg					3080	2540	3010	1520	3520	3280
Selenium (Se)	0.20	mg/kg					0.56	0.60	0.70	0	0.46	0.38
Silver (Ag)	0.10	mg/kg					0.14	0.12	0.14	<0.10	0.12	0.1
Sodium (Na)	50	mg/kg					351	283	356	156	332	327
Strontium (Sr)	0.50	mg/kg					41.6	43.1	47.0	22	36.5	31.6
Sulfur (S)	1000	mg/kg					3300	1500	3500	<1000	<1000	<1000
Thallium (Tl)	0.050	mg/kg					0.189	0.174	0.195	0	0.237	0.237
Tin (Sn)	1.0	mg/kg					<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	1.0	mg/kg					767	651	796	619.0	1040	997
Tungsten (W)	0.50	mg/kg					<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.050	mg/kg					0.670	0.642	0.699	0.78	0.966	0.964
Vanadium (V)	0.20	mg/kg					44.2	38.5	46.9	25.000	52.5	48.8
Zinc (Zn)	2.0	mg/kg	123	315	120	820	131.0	145.0	156.0	102.0	170.0	171.0
Zirconium (Zr)	1.0	mg/kg					12.4	11.9	13.4	3.9	11.6	9.9

						Watershed	North Driftwood River					
						Waterbody	Jack Lake			Sutherland Lake		
						Client Sample ID	NDR-JACLK-01	NDR-JACLK-02	NDR-JACLK-03	NDR-SUTLK-01	NDR-SUTLK-02	NDR-SUTLK-03
						Date Sampled	22-Oct-2022	22-Oct-2022	22-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022
						Time Sampled	12:15	12:45	13:15	11:00	11:30	12:00
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**						
Physical Tests												
Moisture	0.25	%					96	95	42	95	96	97
pH (1:2 soil:water)	0.10	pH units					6.98	6.75	7.34	6.88	6.93	6.91
Particle Size												
Coarse Sand/Gravel (>2mm)	1.0	%					<1.0	<1.0	<1.0	15	17	<1.0
Medium Sand (0.5mm-2.0mm)	1.0	%					<1.0	<1.0	1.0	<1.0	<1.0	<1.0
Fine Sand (0.63mm-0.5mm)	1.0	%					45.5	37.6	53.8	30.0	32.5	53.0
Silt (0.004mm-0.063mm)	1.0	%					48.7	51.2	31.2	46.3	43.3	46.9

						Watershed	North Driftwood River						
						Waterbody	Jack Lake			Sutherland Lake			
						Client Sample ID	NDR-JACLK-01	NDR-JACLK-02	NDR-JACLK-03	NDR-SUTLK-01	NDR-SUTLK-02	NDR-SUTLK-03
						Date Sampled	22-Oct-2022	22-Oct-2022	22-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022
						Time Sampled	12:15	12:45	13:15	11:00	11:30	12:00
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**						
Clay (<0.004mm)	1.0						5.6	11.1	14.0	8.3	7.1	<1
Nutrients & Organics												
Fraction Organic Carbon	0.0010	g/g										
Total Kjeldahl Nitrogen	0.020	%			0.055	0.48	1.98	2.05	0.08	1.91	2.32	2.67
Total Organic Carbon	0.050	%			1	10	24.4	24.9	1.54	24.8	25.7	30.4
Metals												
Aluminum (Al)	50	mg/kg					13200	13100	9460	9270	9260	8140
Antimony (Sb)	0.10	mg/kg					0.66	0.61	<0.10	0.33	0.56	0.34
Arsenic (As)	0.10	mg/kg	5.9	17	6	33	9.05	7.61	2.25	6.39	6.60	5.25
Barium (Ba)	0.50	mg/kg					77.8	95.1	60.3	50.2	60.4	37.1
Beryllium (Be)	0.10	mg/kg					0.57	0.51	0.27	0.38	0.36	0.26
Bismuth (Bi)	0.20	mg/kg					0.42	0.65	<0.20	0.36	0.43	0.39
Boron (B)	5.0	mg/kg					13.1	13.4	7.6	16.9	19.8	17.7
Cadmium (Cd)	0.020	mg/kg	0.6	3.5	0.6	10	1.50	1.90	0.08	1.29	1.44	1.44
Calcium (Ca)	50	mg/kg					11200	11800	57800	20300	15700	14400
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	32.2	34.5	39.8	27.2	24.7	21.1
Cobalt (Co)	0.10	mg/kg					7.03	9.36	9.88	6.09	5.89	4.74
Copper (Cu)	0.50	mg/kg	35.7	197	16	110	26.3	47.6	33.9	24.7	22.8	33.8
Iron (Fe)	50	mg/kg			20000	40000	19300	19400	18200	13200	12400	11700
Lead (Pb)	0.50	mg/kg	35	91.3	31	250	45.1	71.7	5.9	43.4	45.8	50.0
Lithium (Li)	2.0	mg/kg					18.4	17.0	15.2	13.2	12.3	10.7
Magnesium (Mg)	20	mg/kg					5610	6250	18200	8340	5830	4200
Manganese (Mn)	1.0	mg/kg			460	1100	249	277	303	310	249	160
Mercury (Hg)	0.0050	mg/kg	0.17	0.486	0.2	2						
Molybdenum (Mo)	0.10	mg/kg					1.23	1.90	0.60	1.79	2.30	1.65
Nickel (Ni)	0.50	mg/kg			16	75	23.7	27.1	26.9	20.0	19.3	17.7
Phosphorus (P)	50	mg/kg					917	1570	477	1020	1250	1300
Potassium (K)	100	mg/kg					1750	1780	1400	1590	1540	1340
Selenium (Se)	0.20	mg/kg					1.47	2.08	<0.20	1.46	1.82	1.64
Silver (Ag)	0.10	mg/kg					0.15	0.25	<0.10	0.14	0.13	0.18
Sodium (Na)	50	mg/kg					328	351	188	322	501	416
Strontium (Sr)	0.50	mg/kg					21.9	23.2	42.8	23.7	24.4	17.8
Sulfur (S)	1000	mg/kg					8800	11900	1600	10200	11000	13200

						Watershed	North Driftwood River					
						Waterbody	Jack Lake			Sutherland Lake		
						Client Sample ID	NDR-JACLK-01	NDR-JACLK-02	NDR-JACLK-03	NDR-SUTLK-01	NDR-SUTLK-02	NDR-SUTLK-03
						Date Sampled	22-Oct-2022	22-Oct-2022	22-Oct-2022	21-Oct-2022	21-Oct-2022	21-Oct-2022
						Time Sampled	12:15	12:45	13:15	11:00	11:30	12:00
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**						
Thallium (Tl)	0.050	mg/kg					0.220	0.222	0.211	0.174	0.197	0.135
Tin (Sn)	1.0	mg/kg					3.5	3.4	<2.0	2.8	4.2	5.6
Titanium (Ti)	1.0	mg/kg					412	381	715	383	335	293
Tungsten (W)	0.50	mg/kg					<0.54	<0.50	<0.50	<0.50	<0.56	<0.56
Uranium (U)	0.050	mg/kg					1.090	1.190	0.502	2.740	3.640	1.800
Vanadium (V)	0.20	mg/kg					31.2	31.3	31.3	20.7	22.1	15.3
Zinc (Zn)	2.0	mg/kg	123	315	120	820	135.0	171.0	35.6	128.0	124.0	154.0
Zirconium (Zr)	1.0	mg/kg					6.2	7.0	5.6	8.3	5.9	5.4

PSQG; Provincial Sediment Quality Guidelines for the protection and management of aquatic sediment quality in Ontario
CSQG; Canadian Council of Ministers of the Environment Canadian Sediment Quality Guidelines for the protection of aquatic life
All values expressed as mg/kg unless otherwise indicated
Dark blue shaded values indicate concentrations that exceed the PSQG LEL
Gray shaded values indicate concentrations that exceed the PSQG SEL and LEL
Blue shaded values indicate concentrations that exceed the CCME ISQG
Light blue shaded values indicate concentrations that exceed the CCME ISQG and PEL

Table E2-1b: Sediment Quality Laboratory Results – NDR Unnamed Tributaries, Streams & Ponds (2022)

						Watershed	**North Driftwood River**									
						Waterbody	**Unnamed Tributaries**			**Unnamed Streams**						**Unnamed Ponds**
						Client Sample ID	**NDR-TRIB-01-01**	**NDR-TRIB-01-02**	**NDR-TRIB-01-03**	**NDR-S-01-01**	**NDR-S-01-02**	**NDR-S-01-03**	**NDR-S-02-01**	**NDR-S-02-02**	**NDR-S-02-03**	**NDR-P-04-03**
						Date Sampled	**18-Oct-22**	**18-Oct-22**	**18-Oct-22**	**23-Oct-22**	**23-Oct-22**	**23-Oct-22**	**17-Oct-22**	**17-Oct-22**	**17-Oct-22**	**26-Oct-22**
						Time Sampled	**11:00**	**11:30**	**12:00**	**9:45**	**10:30**	**0:00**	**14:00**	**14:30**	**15:00**	**12:00**
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**										
Physical Tests																
Moisture	0.25	%					70	69		91	74	81	47	51	55	84.5
pH (1:2 soil:water)	0.10	pH units					5.49	5.73		5.28	5.36	5.33	6.28	6.00	5.91	5.81
Particle Size																
Coarse Sand/Gravel (>2mm)	1.0	%					<1.0	<1.0		<1.0	<1.0	<1.0	1.5	1.2	<1.0	<1.0
Medium Sand (0.5mm-2.0mm)	1.0	%					<1.0	1.7		<1.0	<1.0	<1.0	11.8	7.0	<1.0	<1.0
Fine Sand (0.63mm-0.5mm)	1.0	%					20.9	27.0		26.2	13.9	12.3	45.3	36.2	27.2	13.8
Silt (0.004mm-0.063mm)	1.0	%					57.4	52.4		62.7	68.9	69.8	34.4	45.4	57.6	53.8
Clay (<0.004mm)	1.0						20.7	18.0		9.1	16.9	17.6	7.0	10.2	14.6	32.2
Nutrients & Organics																
Fraction Organic Carbon	0.0010	g/g														
Total Kjeldahl Nitrogen	0.020	%			0.055	0.48	0.38	0.29		1.19	0.70	0.85	0.185	0.16	0.248	0.796
Total Organic Carbon	0.050	%			1	10	9.39	6.11	6.6	28.3	15.4	19.8	4.22	3.27	4.37	25.8
Metals																
Aluminum (Al)	50	mg/kg					11300	10000		7260	13100	11100	5200	7100	8600	9870
Antimony (Sb)	0.10	mg/kg					0.12	<0.10		0.16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic (As)	0.10	mg/kg	5.9	17	6	33	2.84	2.12		2.15	1.83	2.11	1.58	1.46	1.91	1.66
Barium (Ba)	0.50	mg/kg					83.1	65.4		50.5	67.6	61.7	32.7	42.7	55.4	57.5
Beryllium (Be)	0.10	mg/kg					0.41	0.34		0.16	0.35	0.37	0.16	0.20	0.25	0.37
Bismuth (Bi)	0.20	mg/kg					<0.20	<0.20		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	5.0	mg/kg					6.2	5.3		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.4
Cadmium (Cd)	0.020	mg/kg	0.6	3.5	0.6	10	0.65	0.51		1.35	0.64	0.58	0.311	0.332	0.542	0.419
Calcium (Ca)	50	mg/kg					8850	7310		8480	10600	13000	4310	3770	5020	15400
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	29.0	27.4		18.0	26.8	23.1	16.7	23.0	23.8	21.4
Cobalt (Co)	0.10	mg/kg					8.80	7.25		3.61	5.05	5.3	5.24	5.85	7.97	5.37
Copper (Cu)	0.50	mg/kg	35.7	197	16	110	15.1	13.1		17.7	13.2	18.7	5.2	6.6	7.8	13.4
Iron (Fe)	50	mg/kg			20000	40000	16300	13000		6020	9860	9700	7450	9120	10800	10400
Lead (Pb)	0.50	mg/kg	35	91.3	31	250	12.4	8.9		12.1	9.9	10.5	6.20	6	8.89	7.69
Lithium (Li)	2.0	mg/kg					16.7	15.3		6.7	13.6	11.1	7.4	9.9	12.1	10.8
Magnesium (Mg)	20	mg/kg					5640	4950		2340	3470	3680	2850	2920	3910	4710
Manganese (Mn)	1.0	mg/kg			460	1100	712	552		244	256	340	477	457	759	291
Mercury (Hg)	0.0050	mg/kg	0.17	0.486	0.2	2										

							Watershed	North Driftwood River									
							Waterbody	Unnamed Tributaries			Unnamed Streams						Unnamed Ponds
							Client Sample ID	NDR-TRIB-01-01	NDR-TRIB-01-02	NDR-TRIB-01-03	NDR-S-01-01	NDR-S-01-02	NDR-S-01-03	NDR-S-02-01	NDR-S-02-02	NDR-S-02-03	NDR-P-04-03
							Date Sampled	18-Oct-22	18-Oct-22	18-Oct-22	23-Oct-22	23-Oct-22	23-Oct-22	17-Oct-22	17-Oct-22	17-Oct-22	26-Oct-22
							Time Sampled	11:00	11:30	12:00	9:45	10:30	0:00	14:00	14:30	15:00	12:00
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**											
Molybdenum (Mo)	0.10	mg/kg					0.22	0.18		0.66	0.24	0.26	0.40	0.52	0.21	0.31
Nickel (Ni)	0.50	mg/kg			16	75	16.5	14.8		9.5	12.3	13.1	9.0	12.0	12.5	13.1
Phosphorus (P)	50	mg/kg					638	551		933	902	747	389	426	550	546
Potassium (K)	100	mg/kg					1400	1240		770	950	800	540	750	900	1040
Selenium (Se)	0.20	mg/kg					0.29	0.28		0.58	0.68	0.74	<0.20	<0.20	<0.20	0.51
Silver (Ag)	0.10	mg/kg					<0.10	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	50	mg/kg					156	197		132	116	93	98	109	150	116
Strontium (Sr)	0.50	mg/kg					23.9	20.2		25.4	32.5	38.2	11.0	13.4	14.9	48.1
Sulfur (S)	1000	mg/kg					<1000	<1000		2300	1200	1500	<1000	<1000	<1000	1200
Thallium (Tl)	0.050	mg/kg					0.126	0.109		0.120	0.127	0.095	0.067	0.086	0.115	0.078
Tin (Sn)	1.0	mg/kg					<2.0	<2.0		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	1.0	mg/kg					589	585		224	291	267	337	434	483	328
Tungsten (W)	0.50	mg/kg					<0.50	<0.50		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.050	mg/kg					0.897	1.160		0.758	4.580	3.660	0.458	0.545	0.689	1.59
Vanadium (V)	0.20	mg/kg					26.4	24.1		14.3	22.7	20.8	13.4	17.0	20.6	19.5
Zinc (Zn)	2.0	mg/kg	123	315	120	820	109.0	87.9		166.0	59.4	68.0	46.4	55.3	80.3	45.1
Zirconium (Zr)	1.0	mg/kg					4.8	4.4		1.6	3.0	4.7	1.7	2.0	2.5	5.7

PSQG; Provincial Sediment Quality Guidelines for the protection and management of aquatic sediment quality in Ontario
CSQG; Canadian Council of Ministers of the Environment Canadian Sediment Quality Guidelines for the protection of aquatic life
All values expressed as mg/kg unless otherwise indicated
Dark blue shaded values indicate concentrations that exceed the PSQG LEL
Gray shaded values indicate concentrations that exceed the PSQG SEL and LEL
Blue shaded values indicate concentrations that exceed the CCME ISQG
Light blue shaded values indicate concentrations that exceed the CCME ISQG and PEL

Table E2-1c: Sediment Quality Laboratory Results – WBR Unnamed Ponds (2022)

						Watershed	**West Buskegau River**					
						Waterbody	**Unnamed Ponds**					
						Client Sample ID	**WBR-P-03-01**	**WBR-P-03-02**	**WBR-P-03-03**	**WBR-P-04-01**	**WBR-P-04-02**	**WBR-P-04-03**
						Date Sampled	**24-Oct-2022**	**24-Oct-2022**	**24-Oct-2022**	**24-Oct-2021**	**24-Oct-2021**	**25-Oct-2021**
						Time Sampled	**13:30**	**14:00**	**14:00**	**11:00**	**11:20**	**11:45**
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**						
Physical Tests												
Moisture	0.25	%					66.5	72.2	69.9	89.2	57.6	83.1
pH (1:2 soil:water)	0.10	pH units					5.6	5.27	5.87	5.14	6.06	6.13
Particle Size												
Coarse Sand/Gravel (>2mm)	1.0	%					<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Medium Sand (0.5mm-2.0mm)	1.0	%					<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fine Sand (0.63mm-0.5mm)	1.0	%					7.2	8.6	7.4	22	3.7	12.4
Silt (0.004mm-0.063mm)	1.0	%					63.7	61.7	59.9	66.8	57.3	69.8
Clay (<0.004mm)	1.0						28.1	28.6	30.5	9.8	36.7	17.6
Nutrients & Organics												
Fraction Organic Carbon	0.0010	g/g										
Total Kjeldahl Nitrogen	0.020	%			0.055	0.48	0.367	0.484	0.415	1.18	0.306	0.856
Total Organic Carbon	0.050	%			1	10	7.53	12.2	13.4	28.6	6.68	26.1
Metals												
Aluminum (Al)	50	mg/kg					15900	13800	18100	8660	17400	11600
Antimony (Sb)	0.10	mg/kg					0.1	<0.10	0.12	0.15	0.12	<0.10
Arsenic (As)	0.10	mg/kg	5.9	17	6	33	2.1	1.79	2.89	2.38	2.66	1.91
Barium (Ba)	0.50	mg/kg					76.9	70.6	89.5	67.5	88	69.1
Beryllium (Be)	0.10	mg/kg					0.48	0.38	0.72	0.25	0.56	0.46
Bismuth (Bi)	0.20	mg/kg					<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	5.0	mg/kg					7.4	6.2	9.5	<5.0	8.6	5.8
Cadmium (Cd)	0.020	mg/kg	0.6	3.5	0.6	10	0.43	0.572	0.42	0.784	0.315	0.44
Calcium (Ca)	50	mg/kg					8010	8300	17900	12100	9740	18100
Chromium (Cr)	0.50	mg/kg	37.3	90	26	110	37.1	32.4	40.2	18.8	47	25.5
Cobalt (Co)	0.10	mg/kg					9.22	7.77	11.1	5.13	10.3	6.15
Copper (Cu)	0.50	mg/kg	35.7	197	16	110	10.4	9.53	17.4	10.2	13.2	15.8
Iron (Fe)	50	mg/kg			20000	40000	17900	13900	21900	8810	21000	12400
Lead (Pb)	0.50	mg/kg	35	91.3	31	250	13.3	13.9	12.8	20.9	13.2	9.37
Lithium (Li)	2.0	mg/kg					21.7	17	24.5	8.3	23.3	12.4
Magnesium (Mg)	20	mg/kg					6430	4590	8290	2840	8760	5530
Manganese (Mn)	1.0	mg/kg			460	1100	486	442	800	446	468	344
Mercury (Hg)	0.0050	mg/kg	0.17	0.486	0.2	2						

						Watershed	West Buskegau River					
						Waterbody	Unnamed Ponds					
						Client Sample ID	WBR-P-03-01	WBR-P-03-02	WBR-P-03-03	WBR-P-04-01	WBR-P-04-02	WBR-P-04-03
						Date Sampled	24-Oct-2022	24-Oct-2022	24-Oct-2022	24-Oct-2021	24-Oct-2021	25-Oct-2021
						Time Sampled	13:30	14:00	14:00	11:00	11:20	11:45
Parameter	**Lowest Detection Limit**	**Units**	**CSQG ISQG**	**CSQG PEL**	**PSQG LEL**	**PSQG SEL**						
Molybdenum (Mo)	0.10	mg/kg					0.22	0.28	0.23	0.5	0.73	0.36
Nickel (Ni)	0.50	mg/kg			16	75	18.5	15.2	22.4	9.46	24.4	15.2
Phosphorus (P)	50	mg/kg					616	621	669	669	598	608
Potassium (K)	100	mg/kg					1860	1570	2160	810	2410	1220
Selenium (Se)	0.20	mg/kg					0.3	0.4	0.45	0.78	0.24	0.59
Silver (Ag)	0.10	mg/kg					<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium (Na)	50	mg/kg					226	132	181	144	248	122
Strontium (Sr)	0.50	mg/kg					25.9	29.6	37.5	38.6	29	53.3
Sulfur (S)	1000	mg/kg					<1000	<1000	<1000	1600	<1000	1400
Thallium (Tl)	0.050	mg/kg					0.162	0.16	0.161	0.097	0.179	0.099
Tin (Sn)	1.0	mg/kg					<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)	1.0	mg/kg					726	514	648	203	953	398
Tungsten (W)	0.50	mg/kg					<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium (U)	0.050	mg/kg					0.934	1.75	1.66	1.19	0.898	2.1
Vanadium (V)	0.20	mg/kg					30.9	25.2	35.3	16.4	37.6	22.6
Zinc (Zn)	2.0	mg/kg	123	315	120	820	79.8	78.3	74.5	52	73.1	53.4
Zirconium (Zr)	1.0	mg/kg					3.9	3.5	6.3	3	7.9	6.8

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CSQG; Canadian Council of Ministers of the Environment Canadian Sediment Quality Guidelines for the protection of aquatic life
All values expressed as mg/kg unless otherwise indicated
Dark blue shaded values indicate concentrations that exceed the PSQG LEL
Gray shaded values indicate concentrations that exceed the PSQG SEL and LEL
Blue shaded values indicate concentrations that exceed the CCME ISQG
Light blue shaded values indicate concentrations that exceed the CCME ISQG and PEL

APPENDIX F

Benthic Invertebrate Community Data

Table F1-1: Summary of Benthic Invertebrate Community Descriptors (2021)

Station	Replicate	Descriptor						
		Count	TID (#/m^2)	Richness	Diversity	Evenness	% EPT	% Chiron.
NDR-GER-LK	1	1522	22058	17	0.82	0.20	32.59	28.38
	2	576	8348	8	0.73	0.34	30.56	41.67
	3	499	7232	12	0.74	0.22	22.65	44.89
	Average	866	12546	12	0.76	0.25	28.60	38.31
	Median	576	8348	12	0.74	0.22	30.56	41.67
	Minimum	499	7232	8	0.73	0.20	22.65	28.38
	Maximum	1522	22058	17	0.82	0.34	32.59	44.89
	Standard Deviation	465	6741	4	0.04	0.06	4.29	7.14
	Standard Error	269	3892	2	0.02	0.03	2.48	4.12
NDR-MAR-LK	1	1984	28754	15	0.70	0.11	22.58	50.81
	2	704	10203	8	0.64	0.18	15.91	56.82
	3	753	10913	11	0.76	0.21	23.37	42.50
	Mean	1147	16623	11	0.70	0.17	20.62	50.04
	Median	753	10913	11	0.70	0.18	22.58	50.81
	Min.	704	10203	8	0.64	0.11	15.91	42.50
	Max.	1984	28754	15	0.76	0.21	23.37	56.82
	SD	592	8582	3	0.05	0.04	3.35	5.87
	SE	342	4955	2	0.03	0.02	1.93	3.39
NDR-P-01	1	231	3348	3	0.59	0.16	0.00	77.78
	2	56	812	7	0.73	0.47	0.00	64.19
	3	203	2942	8	0.59	0.09	0.83	57.02
	Average	163	2367	6	0.64	0.24	0.28	66.33
	Median	203	2942	7	0.59	0.16	0.00	64.19
	Minimum	56	812	3	0.59	0.09	0.00	57.02
	Maximum	231	3348	8	0.73	0.47	0.83	77.78
	Standard Deviation	77	1112	2	0.07	0.16	0.39	8.61
	Standard Error	44	642	1	0.04	0.09	0.22	4.97
NDR-P-03	1	464	6725	6	0.58	0.18	3.45	58.62
	2	345	5000	8	0.63	0.14	6.96	57.97
	3	176	2551	6	0.45	0.12	0.00	72.73
	Average	328	4758	7	0.55	0.15	3.47	63.11
	Median	345	5000	6	0.58	0.14	3.45	58.62
	Minimum	176	2551	6	0.45	0.12	0.00	57.97
	Maximum	464	6725	8	0.63	0.18	6.96	72.73
	Standard Deviation	118	1713	1	0.07	0.02	2.84	6.81
	Standard Error	68	989	1	0.04	0.01	1.64	3.93

Station	Replicate	Descriptor						
		Count	TID (#/m^2)	Richness	Diversity	Evenness	% EPT	% Chiron.
NDR-S-01	1	144	2087	4	0.44	0.18	0.00	72.22
	2	352	5101	3	0.17	0.11	0.00	90.91
	3	432	6261	2	0.14	0.17	0.00	92.59
	Average	309	4483	3	0.25	0.15	0.00	85.24
	Median	352	5101	3	0.17	0.17	0.00	90.91
	Minimum	144	2087	2	0.14	0.11	0.00	72.22
	Maximum	432	6261	4	0.44	0.18	0.00	92.59
	Standard Deviation	121	1759	1	0.14	0.03	0.00	9.23
	Standard Error	70	1016	0	0.08	0.02	0.00	5.33
NDR-S-02	1	561	8130	13	0.62	0.11	5.88	59.89
	2	608	8812	11	0.64	0.11	7.89	57.89
	3	850	12319	15	0.84	0.23	24.47	33.88
	Average	673	9754	13	0.70	0.15	12.75	50.56
	Median	608	8812	13	0.64	0.11	7.89	57.89
	Minimum	561	8130	11	0.62	0.11	5.88	33.88
	Maximum	850	12319	15	0.84	0.23	24.47	59.89
	Standard Deviation	127	1835	2	0.10	0.06	8.33	11.82
	Standard Error	73	1059	1	0.06	0.03	4.81	6.82
NDR-S-04	1	275	3986	11	0.86	0.55	30.18	29.09
	2	263	3812	14	0.70	0.16	8.37	51.71
	3	270	3913	13	0.74	0.16	15.19	47.41
	Average	269	3903	13	0.77	0.29	17.91	42.74
	Median	270	3913	13	0.74	0.16	15.19	47.41
	Minimum	263	3812	11	0.70	0.16	8.37	29.09
	Maximum	275	3986	14	0.86	0.55	30.18	51.71
	Standard Deviation	5	71	1	0.07	0.18	9.11	9.81
	Standard Error	3	41	1	0.04	0.11	5.26	5.66
NDR-TRIB-01	1	1041	15087	9	0.71	0.17	0.00	46.11
	2	688	9971	5	0.45	0.16	0.00	72.09
	3	656	9507	7	0.51	0.15	0.00	68.29
	Average	795	11522	7	0.56	0.16	0.00	62.17
	Median	688	9971	7	0.51	0.16	0.00	68.29
	Minimum	656	9507	5	0.45	0.15	0.00	46.11
	Maximum	1041	15087	9	0.71	0.17	0.00	72.09
	Standard Deviation	174	2528	2	0.11	0.01	0.00	11.46
	Standard Error	101	1460	1	0.07	0.01	0.00	6.62
WBR-P-01	1	592	8580	6	0.53	0.18	2.70	64.86
	2	368	5333	5	0.52	0.14	0.00	65.22
	3	912	13217	5	0.31	0.09	5.26	82.46
	Average	624	9043	5	0.45	0.13	2.66	70.85
	Median	592	8580	5	0.52	0.14	2.70	65.22
	Minimum	368	5333	5	0.31	0.09	0.00	64.86
	Maximum	912	13217	6	0.53	0.18	5.26	82.46
	Standard Deviation	223	3235	0	0.10	0.04	2.15	8.21
	Standard Error	129	1868	0	0.06	0.02	1.24	4.74

Station	Replicate	Descriptor						
		Count	TID (#/m^2)	Richness	Diversity	Evenness	% EPT	% Chiron.
WBR-S-02	1	212	3072	12	0.83	0.30	15.09	28.30
	2	261	3783	17	0.83	0.17	44.06	32.18
	3	546	7913	12	0.80	0.24	38.46	33.70
	Average	340	4923	14	0.82	0.23	32.54	31.40
	Median	261	3783	12	0.83	0.24	38.46	32.18
	Minimum	212	3072	12	0.80	0.17	15.09	28.30
	Maximum	546	7913	17	0.83	0.30	44.06	33.70
	Standard Deviation	147	2134	2	0.01	0.05	12.55	2.27
	Standard Error	85	1232	1	0.01	0.03	7.24	1.31
WBR-S-03	1	513	7435	14	0.81	0.16	7.99	26.51
	2	1664	24116	16	0.70	0.14	5.77	6.73
	3	401	5812	11	0.75	0.23	11.97	41.90
	Average	859	12454	14	0.75	0.17	8.58	25.05
	Median	513	7435	14	0.75	0.16	7.99	26.51
	Minimum	401	5812	11	0.70	0.14	5.77	6.73
	Maximum	1664	24116	16	0.81	0.23	11.97	41.90
	Standard Deviation	571	8273	2	0.04	0.04	2.57	14.39
	Standard Error	330	4776	1	0.02	0.02	1.48	8.31
WBR-S-04	1	482	6986	9	0.82	0.34	20.12	29.88
	2	267	3870	12	0.83	0.22	7.12	28.46
	3	165	2391	22	0.84	0.14	26.67	32.12
	Average	305	4415	14	0.83	0.24	17.97	30.15
	Median	267	3870	12	0.83	0.22	20.12	29.88
	Minimum	165	2391	9	0.82	0.14	7.12	28.46
	Maximum	482	6986	22	0.84	0.34	26.67	32.12
	Standard Deviation	132	1915	6	0.01	0.08	8.13	1.51
	Standard Error	76	1106	3	0.01	0.05	4.69	0.87

EPT; Ephemeroptera, Plecoptera, Trichoptera Taxa
Chiron; Chironomid Taxa

Table F1-2: Summary of Benthic Invertebrate Community Descriptors (2022)

Station	Replicate	Descriptor						
		Count	TID (#/m^2)	Richness	Diversity	Evenness	% EPT	% Chiron.
NDR-GER-LK	1	14	203	3	0.56	0.46	0.00	42.86
	2	189	2739	3	0.49	0.32	0.00	35.98
	3	69	1000	5	0.21	0.25	0.00	7.25
	Average	91	1314	4	0.42	0.34	0.00	28.69
	Median	69	1000	3	0.49	0.32	0.00	35.98
	Minimum	14	203	3	0.21	0.25	0.00	7.25
	Maximum	189	2739	5	0.56	0.46	0.00	42.86
	Standard Deviation	73	1059	1	0.15	0.08	0.00	15.42
	Standard Error	42	611	1	0.09	0.05	0.00	8.90
NDR-MAR-LK	1	110	1594	8	0.77	0.31	8.18	36.36
	2	93	1348	5	0.49	0.39	1.08	63.44
	3	60	870	4	0.18	0.31	0.00	8.33
	Average	88	1271	6	0.48	0.34	3.09	36.05
	Median	93	1348	5	0.49	0.31	1.08	36.36
	Minimum	60	870	4	0.18	0.31	0.00	8.33
	Maximum	110	1594	8	0.77	0.39	8.18	63.44
	Standard Deviation	21	301	2	0.24	0.04	3.63	22.50
	Standard Error	12	174	1	0.14	0.02	2.10	12.99
NDR-JAC-LK	1	54	783	14	0.64	0.20	27.78	51.85
	2	203	2942	4	0.19	0.25	0.00	89.66
	3	136	1971	7	0.54	0.16	0.74	62.50
	Average	131	1899	8	0.46	0.20	9.50	68.00
	Median	136	1971	7	0.54	0.20	0.74	62.50
	Minimum	54	783	4	0.19	0.16	0.00	51.85
	Maximum	203	2942	14	0.64	0.25	27.78	89.66
	Standard Deviation	61	883	4	0.20	0.04	12.92	15.92
	Standard Error	35	510	2	0.11	0.02	7.46	9.19
NDR-SUT-LK	1	20	290	4	0.72	0.89	0.00	0.00
	2	15	217	2	0.50	0.40	0.00	46.67
	3	68	986	5	0.59	0.22	0.00	58.82
	Average	34	498	4	0.60	0.50	0.00	35.16
	Median	20	290	4	0.59	0.40	0.00	46.67
	Minimum	15	217	2	0.50	0.22	0.00	0.00
	Maximum	68	986	5	0.72	0.89	0.00	58.82
	Standard Deviation	24	346	1	0.09	0.28	0.00	25.35
	Standard Error	14	200	1	0.05	0.16	0.00	14.64

Station	Replicate	Descriptor						
		Count	TID (#/m^2)	Richness	Diversity	Evenness	% EPT	% Chiron.
NDR-P-01	1	97	1406	3	0.46	0.26	0.00	65.98
	2	352	5101	2	0.30	0.47	0.00	18.18
	3	320	4638	1	0.00	0.17	0.00	100.00
	Average	256	3715	2	0.25	0.30	0.00	61.39
	Median	320	4638	2	0.30	0.26	0.00	65.98
	Minimum	97	1406	1	0.00	0.17	0.00	18.18
	Maximum	352	5101	3	0.46	0.47	0.00	100.00
	Standard Deviation	113	1644	1	0.19	0.13	0.00	33.56
	Standard Error	65	949	0	0.11	0.07	0.00	19.38
NDR-P-03	1	81	1174	3	0.34	0.30	0.00	79.01
	2	168	2435	5	0.57	0.18	0.00	61.90
	3	3	43	1	0.00	0.33	0.00	100.00
	Average	84	1217	3	0.30	0.27	0.00	80.31
	Median	81	1174	3	0.34	0.30	0.00	79.01
	Minimum	3	43	1	0.00	0.18	0.00	61.90
	Maximum	168	2435	5	0.57	0.33	0.00	100.00
	Standard Deviation	67	977	2	0.23	0.07	0.00	15.58
	Standard Error	39	564	1	0.13	0.04	0.00	8.99
NDR-P-07	1	368	5333	2	0.45	0.26	0.00	65.22
	2	800	11594	6	0.68	0.28	0.00	48.00
	3	832	12058	2	0.45	0.18	0.00	65.38
	Average	667	9662	3	0.53	0.24	0.00	59.53
	Median	800	11594	2	0.45	0.26	0.00	65.22
	Minimum	368	5333	2	0.45	0.18	0.00	48.00
	Maximum	832	12058	6	0.68	0.28	0.00	65.38
	Standard Deviation	212	3067	2	0.10	0.04	0.00	8.16
	Standard Error	122	1770	1	0.06	0.02	0.00	4.71
NDR-S-01	1	352	5101	5	0.64	0.31	0.00	54.55
	2	208	3014	3	0.56	0.38	0.00	53.85
	3	96	1391	4	0.16	0.11	0.00	91.67
	Average	219	3169	4	0.45	0.27	0.00	66.69
	Median	208	3014	4	0.56	0.31	0.00	54.55
	Minimum	96	1391	3	0.16	0.11	0.00	53.85
	Maximum	352	5101	5	0.64	0.38	0.00	91.67
	Standard Deviation	105	1519	1	0.21	0.11	0.00	17.67
	Standard Error	60	877	0	0.12	0.07	0.00	10.20
NDR-S-02	1	685	9928	16	0.73	0.11	18.10	47.88
	2	264	3826	10	0.70	0.16	40.91	36.36
	3	395	5725	18	0.76	0.11	16.96	43.54
	Average	448	6493	15	0.73	0.13	25.32	42.60
	Median	395	5725	16	0.73	0.11	18.10	43.54
	Minimum	264	3826	10	0.70	0.11	16.96	36.36
	Maximum	685	9928	18	0.76	0.16	40.91	47.88
	Standard Deviation	176	2549	3	0.02	0.02	11.03	4.75
	Standard Error	102	1472	2	0.01	0.01	6.37	2.74

Station	Replicate	Descriptor						
		Count	TID (#/m^2)	Richness	Diversity	Evenness	% EPT	% Chiron.
NDR-S-04	1	140	2029	34	0.82	0.16	24.29	37.86
	2	920	13333	20	0.81	0.13	13.04	30.43
	3	869	12594	28	0.75	0.14	5.87	34.06
	Average	643	9319	27	0.79	0.15	14.40	34.12
	Median	869	12594	28	0.81	0.14	13.04	34.06
	Minimum	140	2029	20	0.75	0.13	5.87	30.43
	Maximum	920	13333	34	0.82	0.16	24.29	37.86
	Standard Deviation	356	5164	6	0.03	0.01	7.58	3.03
	Standard Error	206	2981	3	0.02	0.01	4.38	1.75
NDR-S-05	1	2784	40348	6	0.21	0.12	0.00	6.90
	2	2160	31304	6	0.47	0.14	0.00	25.93
	3	1984	28754	5	0.60	0.21	0.00	48.39
	Average	2309	33469	6	0.43	0.16	0.00	27.07
	Median	2160	31304	6	0.47	0.14	0.00	25.93
	Minimum	1984	28754	5	0.21	0.12	0.00	6.90
	Maximum	2784	40348	6	0.60	0.21	0.00	48.39
	Standard Deviation	343	4975	0	0.16	0.04	0.00	16.96
	Standard Error	198	2872	0	0.09	0.02	0.00	9.79
NDR-TRIB-01	1	651	9435	25	0.62	0.10	1.23	58.99
	2	1796	26029	11	0.60	0.12	0.17	60.58
	3	1299	18826	11	0.65	0.11	1.39	55.43
	Average	1249	18097	16	0.62	0.11	0.93	58.33
	Median	1299	18826	11	0.62	0.11	1.23	58.99
	Minimum	651	9435	11	0.60	0.10	0.17	55.43
	Maximum	1796	26029	25	0.65	0.12	1.39	60.58
	Standard Deviation	469	6794	7	0.02	0.01	0.54	2.15
	Standard Error	271	3923	4	0.01	0.00	0.31	1.24
WBR-P-03	1	1004	14551	26	0.16	0.05	1.59	91.63
	2	1104	16000	2	0.03	0.15	0.00	98.55
	3	1248	18087	6	0.18	0.09	0.00	90.38
	Average	1119	16213	11	0.12	0.09	0.53	93.52
	Median	1104	16000	6	0.16	0.09	0.00	91.63
	Minimum	1004	14551	2	0.03	0.05	0.00	90.38
	Maximum	1248	18087	26	0.18	0.15	1.59	98.55
	Standard Deviation	100	1451	10	0.07	0.04	0.75	3.59
	Standard Error	58	838	6	0.04	0.02	0.43	2.07
WBR-P-04	1	976	14145	9	0.36	0.17	0.00	78.69
	2	152	2203	5	0.55	0.44	0.00	5.26
	3	208	3014	5	0.58	0.34	15.38	61.54
	Average	445	6454	6	0.49	0.32	5.13	48.50
	Median	208	3014	5	0.55	0.34	0.00	61.54
	Minimum	152	2203	5	0.36	0.17	0.00	5.26
	Maximum	976	14145	9	0.58	0.44	15.38	78.69
	Standard Deviation	376	5448	2	0.10	0.11	7.25	31.36
	Standard Error	217	3146	1	0.06	0.06	4.19	18.11

Station	Replicate	Descriptor						
		Count	TID (#/m^2)	Richness	Diversity	Evenness	% EPT	% Chiron.
JC-S-01	1	1297	18797	11	0.22	0.06	1.31	87.90
	2	3745	54275	8	0.12	0.07	0.00	93.99
	3	2128	30841	8	0.10	0.07	0.38	94.74
Average		2390	34638	9	0.15	0.06	0.56	92.21
Median		2128	30841	8	0.12	0.07	0.38	93.99
Minimum		1297	18797	8	0.10	0.06	0.00	87.90
Maximum		3745	54275	11	0.22	0.07	1.31	94.74
Standard Deviation		1016	14731	1	0.05	0.00	0.55	3.06
Standard Error		587	8505	1	0.03	0.00	0.32	1.77

EPT; Ephemeroptera, Plecoptera, Trichoptera Taxa
Chiron; Chironomid Taxa

467500 470000 472500 475000 477500 480000 482500

5412500 5410000 5407500 5405000

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CAMP-09-RD

NDR-S-04-B3
NDR-S-04-B2
NDR-S-04-B1
North Driftwood River
100 m

NDR-S-02-B1
NDR-S-02-B2
NDR-S-02-B3
North Driftwood River
100 m

LOWER STURGEON DAM RD
North Driftwood River
NDR-TRIB-01-B3
NDR-TRIB-01-B2
NDR-TRIB-01-B1
100 m
Jocko Creek

CAMP-09-RD

NDR-P-03-B3
NDR-P-03-B2
NDR-P-03-B1
North Driftwood River
655

NDR-MarLk-B2
NDR-MarLk-B3
NDR-MarLk-B1
Martin Lake
NDR-GerLk-B1
NDR-GerLk-B2
NDR-GerLk-B3
Gerry Lake
Jack Lake

NDR-P-01-B1
NDR-P-01-B2
NDR-P-01-B3
NDR-S-01-B1
NDR-S-01-B2
NDR-S-01-B3

West Buskegau River

WBR-S-04-B3
WBR-S-04-B2
WBR-S-04-B1
WBR-S-03-B3
WBR-S-03-B2
WBR-S-03-B1
West Buskegau River
WBR-P-01-B3
WBR-P-01-B2
WBR-P-01-B1
200 m

West Buskegau River
WBR-S-02-B2
WBR-S-02-B1
WBR-S-02-B3
Prosser Creek
100 m

West Buskegau River
Prosser Creek

LEGEND

- Property Boundary (2021)
- Utility Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction
- Benthic Sampling Location

NOTES:
- Topographic map information extracted from Land Information Ontario (NDMNRF), Queen's Printer for Ontario, 2021
- Aerial imagery around property boundary provided by CNC, scene date, summer 2021.
- Surrounding aerial imagery extracted from ESRI ArcGIS Online Image Service, scene date is May 2019.

Datum: NAD83
Projection: UTM Zone 17N

0 1 2 4 6 8 10 Kilometres

[redacted]

CRAWFORD NICKEL PROJECT

Benthic Sampling Locations (2021)

PROJECT N°:OMEMA2304 | **FIGURE: F1-1**

SCALE: 1:45,000 | DATE: November 2023

460000 462500 465000 467500 470000 472500 475000 477500 480000 482500

5412500 5410000 5407500 5405000 5402500

X:\CA\CAOAK300-OAK\MS-FS1-ProjectF\2020\Projects\OMEMA2002_Canada Nickel_Crawford Lake\11_GIS\AquaticBaseline_2022\MXD\Ben_Sampling_Locs_1.mxd

CAMP 40 RD

NDR-S-04-01
NDR-S-04-02
NDR-S-04-03
North Driftwood River
50 m

Nesbitt Creek

NDR-P-07-03
NDR-S-05-03

CAMP 40 RD

North Driftwood River

NDR-S-02-01

LOWER STURGEON DAM RD

655

NDR-MarLK-03
Martin Lake
NDR-GerLk-03
Gerry Lake
NDR-GerLK-02
Jack Lake
NDR-SutLk-02
NDR-SutLk-01
Mel Lake
Davis Lake
Zed Lake

NDR-S-01-02

West Buskegau River

Prosser Creek

NDR-JC-S-01-01
NDR-JC-S-01-02
NDR-JC-S-01-03
655
50 m

LEGEND

- Preliminary Project Boundary
- Transmission Line
- Primary Road / Highway
- Secondary / Local Road
- Resource / Recreation Road
- Watercourse
- Waterbody
- Flow Direction
- Benthic Sampling Locations

0 1 2 4 6 8 10 Kilometres

OVERVIEW MAP
Enlarged Area
10 Km

NOTES:
- Topographic map information extracted from Land Information Ontario (MNRF), Queen's Printer for Ontario, 2019/2020
- Preliminary project boundary provided by Canada Nickel Company, November 30, 2022.
- Aerial imagery provided by CNC, scene date, summer 2021 and ESRI online mapping service, 2019.

Datum: NAD83
Projection: UTM Zone 17N

N W E S

[redacted]

CRAWFORD NICKEL PROJECT

Benthic Sampling Locations (2022)

PROJECT N°:OMEMA2304 | **FIGURE: F1-2**

SCALE: 1:58,000 | DATE: November 2023

Table F2-1: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2021)

Taxa Group	PROPORTIONS BY AREA (%)											
	NDR-GER-LK	SE	NDR-MAR-LK	SE	NDR-P-01	SE	NDR-P-03	SE	NDR-S-01	SE	NDR-S-02	SE
Nemata	0.35	0.29	2.59	1.34	1.34	0.57	3.86	3.16	0.00	0.00	0.88	0.72
Tricladida	0.00	0.00	0.27	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enchytraeidae	0.00	0.00	0.00	0.00	0.00	0.00	3.03	2.47	0.00	0.00	0.00	0.00
Naididae	1.77	0.77	4.28	0.12	9.06	6.45	1.52	1.24	5.56	4.54	6.36	2.64
Lumbriculidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Erpobdellidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glossiphoniidae	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acari	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arrenuridae	0.35	0.29	0.27	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.72
Hygrobatidae	0.00	0.00	0.00	0.00	0.00	0.00	1.15	0.94	0.00	0.00	0.00	0.00
Limnesiidae	1.77	0.77	0.54	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oxidae	0.93	0.76	0.00	0.00	0.79	0.65	0.77	0.63	0.00	0.00	0.00	0.00
Pionidae	0.00	0.00	0.27	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unionicolidae	0.00	0.00	0.00	0.00	0.00	0.00	1.15	0.94	1.52	1.24	0.00	0.00
Ostracoda	0.00	0.00	0.27	0.22	0.00	0.00	0.00	0.00	1.85	1.51	0.63	0.51
Gammaridae	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hyalellidae	3.19	1.51	2.71	0.65	0.00	0.00	0.10	0.08	0.00	0.00	5.84	1.56
Collembola	0.00	0.00	0.00	0.00	0.28	0.22	0.00	0.00	0.00	0.00	1.58	0.68
Chrysomelidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.03
Dytiscidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elmidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baetidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.14	2.56
Caenidae	22.81	1.47	10.92	2.01	0.00	0.00	3.47	1.64	0.00	0.00	6.47	2.05
Ephemeridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.05
Ephemerellidae	2.47	1.04	1.25	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heptageniidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leptophlebiidae	2.90	1.31	8.45	1.20	0.00	0.00	0.00	0.00	0.00	0.00	3.08	0.28
Crambidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.51
Sialidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.78
Coenagrionidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.34	1.30
Corduliidae	0.02	0.02	0.04	0.04	0.05	0.04	0.00	0.00	0.00	0.00	0.67	0.54
Gomphidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capniidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leuctridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corixidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dipseudopsidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydroptilidae	0.00	0.00	0.00	0.00	0.28	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Lepidostomatidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Taxa Group	PROPORTIONS BY AREA (%)											
	NDR-GER-LK	SE	NDR-MAR-LK	SE	NDR-P-01	SE	NDR-P-03	SE	NDR-S-01	SE	NDR-S-02	SE
Leptoceridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Limnephilidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Molannidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phryganeidae	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polycentropodidae	0.35	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Psychomyiidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ceratopogonidae	1.63	0.68	0.76	0.62	6.08	2.65	4.98	0.85	1.52	1.24	5.54	0.11
Chaoboridae	0.00	0.00	0.00	0.00	15.24	2.56	2.32	1.89	4.32	1.82	0.00	0.00
Chironomidae	38.31	4.12	50.04	3.39	66.33	4.97	63.11	3.93	85.24	5.33	50.56	6.82
Tabanidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tipulidae	0.00	0.00	0.00	0.00	0.28	0.22	0.00	0.00	0.00	0.00	0.95	0.78
Ancylidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrobiidae	1.77	0.77	2.44	0.81	0.00	0.00	0.00	0.00	0.00	0.00	1.25	1.02
Lymnaeidae	0.00	0.00	0.00	0.00	0.28	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Physidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Planorbidae	8.02	4.03	8.35	4.01	0.00	0.00	1.52	1.24	0.00	0.00	3.71	0.79
Valvatidae	4.10	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaeriidae	9.11	3.69	6.55	3.82	0.00	0.00	13.03	5.97	0.00	0.00	2.46	0.24
TOTAL	100		100		100		100		100		100	

Taxa Group	PROPORTIONS BY AREA (%)											
	NDR-S-04	SE	NDR-TRIB-01	SE	WBR-P-01	SE	WBR-S-02	SE	WBR-S-03	SE	WBR-S-04	SE
Nemata	0.49	0.40	10.44	1.82	2.92	2.39	0.26	0.21	0.92	0.47	0.40	0.33
Tricladida	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enchytraeidae	0.00	0.00	0.26	0.21	0.00	0.00	0.63	0.51	0.52	0.42	0.00	0.00
Naididae	5.46	1.10	9.36	3.89	15.04	5.42	2.14	1.45	30.73	9.86	3.80	2.19
Lumbriculidae	0.00	0.00	0.00	0.00	0.00	0.00	1.89	1.54	2.31	1.17	0.40	0.33
Erpobdellidae	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glossiphoniidae	1.94	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.79	0.20	0.16
Acari	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.26	0.00	0.00
Arrenuridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hygrobatidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Limnesiidae	0.00	0.00	0.00	0.00	1.45	1.18	0.00	0.00	0.00	0.00	0.00	0.00
Oxidae	0.00	0.00	0.00	0.00	1.45	1.18	0.00	0.00	0.00	0.00	0.00	0.00
Pionidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unionicolidae	1.94	1.58	0.00	0.00	1.45	1.18	0.00	0.00	0.00	0.00	0.00	0.00
Ostracoda	0.49	0.40	2.35	1.09	0.00	0.00	0.49	0.40	1.16	0.48	0.61	0.49
Gammaridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hyalellidae	0.49	0.40	0.77	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Collembola	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.26	0.00	0.00

Taxa Group	PROPORTIONS BY AREA (%)											
	NDR-GER-LK	SE	NDR-MAR-LK	SE	NDR-P-01	SE	NDR-P-03	SE	NDR-S-01	SE	NDR-S-02	SE
Chrysomelidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dytiscidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.90
Elmidae	7.88	1.53	0.00	0.00	0.00	0.00	8.02	0.48	15.32	2.71	15.98	1.63
Baetidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Caenidae	1.94	1.58	0.00	0.00	1.75	1.43	13.20	2.75	1.97	0.94	8.56	2.94
Ephemeridae	6.14	2.37	0.00	0.00	0.00	0.00	5.46	2.35	2.32	1.52	0.25	0.20
Ephemerellidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heptageniidae	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.35	0.00	0.00	0.00	0.00
Leptophlebiidae	1.01	0.83	0.00	0.00	0.00	0.00	9.84	6.25	2.14	1.37	5.64	1.09
Crambidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sialidae	2.93	1.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coenagrionidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corduliidae	0.00	0.00	0.00	0.00	0.90	0.74	0.00	0.00	0.00	0.00	0.00	0.00
Gomphidae	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.21	0.00	0.00	0.00	0.00
Capniidae	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.42	0.67	0.54	0.81	0.66
Leuctridae	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.21	0.00	0.00	0.00	0.00
Corixidae	0.00	0.00	0.78	0.63	0.00	0.00	0.00	0.00	0.00	0.00	3.20	2.37
Dipseudopsidae	1.99	1.06	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.26	0.27	0.15
Hydroptilidae	0.00	0.00	0.00	0.00	0.90	0.74	1.25	0.55	0.26	0.21	0.90	0.37
Lepidostomatidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.14
Leptoceridae	0.51	0.41	0.00	0.00	0.00	0.00	0.26	0.21	0.00	0.00	0.40	0.33
Limnephilidae	4.39	2.98	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.27	0.00	0.00
Molannidae	1.94	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.33
Phryganeidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polycentropodidae	0.00	0.00	0.00	0.00	0.00	0.00	1.02	0.83	0.58	0.24	0.20	0.16
Psychomyiidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.16
Ceratopogonidae	3.04	2.48	11.96	2.12	0.58	0.48	2.86	0.63	6.48	1.47	10.44	1.34
Chaoboridae	0.00	0.00	0.81	0.66	0.90	0.74	0.00	0.00	0.00	0.00	0.00	0.00
Chironomidae	42.74	5.66	62.17	6.62	70.85	4.74	31.40	1.31	25.05	8.31	30.15	0.87
Tabanidae	0.62	0.50	0.00	0.00	0.00	0.00	0.63	0.51	0.52	0.42	0.00	0.00
Tipulidae	0.51	0.41	0.00	0.00	0.00	0.00	1.49	0.69	0.08	0.07	0.20	0.16
Ancylidae	0.49	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrobiidae	7.50	3.07	0.00	0.00	0.00	0.00	3.35	1.40	0.00	0.00	0.61	0.49
Lymnaeidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Physidae	0.13	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.21	0.00	0.00
Planorbidae	0.51	0.41	0.00	0.00	0.00	0.00	0.63	0.51	0.32	0.26	1.61	0.78
Valvatidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaeriidae	4.93	0.77	1.07	0.59	1.80	1.47	13.43	4.54	5.89	1.64	13.32	2.24
TOTAL	100		100		100		100		100		100	

Table F2-2: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2022)

TAXA GROUP	PROPORTIONS BY AREA (%)															
	NDR-GER-LK	SE	NDR-JAC-LK	SE	NDR-MAR-LK	SE	NDR-P-01	SE	NDR-P-03	SE	NDR-P-07	SE	NDR-S-01	SE	NDR-S-02	SE
Nemata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.17	4.86	14.21	8.54	3.95	1.82	1.45	0.60
Enchytraeidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.35	5.18	0.00	0.00	0.00	0.00	1.86	0.96
Naididae	22.08	16.29	4.29	2.78	14.09	7.97	0.00	0.00	0.00	0.00	2.67	2.18	3.72	2.25	5.42	1.22
Lumbricidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lumbriculidae	0.00	0.00	0.16	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Erpobdellidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.34	0.00	0.00	0.00	0.00	0.05	0.04
Glossiphoniidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Limnesiidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oxidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pionidae	0.00	0.00	0.25	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unionicolidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Harpacticoida	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	1.09	0.00	0.00	0.78	0.64
Ostracoda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.59	1.30	1.33	1.09	0.00	0.00	0.39	0.32
Hyalellidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.23	0.12
Cambaridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.07
Collembola	2.38	1.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dytiscidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elmidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.41	0.51
Baetidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Caenidae	0.00	0.00	8.64	7.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.32
Ephemeridae	0.00	0.00	0.00	0.00	3.09	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.27	9.00
Heptageniidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.01	0.83
Leptophlebiidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sialidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.41
Corduliidae	0.00	0.00	0.00	0.00	0.30	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.07
Libellulidae	0.00	0.00	0.00	0.00	0.36	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dipseudopsidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.44	1.59
Helicopsychidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydropsychidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.34
Hydroptilidae	0.00	0.00	0.25	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leptoceridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.45	0.60
Limnephilidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Molannidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phryganeidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Polycentropodidae	0.00	0.00	0.62	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.28
Ceratopogonidae	0.00	0.00	0.25	0.20	8.48	6.93	0.00	0.00	3.17	2.59	0.00	0.00	19.58	8.59	14.18	2.49
Chaoboridae	46.84	20.38	10.72	5.40	33.99	22.98	38.27	19.40	0.00	0.00	20.93	8.69	3.03	2.47	0.00	0.00
Chironomidae	28.69	8.90	68.00	9.19	36.05	12.99	61.39	19.38	80.31	8.99	59.53	4.71	66.69	10.20	42.60	2.74
Empididae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tabanidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.41
Limoniidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ancylidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.03	2.47	0.39	0.32
Hydrobiidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.30
Planorbidae	0.00	0.00	1.23	1.01	0.00	0.00	0.34	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TAXA GROUP	PROPORTIONS BY AREA (%)															
	NDR-GER-LK	SE	NDR-JAC-LK	SE	NDR-MAR-LK	SE	NDR-P-01	SE	NDR-P-03	SE	NDR-P-07	SE	NDR-S-01	SE	NDR-S-02	SE
Valvatidae	0.00	0.00	0.62	0.50	1.21	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaeriidae	0.00	0.00	4.98	3.27	2.42	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.01	0.62
Unionidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	100		100		100		100		100		100		100		100	

TAXA GROUP	PROPORTIONS BY AREA (%)													
	NDR-S-04	SE	NDR-S-05	SE	NDR-SUT-LK	SE	NDR-TRIB-01	SE	WBR-P-03	SE	WBR-P-04	SE	JC-S-01	SE
Nemata	0.00	0.00	2.98	0.87	6.67	5.44	9.49	1.89	1.47	0.76	7.02	5.73	0.78	0.31
Enchytraeidae	0.31	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.12
Naididae	23.55	5.22	1.71	0.63	1.96	1.60	8.16	1.90	1.22	0.56	4.32	1.85	1.66	0.89
Lumbricidae	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lumbriculidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.11
Erpobdellidae	2.29	1.69	0.00	0.00	0.00	0.00	0.13	0.08	0.00	0.00	0.00	0.00	0.01	0.01
Glossiphoniidae	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.48	0.00	0.00	0.00	0.00	0.00	0.00
Limnesiidae	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.33	0.21	0.17	0.00	0.00	0.00	0.00
Oxidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.11	3.11	1.91	0.00	0.00
Pionidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.08
Unionicolidae	0.00	0.00	0.25	0.20	0.00	0.00	0.41	0.34	0.00	0.00	0.00	0.00	0.00	0.00
Harpacticoida	0.00	0.00	0.00	0.00	6.67	5.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ostracoda	0.00	0.00	0.38	0.31	1.96	1.60	0.82	0.67	0.00	0.00	0.00	0.00	0.39	0.20
Hyalellidae	0.00	0.00	0.00	0.00	0.00	0.00	5.66	0.83	0.00	0.00	0.00	0.00	0.00	0.00
Cambaridae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Collembola	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.20
Dytiscidae	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00
Elmidae	10.03	1.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baetidae	0.38	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Caenidae	2.73	1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.13	4.19	0.00	0.00
Ephemeridae	4.84	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heptageniidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Leptophlebiidae	1.10	0.73	0.00	0.00	0.00	0.00	0.41	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Sialidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Corduliidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Libellulidae	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Dipseudopsidae	0.54	0.23	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Helicopsychidae	0.14	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydropsychidae	1.43	1.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydroptilidae	0.53	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.43	0.00	0.00	0.43	0.22
Leptoceridae	0.82	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Limnephilidae	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.03	0.02
Molannidae	0.69	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phryganeidae	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.34	0.00	0.00	0.00	0.00	0.00	0.00
Polycentropodidae	1.19	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.08
Ceratopogonidae	4.66	1.11	65.66	11.40	0.00	0.00	9.58	2.26	1.81	0.91	0.00	0.00	2.86	0.22
Chaoboridae	0.00	0.00	1.57	0.76	38.95	7.04	0.00	0.00	0.27	0.22	25.97	15.57	0.00	0.00
Chironomidae	34.12	1.75	27.07	9.79	35.16	14.64	58.33	1.24	93.52	2.07	48.50	18.11	92.21	1.77
Empididae	0.24	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.10

TAXA GROUP	PROPORTIONS BY AREA (%)													
	NDR-S-04	SE	NDR-S-05	SE	NDR-SUT-LK	SE	NDR-TRIB-01	SE	WBR-P-03	SE	WBR-P-04	SE	JC-S-01	SE
Tabanidae	0.45	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.11	0.00	0.00	0.23	0.09
Limoniidae	0.29	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ancylidae	1.73	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrobiidae	1.36	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Planorbidae	0.38	0.17	0.00	0.00	0.00	0.00	2.19	1.32	0.48	0.39	2.56	2.09	0.00	0.00
Valvatidae	0.62	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sphaeriidae	5.50	1.00	0.38	0.31	8.63	4.85	3.24	0.88	0.21	0.17	3.39	1.39	0.41	0.34
Unionidae	0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	100		100		100		100		100		100		100	

Table F3-1: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2021)

	Waterbody	Gerry Lake			Martin Lake			North Driftwood River Unnamed Pond						North Driftwood River Unnamed Stream									North Driftwood River Unnamed Tributary			West Buskegau River Unnamed Pond			West Buskegau River Unnamed Stream								
	UTM	471195, 5406131			470659, 5406708			473206, 5406526			469886, 5409399			475413, 5406458			472044, 5408756			470383, 5412395			471529, 5406900			475213, 5412048			478576, 5405893			476687, 5412335			476578, 5412886		
	Station	NDR-GerLk			NDR-MarLk			NDR-P-01			NDR-P-03			NDR-S-01			NDR-S-02			NDR-S-04			NDR-Trib-01			WBR-P-01			WBR-S-02			WBR-S-03			WBR-S-04		
	Replicate #	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Roundworms	P. Nemata	16	-	-	112	-	16	-	16	8	-	40	-	-	-	-	-	16	-	-	-	4	152	48	64	-	-	80	-	2	-	4	-	8	-	-	2
Flatworms	O. Tricladida	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worms	F. Enchytraeidae	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	4	-	-	8	-	-	-	-	-
	Dero digitata	-	-	-	16	32	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56	-	32	48	32	16	4	-	-	-	-	-	-	4	1
	Dero nivea	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	16	-	-	-	-	-	-	-	-	-	-
	Haemonais waldvogeli	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nais	-	-	-	-	-	-	-	16	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80	-	-	-	2	-	8	-	-	-	-	-
	Slavina appendiculata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	41	-	-	-	-
	Aulodrilus limnobius	-	-	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Limnodrilus udekemianus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	4	4	16	-	16	-	-	-	-	-	-	58	41	8	-	8	1
	Varichaetadrilus harmani	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-	-	-
	immatures with hair chaetae	-	-	-	-	-	-	-	-	-	-	-	8	16	-	-	16	-	-	-	-	-	8	16	-	-	-	-	-	-	-	-	-	-	-	-	-
	immatures without hair chaetae	32	-	-	16	-	-	-	-	-	-	-	-	8	-	-	32	64	-	-	16	4	-	-	-	-	-	-	-	-	-	90	780	32	-	12	2
	Lumbriculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	82	8	-	-	2
Leeches	*Erpobdella punctata*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Glossiphonia complanata	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-
	Helobdella stagnalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	1
Mites	Subcl. Acari	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-
	Arrenurus	16	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hygrobates	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Limnesia	32	-	16	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-
	Frontipoda	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oxus	-	-	-	-	-	-	-	16	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-
	Piersigia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	indeterminate	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Koenika	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Neumania	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unionicola	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-
Seed Shrimps	Cl. Ostracoda	-	-	-	16	-	-	-	-	-	-	-	-	8	-	-	-	-	16	-	-	4	48	-	16	-	-	-	-	-	-	8	8	32	-	-	-	3
Water Scuds	*Gammarus lacustris*	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hyalella	48	-	32	32	16	32	-	-	-	-	1	-	-	-	-	16	32	80	-	-	4	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Springtails	O. Collembola	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	16	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-

Table F3-1: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2021)

	Waterbody	Gerry Lake			Martin Lake			North Driftwood River Unnamed Pond						North Driftwood River Unnamed Stream									North Driftwood River Unnamed Tributary			West Buskegau River Unnamed Pond			West Buskegau River Unnamed Stream								
	UTM	471195, 5406131			470659, 5406708			473206, 5406526			469886, 5409399			475413, 5406458			472044, 5408756			470383, 5412395			471529, 5406900			475213, 5412048			478576, 5405893			476687, 5412335			476578, 5412886		
	Station	NDR-GerLk			NDR-MarLk			NDR-P-01			NDR-P-03			NDR-S-01			NDR-S-02			NDR-S-04			NDR-Trib-01			WBR-P-01			WBR-S-02			WBR-S-03			WBR-S-04		
	Replicate #	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Beetles	*Donacia*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Liodessus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-
	Dubiraphia minima	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	Dubiraphia quadrinotata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	Dubiraphia vittata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-
	Dubiraphia larvae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**16**	16	16	-	-	-	-	-	-	16	24	40	60	192	80	**80**	36	**21**
	Optioservus larvae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	8	-	-	-
	Stenelmis larvae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Mayflies	*Callibaetis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Caenis	368	144	96	304	48	80	-	-	-	16	24	-	-	-	-	16	32	96	16	-	-	-	-	-	-	-	48	20	52	56	-	32	16	64	4	18
	Ephemera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	27	-	-	-	-	-	1	-
	Hexagenia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	19	2	29	-	-	-	-	-	-	-	-	2	-	16	24	-	1	-
	Eurylophella	64	-	16	32	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	8	-	-	-	-	-	-
	Leptophlebia	48	32	-	112	64	80	-	-	-	-	-	-	-	-	-	16	16	32	-	8	-	-	-	-	-	-	-	-	12	136	28	16	-	32	8	12
Aquatic Moths	F. Crambidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alderflies	*Sialis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	16	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Damselflies	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	16	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dragonflies	*Cordulia shurtleffi*	1	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Somatochlora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
Stoneflies	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	8	-	-	4
	Leuctra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
Bugs	*Hesperocorixa*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	12	-
	Sigara compressoidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1
	Sigara signata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-
Caddisflies	*Phylocentropus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	12	-	-	-	-	-	-	-	-	-	-	16	-	1	-	1
	Oxyethira	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	6	8	4	-	-	-	4	2
	Lepidostoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	Mystacides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	2
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nemotaulius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	4	-	-	-	-	-	-	-	-	-	-	**4**	-	-	-	-	-
	Molanna	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	Phryganea	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nyctiophylax	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	16	-	-	-	-
	Polycentropus	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	4	-	-	-	-	1
	Lype	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

Table F3-1: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2021)

	Waterbody	Gerry Lake			Martin Lake			North Driftwood River Unnamed Pond						North Driftwood River Unnamed Stream									North Driftwood River Unnamed Tributary			West Buskegau River Unnamed Pond			West Buskegau River Unnamed Stream								
	UTM	471195, 5406131			470659, 5406708			473206, 5406526			469886, 5409399			475413, 5406458			472044, 5408756			470383, 5412395			471529, 5406900			475213, 5412048			478576, 5405893			476687, 5412335			476578, 5412886		
	Station	NDR-GerLk			NDR-MarLk			NDR-P-01			NDR-P-03			NDR-S-01			NDR-S-02			NDR-S-04			NDR-Trib-01			WBR-P-01			WBR-S-02			WBR-S-03			WBR-S-04		
	Replicate #	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Biting-Midge	*Bezzia*	-	16	-	-	-	-	-	-	-	-	8	8	-	-	-	-	-	-	-	-	-	32	48	16	-	-	-	-	-	-	12	-	8	-	-	3
	Culicoides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	4	-	-	-	-	8	-	-	6
	Dasyhelea	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-
	Mallochohelea	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	32	-	24	-	-	-	-	-	-	-	-	6	24	32	48	16	48	36	4
	Serromyia	16	-	-	-	16	-	32	48	-	-	-	-	-	16	-	32	-	-	-	-	-	96	64	32	-	-	-	-	-	-	-	-	-	-	-	-
	Sphaeromias	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phantom Midge	*Chaoborus flavicans*	-	-	-	-	-	-	-	48	4	-	8	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-
	Chaoborus punctipennis	-	-	-	-	-	-	32	96	60	-	8	-	8	-	32	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-
	Chaoborus	-	-	-	-	-	-	-	-	-	-	**8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Midges	*Chironomus*	80	32	16	96	-	32	80	64	84	32	-	8	-	32	64	-	-	-	-	-	-	160	240	240	80	32	48	-	-	-	-	-	-	-	4	1
	Cladopelma	-	-	-	-	-	-	-	16	4	-	8	-	48	48	48	-	-	16	-	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cladotanytarsus	-	-	-	-	-	-	-	-	-	16	32	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cryptochironomus	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	4	-	-	-	-	1
	Dicrotendipes	112	96	96	464	64	64	-	32	-	112	32	24	-	16	80	-	16	-	-	-	4	-	-	16	64	16	80	4	-	-	-	-	-	-	-	-
	Einfeldia	-	-	-	-	-	-	80	144	40	-	-	-	8	16	-	-	-	-	-	-	-	176	144	96	64	64	-	-	-	-	-	-	-	-	-	-
	Endochironomus	32	-	16	64	16	-	-	-	8	-	-	-	-	-	-	-	32	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Glyptotendipes	-	-	-	-	-	-	-	-	16	16	-	-	8	32	-	-	16	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kiefferulus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lauterborniella	-	96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-	48	16	-	-	-	-	-	-	-	-	-
	Micropsectra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	32	8	28	-	-	-	-	-	-	4	14	48	8	16	16	-	4	9
	Microtendipes	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	16	-	-	32	-	-	-	-	-	-	-	-	-	10	32	-	-	-	-	-	2
	Nilothauma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pagastiella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	12	-
	Parachironomus	-	-	16	128	144	64	16	80	48	-	-	-	-	80	96	16	64	16	-	16	4	-	-	-	32	16	80	-	-	-	4	-	-	16	-	-
	Paralauterborniella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
	Paratanytarsus	16	-	32	16	16	48	-	-	-	16	-	-	-	-	-	16	-	-	-	-	4	-	-	-	-	16	144	-	-	-	-	-	-	-	-	-
	Paratendipes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phaenopsectra	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
	Polypedilum halterale	-	-	-	-	-	-	-	-	-	-	8	8	8	-	-	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Polypedilum nubeculosum	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Polypedilum scalaenum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	68	52	-	-	-	-	-	-	-	2	-	48	32	136	16	8	6
	Polypedilum	-	-	-	16	-	-	-	16	-	-	-	-	-	-	-	32	16	16	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1
	Pseudochironomus	-	-	-	-	-	-	-	-	-	16	40	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rheotanytarsus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	Stempellinella	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-
	Stictochironomus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	48	4	1
	Tanytarsus	32	-	48	80	16	32	-	-	16	48	-	32	24	32	16	144	32	16	-	-	-	32	16	48	128	-	224	4	-	8	-	-	-	-	12	9
	Tribelos	-	-	-	-	-	-	-	-	-	-	16	8	-	-	-	-	-	-	-	4	16	-	-	-	-	-	-	-	2	8	4	16	-	-	-	-
	Zavreliella	-	-	-	16	32	32	16	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table F3-1: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2021)

Waterbody		Gerry Lake			Martin Lake			North Driftwood River Unnamed Pond						North Driftwood River Unnamed Stream									North Driftwood River Unnamed Tributary			West Buskegau River Unnamed Pond			West Buskegau River Unnamed Stream								
UTM		471195, 5406131			470659, 5406708			473206, 5406526			469886, 5409399			475413, 5406458			472044, 5408756			470383, 5412395			471529, 5406900			475213, 5412048			478576, 5405893			476687, 5412335			476578, 5412886		
Station		NDR-GerLk			NDR-MarLk			NDR-P-01			NDR-P-03			NDR-S-01			NDR-S-02			NDR-S-04			NDR-Trib-01			WBR-P-01			WBR-S-02			WBR-S-03			WBR-S-04		
Replicate #		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	Brillia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	2	-	-	-	8	-	-	-
	Byrophaenocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
	Chaetocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-
	Corynoneura	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	Cricotopus (Isocladius)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Epoicocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	4	1
	Heterotrissocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	16	-	-	-	5
	Nanocladius	16	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-
	Orthocladius annectens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-
	Parakiefferiella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	16	-	-	-	8	-	-	16	-	5
	Parametriocnemus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
	Psectrocladius	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pseudosmittia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
	Zalutschia	-	-	-	-	-	16	-	-	-	-	-	-	-	32	96	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-
	Ablabesmyia	128	16	-	64	48	32	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	12	12	16	4	16	-	16	8	3
	Clinotanypus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Guttipelopia	-	-	-	-	-	-	-	-	-	-	8	8	-	-	-	-	-	-	-	-	-	-	16	32	-	-	32	-	-	-	-	-	-	-	-	-	-
	Labrudinia	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	4	-	-	4	-	-	16	-	1
	Larsia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	4	-	-	-	-	-	-	20	8	24	8	-	-	16	12	3
	Monopelopia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-
	Natarsia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8	24	4	16	-	-	-	-
	Paramerina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Procladius	16	-	-	-	64	-	16	16	12	16	-	8	8	32	-	16	32	64	-	32	4	64	32	-	16	16	-	-	-	-	-	-	-	-	-	8	1
	Psectrotanypus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	48	16	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tanypus	-	-	-	-	-	-	16	48	24	-	-	-	-	-	-	32	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Thienemannimyia complex	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	8	-	-	12	-	-	-	1
	Zavrelimyia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	2	-	-	-	-	-	-	-
	Hemerodromia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
	Chrysops	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	4	-	-	8	-	-	-	-	-
	Helius	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hexatoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	4	8	-	-	1	-	-	-
	Ormosia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-
	Pilaria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	Rhabdomastix	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table F3-1: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2021)

	Waterbody	Gerry Lake			Martin Lake			North Driftwood River Unnamed Pond						North Driftwood River Unnamed Stream									North Driftwood River Unnamed Tributary			West Buskegau River Unnamed Pond			West Buskegau River Unnamed Stream								
	UTM	471195, 5406131			470659, 5406708			473206, 5406526			469886, 5409399			475413, 5406458			472044, 5408756			470383, 5412395			471529, 5406900			475213, 5412048			478576, 5405893			476687, 5412335			476578, 5412886		
	Station	NDR-GerLk			NDR-MarLk			NDR-P-01			NDR-P-03			NDR-S-01			NDR-S-02			NDR-S-04			NDR-Trib-01			WBR-P-01			WBR-S-02			WBR-S-03			WBR-S-04		
	Replicate #	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Snails	*Ferrissia*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Amnicola	32	-	16	16	16	32	-	-	-	-	-	-	-	-	-	-	-	32	-	28	32	-	-	-	-	-	-	12	-	24	-	-	-	-	-	3
	indeterminate	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Physella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
	Armiger crista	48	-	-	-	-	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gyraulus	32	-	16	-	-	16	-	-	-	-	-	8	-	-	-	16	-	16	-	4	-	-	-	-	-	-	-	4	-	-	-	16	-	16	-	-
	Helisoma anceps	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
	Promenetus exacuous	192	16	-	160	-	48	-	-	-	-	-	-	-	-	-	-	16	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Valvata tricarinata	96	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Valvata	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clams																																					
	Pisidium/Cyclocalyx	16	96	48	32	112	16	-	-	-	112	24	8	-	-	-	16	16	16	16	8	16	8	-	-	32	-	-	52	22	40	24	144	8	64	44	14
	Sphaerium (Amesoda) striatinum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
	Sphaerium (Musculium)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-
	Sphaerium immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
	immature	-	-	-	-	-	-	-	-	-	**16**	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-
	Total Number of Organisms	1522	576	499	1984	704	753	288	673	484	464	345	176	144	352	432	561	608	850	275	263	270	1041	688	656	592	368	912	212	261	546	513	1664	401	482	267	165
	Total Number of Taxa*	27	11	18	31	15	20	8	16	19	13	19	15	10	11	7	24	25	27	13	21	24	21	11	14	12	15	17	20	34	21	33	24	18	16	27	45

Table F3-2: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2022)

	Waterbody	Jocko Creek			Gerry Lake			Jack Lake			Martin Lake			North Driftwood River Unnamed Pond									North Driftwood River Unnamed Stream									Sutherland Lake			North Driftwood River Unnamed Tributary			West Buskegau River Unnamed Pond					
	UTM	473306, 5401503			471232, 5405376			471159, 5404798			476994, 5406297			473246, 5406520			469790, 5409426			467427, 5411257			475472, 5406456			472022, 5408783			470362, 5412388			468614, 5410394			471333, 5404355			471570, 5406914			474915, 5412131			474611, 5412309		
	Station	JC-S-01			NDR-GerLk			NDR-JacLk			NDR-MarLk			NDR-P-01			NDR-P-03			NDR-P-07			NDR-S-01			NDR-S-02			NDR-S-04			NDR-S-05			NDR-SutLk			NDR-Trib-01			WBR-P-03			WBR-P-04		
	Replicate #	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Roundworms	P. Nemata	20	16	8	-	-	-	-	-	-	-	-	-	-	-	-	16	8	-	-	64	288	-	16	4	16	-	8	-	-	-	32	64	96	4	-	-	72	224	64	12	-	40	-	32	-
Worms	F. Enchytraeidae	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-	4	16	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chaetogaster diaphanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
	Dero digitata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	64	-	-	4	-	32	-	-	-	-	-	-	-
	Dero nivea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	-	-	-	-	-	-	-	-
	Haemonais waldvogeli	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-
	Nais	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
	Aulodrilus limnobius	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Limnodrilus udekemianus	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	4	12	1	125	-	-	-	-	-	-	-	24	-	48	-	-	-	-	-	-
	Tubifex tubifex	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	immatures with hair chaetae	12	32	-	-	92	1	1	-	15	-	-	-	-	-	-	-	-	-	-	64	-	-	-	-	8	-	-	1	-	-	32	16	-	-	-	-	-	-	32	64	8	-	8	-	-	-
	immatures without hair chaetae	32	16	-	-	15	2	-	-	-	4	23	1	-	-	-	-	-	-	-	-	-	-	-	2	24	4	8	14	115	275	-	-	-	-	-	-	8	-	32	12	-	8	-	8	-
	Rhyacodrilus montana	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	indeterminate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lumbriculus	-	16	8	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leeches	Erpobdella obscura	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Erpobdella punctata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-
	Erpobdella immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	9	4	-	-	-	-	-	-	-	**1**	-	-	-	-	-	-	-	-
	Helobdella stagnalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-
Mites	Limnesia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	8	-	-	-
	Oxus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	16	-	16
	indeterminate	4	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Koenika	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Unionicola	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-
Harpacticoids	O. Harpacticoida	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	16	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Seed Shrimps	Cl. Ostracoda	4	32	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	32	-	-	-	-	-	8	-	-	-	-	-	32	-	-	-	-	4	-	-	32	-	-	-	-	-	-	-
Water Scuds	Hyalella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	4	4	-	-	-	-	-	-	-	-	-	40	128	48	-	-	-	-	-	-	-
Crayfish	Faxonius (=Orconectes) propinquus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Springtails	O. Collembola	-	-	16	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Insects	Cl. Insecta																																														
Beetles	Agabus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
	Dubiraphia larvae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8	12	9	116	96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mayflies	Acerpenna	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Caenis	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	6	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32
	Ephemera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	9	-	8	40	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hexagenia	-	-	-	-	-	-	-	-	-	9	1	-	-	-	-	-	-	-	-	-	-	-	-	-	74	95	9	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Leptophlebia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-
Alderflies	Sialis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dragonflies	Epitheca	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Somatochlora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ladona julia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	Leucorrhinia	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table F3-2: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2022)

	Waterbody	Jocko Creek			Gerry Lake			Jack Lake			Martin Lake			North Driftwood River Unnamed Pond						North Driftwood River Unnamed Stream									Sutherland Lake			North Driftwood River Unnamed Tributary			West Buskegau River Unnamed Pond					
	UTM	473306, 5401503			471232, 5405376			471159, 5404798			476994, 5406297			473246, 5406520			469790, 5409426			467427, 5411257			475472, 5406456			472022, 5408783			470362, 5412388			468614, 5410394			471333, 5404355			471570, 5406914			474915, 5412131			474611, 5412309		
	Station	JC-S-01			NDR-GerLk			NDR-JacLk			NDR-MarLk			NDR-P-01			NDR-P-03			NDR-P-07			NDR-S-01			NDR-S-02			NDR-S-04			NDR-S-05			NDR-SutLk			NDR-Trib-01			WBR-P-03			WBR-P-04		
	Replicate #	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Caddisflies	Phylocentropus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	4	29	1	-	8	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
	Helicopsyche	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cheumatopsyche	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hydropsyche bronta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hydroptila	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oxyethira	12	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	8	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-
	Ceraclea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mystacides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oecetis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	8	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nemotaulius	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
	Molanna	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Agrypnia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
	Banksiola	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
	Phryganea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
	Ptilostomis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-
	Nyctiophylax	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Polycentropus	4	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biting-Midge	Bezzia	44	64	48	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	8	2	-	8	-	-	-	-	-	-	24	-	48	-	-	-	-	-	-
	Culicoides	-	32	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dasyhelea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mallochohelea	-	-	-	-	-	-	-	-	-	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80	28	72	3	28	48	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-
	Serromyia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	2432	1408	800	-	-	-	32	64	128	8	-	32	-	-	-
	Sphaeromias	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	64	64	-	-	-	-	-	-	-	32	64	-	-	-	-	-	32	-	4	-	16	-	-	-	-
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	**8**	-	-	-	-	-	-	-	-	**4**	-	-	-	-	-	-
Phantom Midge	Chaoborus flavicans	-	-	-	6	4	51	-	-	11	8	1	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-
	Chaoborus punctipennis	-	-	-	1	-	4	-	19	20	4	-	28	32	288	-	-	-	-	128	224	-	32	-	-	-	-	-	-	-	-	-	32	64	4	4	12	-	-	-	8	-	-	144	96	-
	Chaoborus immature	-	-	-	-	-	**6**	-	-	-	-	-	**8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**4**	-	-	-	-	-	-	-	-	-	-	-	-
Midges	pupae	-	-	-	-	-	-	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chironomus	-	-	-	-	62	5	-	180	6	-	59	5	-	32	32	-	-	-	64	160	-	-	48	18	-	-	-	1	-	-	-	-	160	-	5	4	64	448	128	8	32	-	32	-	-	-
	Cladopelma	16	-	-	-	-	-	1	-	-	-	-	-	16	32	64	-	-	1	80	96	32	-	48	18	-	-	-	-	-	-	32	144	64	-	-	8	-	-	16	300	688	432	416	-	16	-
	Cladotanytarsus	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48	-	-	-	-	-	-
	Cryptochironomus	25	-	32	-	-	-	1	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	8	4	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dicrotendipes	8	29	-	-	-	-	1	-	2	-	-	-	-	-	-	-	24	-	-	-	-	-	-	-	-	-	4	-	5	12	8	-	-	-	-	-	8	-	-	-	12	-	16	-	-	-
	Einfeldia	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	16	-	-	-	-	8	-	-	-	-	-	-	64	176	352	-	-	-	24	96	96	4	160	-	128	8	-
	Einfeldia natchitocheae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	16	-	-	-	-	-	-
	Endochironomus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	32	-	-	-	-	-	-	-	-	16	64	-	-	-	8	-	-	-	-	-	-	-	-	-	-
	Glyptotendipes	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	16	8	1	16	-	128	32	-	-	8	-	-	-	-	-	32	64	-	-	-	-	-	16	28	-	-	80	-	-	-	-
	Lauterborniella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
	Micropsectra	993	3056	1704	4	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	32	32	-	-	120	12	12	-	-	-	-	-	-	-	-	-	48	128	80	36	-	-	-	-	-	-
	Microtendipes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	13	16	32	-	-	-	-	-	-	16	32	16	-	-	-	-	-	-	-
	Nilothauma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pagastiella	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Parachironomus	8	58	31	-	-	-	-	-	-	-	-	-	16	-	32	-	-	-	-	32	160	-	-	4	-	-	-	-	-	-	-	16	32	-	-	-	8	64	32	24	-	-	-	-	-	-
	Paratanytarsus	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	16	-	-	-	12	6	-	32	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-
	Paratendipes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	4	8	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phaenopsectra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	4	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-
	Polypedilum halterale	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	32	-	-	-	-	-	-	-	32	116	-	64	-	-	-	-
	Polypedilum nubeculosum	-	-	-	-	-	-	8	-	5	-	-	-	-	-	-	-	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-
	Polypedilum scalaenum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	8	3	20	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Midges	Polypedilum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-
	Pseudochironomus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-

Table F3-2: Mean Proportion of Benthic Invertebrate Taxa by Study Area (2022)

	Waterbody	Jocko Creek			Gerry Lake			Jack Lake			Martin Lake			North Driftwood River Unnamed Pond									North Driftwood River Unnamed Stream									Sutherland Lake			North Driftwood River Unnamed Tributary			West Buskegau River Unnamed Pond					
	UTM	473306, 5401503			471232, 5405376			471159, 5404798			476994, 5406297			473246, 5406520			469790, 5409426			467427, 5411257			475472, 5406456			472022, 5408783			470362, 5412388			468614, 5410394			471333, 5404355			471570, 5406914			474915, 5412131			474611, 5412309		
	Station	JC-S-01			NDR-GerLk			NDR-JacLk			NDR-MarLk			NDR-P-01			NDR-P-03			NDR-P-07			NDR-S-01			NDR-S-02			NDR-S-04			NDR-S-05			NDR-SutLk			NDR-Trib-01			WBR-P-03			WBR-P-04		
	Replicate #	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	Rheotanytarsus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	13	24	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stempellinella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stictochironomus	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	12	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tanytarsus	25	58	31	-	-	-	7	-	27	4	-	-	-	-	96	32	8	-	48	-	64	32	-	28	56	44	48	-	44	16	-	-	64	-	-	12	160	192	160	240	128	352	32	-	-
	Tribelos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xenochironomus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zavreliella	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Brillia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cricotopus (Isocladius)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cricotopus/ Orthocladius	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Epoicocladius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	4	-	3	20	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heterotrissocladius	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthocladius annectens	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Parakiefferiella	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	8	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Parametriocnemus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Psectrocladius	-	87	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zalutschia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	32	32	64	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-
	Ablabesmyia	8	29	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	8	-	4	5	24	8	-	-	-	-	-	-	-	32	-	8	-	16	-	-	-
	Clinotanypus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Guttipelopia	8	58	139	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-	-	-	-	96	-	-	-	8	32	-	-	-	-	-	-	-
	Labrudinia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Larsia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	4	12	-	40	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Natarsia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Procladius	16	145	31	-	-	-	5	-	-	12	-	-	-	-	-	16	-	-	-	32	-	-	-	8	8	-	8	-	16	-	-	128	128	-	1	4	32	64	96	124	64	200	80	-	96
	Tanypus	-	-	-	-	6	-	-	2	42	-	-	-	-	-	32	-	-	-	-	32	-	-	-	-	-	-	-	-	-	-	32	16	-	-	1	-	-	-	16	-	-	-	-	-
	Thienemannimyia complex	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	12	8	-	-	-	-	-	-	8	-	-	-	-	-	-	-
	Chelifera/Metachela	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hemerodromia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysops	4	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	4	8	-	-	-	-	-	-	-	-	4	-	-	-	-	-
	Hexatoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pilaria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ferrissia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-	-	8	-	-	3	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Amnicola	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	4	-	12	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gyraulus	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	96	-	-	-	-	-	-	-
	Helisoma anceps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
Snails	Planorbella trivolvis	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Promenetus exacuous	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-
	immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-
	Valvata tricarinata	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Valvata	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pisidium/Cyclocalyx	16	-	-	-	-	-	7	1	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	4	4	7	72	32	32	-	-	-	-	-	8	64	64	-	-	-	-	-	-
Clams	Sphaerium (Musculium)	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	8	-	-
	Sphaerium immature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-
	immature (decalcified)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	8	**32**	-	-	-
	Anodontoides ferussacianus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Number of Organisms	1297	3745	2128	14	189	69	54	203	136	110	92	60	98	352	320	81	168	3	368	800	832	352	208	96	685	264	395	140	920	869	2784	2160	1984	20	15	68	651	1795	1299	1005	1104	1248	976	152	208
	Total Number of Taxa*	23	17	17	5	6	5	14	5	14	14	5	4	7	3	6	5	13	3	7	11	10	9	6	11	33	21	36	34	40	28	11	13	12	4	5	11	25	21	27	26	7	14	9	5	7

APPENDIX G

Data Quality Assurance and Control Assessments

Table G1-1: Surface Water Quality Data Assurance and Quality Control (2021)

	Lowest Detection Limit	Units	Trip Blanks		Duplicates			
Sample ID			**Trip Blank**	**Trip Blank**	**WBR-S-04**	**CNC-DUP-01**	**Calculate?**	**RPD (%)**
Date Sampled			**11-Aug-2021**	**28-Oct-2021**	**9-Aug-2021**	**11-Aug-2021**		
Time Sampled			**0:00**	**0:00**	**14:30**	**0:00**		
Physical Tests (Water)								
Conductivity	1.0	umhos/cm	1.2	1.1	114	111	YES	2.67
Hardness (as CaCO3)	0.50	mg/L	<0.50	<0.50	66.7	65.7	YES	1.51
pH	0.10	pH units	5.56	5.86	7.62	7.85	YES	2.97
Total Suspended Solids	3.0	mg/L	<3.0	<3.0	3.1	3.0	NO	
Total Dissolved Solids	10	mg/L	<10	<10	132	132	YES	0.00
Anions and Nutrients (Water)								
Alkalinity, Total (as CaCO3)	1.0	mg/L	<1.0	<1.0	66.2	59.0	YES	11.50
Ammonia, Total (as N)	0.010	mg/L	0.012	<0.010	0.034	0.023	NO	
Bromide (Br)	0.10	mg/L	<0.10	<0.10	0.1	0.1	NO	
Chloride (Cl)	0.50	mg/L	<0.50	<0.50	0.5	0.5	NO	
Fluoride (F)	0.020	mg/L	0.067	<0.020	0.032	0.032	NO	
Nitrate (as N)	0.020	mg/L	<0.020	<0.020	0.02	0.02	NO	
Nitrite (as N)	0.010	mg/L	<0.010	<0.010	0.01	0.01	NO	
Phosphorus (P)-Total	0.0010	mg/L	<0.0010	0.0017	0.0439	0.0429	YES	2.30
Sulfate (SO4)	0.30	mg/L	<0.30	<0.30	0.46	0.46	NO	
Cyanides (Water)								
Cyanide, Weak Acid Diss	0.0020	mg/L	<0.0020	<0.0020	0.002	0.002	NO	
Cyanide, Total	0.0020	mg/L	<0.0020	<0.0020	0.002	0.002	NO	
Cyanide, Free	0.0020	mg/L	<0.0020	<0.0020	0.002	0.002	NO	
Inorganic Parameters (Water)								
Acidity (as CaCO3)	2.0	mg/L	<2.0	2.3	4.2	4.0	NO	
Total Metals (Water)								
Aluminum (Al)-Total	0.0050	mg/L	<0.0050	<0.0050	0.773	0.760	YES	1.70
Antimony (Sb)-Total	0.00010	mg/L	<0.00010	<0.00010	0.0001	0.0001	NO	
Arsenic (As)-Total	0.00010	mg/L	<0.00010	<0.00010	0.00156	0.00157	YES	0.64
Barium (Ba)-Total	0.00010	mg/L	<0.00010	<0.00010	0.0107	0.0106	YES	0.94
Beryllium (Be)-Total	0.00010	mg/L	<0.00010	<0.00010	0.0001	0.0001	NO	
Bismuth (Bi)-Total	0.000050	mg/L	<0.000050	<0.000050	0.00005	0.00005	NO	
Boron (B)-Total	0.010	mg/L	<0.010	<0.010	0.01	0.01	NO	
Cadmium (Cd)-Total	0.0000050	mg/L	<0.0000050	<0.0000050	0.0000214	0.0000225	NO	
Calcium (Ca)-Total	0.050	mg/L	<0.050	<0.050	19.2	18.9	YES	1.57
Cesium (Cs)-Total	0.000010	mg/L	<0.000010	<0.000010	0.000070	0.000069	YES	1.44
Chromium (Cr)-Total	0.00050	mg/L	<0.00050	<0.00050	0.00182	0.00178	NO	
Cobalt (Co)-Total	0.00010	mg/L	<0.00010	<0.00010	0.00042	0.00040	NO	
Copper (Cu)-Total	0.00050	mg/L	<0.00050	<0.00050	0.00171	0.00167	NO	
Iron (Fe)-Total	0.010	mg/L	<0.010	<0.010	1.31	1.26	YES	3.89
Lead (Pb)-Total	0.000050	mg/L	<0.000050	<0.000050	0.000522	0.000512	YES	1.93
Lithium (Li)-Total	0.0010	mg/L	<0.0010	<0.0010	0.0015	0.0015	NO	
Magnesium (Mg)-Total	0.0050	mg/L	<0.0050	0.0060	4.53	4.49	YES	0.89
Manganese (Mn)-Total	0.00050	mg/L	<0.00050	<0.00050	0.0756	0.0733	YES	3.09
Mercury (Hg)-Total	0.00050	ug/L	<0.00050	<0.00050	0.00206	0.00093	NO	

	Lowest Detection Limit	Units	Trip Blanks		Duplicates		Calculate?	RPD (%)
Sample ID			**Trip Blank**	**Trip Blank**	**WBR-S-04**	**CNC-DUP-01**		
Date Sampled			**11-Aug-2021**	**28-Oct-2021**	**9-Aug-2021**	**11-Aug-2021**		
Time Sampled			**0:00**	**0:00**	**14:30**	**0:00**		
Molybdenum (Mo)-Total	0.000050	mg/L	<0.000050	<0.000050	0.000113	0.000101	NO	
Nickel (Ni)-Total	0.00050	mg/L	<0.00050	<0.00050	0.00147	0.00145	NO	
Phosphorus (P)-Total	0.050	mg/L	<0.050	<0.050	0.05	0.05	NO	
Potassium (K)-Total	0.050	mg/L	<0.050	<0.050	0.488	0.483	YES	1.03
Rubidium (Rb)-Total	0.00020	mg/L	<0.00020	<0.00020	0.00208	0.00219	YES	5.15
Selenium (Se)-Total	0.000050	mg/L	<0.000050	<0.000050	0.000127	0.000152	NO	
Silicon (Si)-Total	0.10	mg/L	<0.10	<0.10	3.18	2.97	YES	6.83
Silver (Ag)-Total	0.000050	mg/L	<0.000050	<0.000050	0.00005	0.00005	NO	
Sodium (Na)-Total	0.050	mg/L	0.084	<0.050	1.75	1.74	YES	0.57
Strontium (Sr)-Total	0.0010	mg/L	<0.0010	<0.0010	0.0387	0.0381	YES	1.56
Sulfur (S)-Total	0.50	mg/L	<0.50	<0.50	0.56	0.5	NO	
Tellurium (Te)-Total	0.00020	mg/L	<0.00020	<0.00020	0.00029	0.0002	NO	
Thallium (Tl)-Total	0.000010	mg/L	<0.000010	<0.000010	0.000011	0.000011	NO	
Thorium (Th)-Total	0.00010	mg/L	<0.00010	<0.00010	0.00022	0.00019	NO	
Tin (Sn)-Total	0.00010	mg/L	<0.00010	<0.00010	0.0001	0.0001	NO	
Titanium (Ti)-Total	0.00030	mg/L	<0.00030	<0.00030	0.0288	0.0293	YES	1.72
Tungsten (W)-Total	0.00010	mg/L	<0.00010	<0.00010	0.0001	0.0001	NO	
Uranium (U)-Total	0.000010	mg/L	<0.000010	<0.000010	0.000092	0.000087	YES	5.59
Vanadium (V)-Total	0.00050	mg/L	<0.00050	<0.00050	0.00197	0.00188	NO	
Zinc (Zn)-Total	0.0030	mg/L	<0.0030	<0.0030	0.0039	0.0040	NO	
Zirconium (Zr)-Total	0.00020	mg/L	<0.00020	<0.00020	0.00126	0.00106	YES	17.24
Dissolved Metals (Water)								
Aluminum (Al)-Dissolved	0.0010	mg/L	<0.0010		0.198	0.186	YES	6.25
Antimony (Sb)-Dissolved	0.00010	mg/L	<0.00010		0.0001	0.0001	NO	
Arsenic (As)-Dissolved	0.00010	mg/L	<0.00010		0.00139	0.00145	YES	4.23
Barium (Ba)-Dissolved	0.00010	mg/L	<0.00010		0.00753	0.00716	YES	5.04
Beryllium (Be)-Dissolved	0.00010	mg/L	<0.00010		0.0001	0.0001	NO	
Bismuth (Bi)-Dissolved	0.000050	mg/L	<0.000050		0.00005	0.00005	NO	
Boron (B)-Dissolved	0.010	mg/L	<0.010		0.01	0.01	NO	
Cadmium (Cd)-Dissolved	0.0000050	mg/L	<0.0000050		0.0000169	0.0000175	NO	
Calcium (Ca)-Dissolved	0.050	mg/L	<0.050		20.2	19.9	YES	1.50
Cesium (Cs)-Dissolved	0.000010	mg/L	<0.000010		0.00001	0.00001	NO	
Chromium (Cr)-Dissolved	0.00010	mg/L	0.00012		0.00080	0.00077	YES	3.82
Cobalt (Co)-Dissolved	0.00010	mg/L	<0.00010		0.00016	0.00016	NO	
Copper (Cu)-Dissolved	0.00020	mg/L	<0.00020		0.00144	0.00146	YES	1.38
Iron (Fe)-Dissolved	0.010	mg/L	<0.010		0.682	0.668	YES	2.07
Lead (Pb)-Dissolved	0.000050	mg/L	<0.000050		0.000265	0.000308	YES	15.01
Lithium (Li)-Dissolved	0.0010	mg/L	<0.0010		0.001	0.001	NO	
Magnesium (Mg)-Dissolved	0.0050	mg/L	<0.0050		4.88	4.93	YES	1.02
Manganese (Mn)-Dissolved	0.00010	mg/L	<0.00010		0.0621	0.0611	YES	1.62
Molybdenum (Mo)-Dissolved	0.000050	mg/L	<0.000050		0.000099	0.000090	NO	
Nickel (Ni)-Dissolved	0.00050	mg/L	<0.00050		0.00085	0.00085	NO	
Phosphorus (P)-Dissolved	0.030	mg/L	<0.030		0.03	0.03	NO	
Potassium (K)-Dissolved	0.050	mg/L	<0.050		0.353	0.352	YES	0.28

	Lowest Detection Limit	Units	Trip Blanks		Duplicates					
Sample ID			**Trip Blank**	**Trip Blank**	**WBR-S-04**	**CNC-DUP-01**	**Calculate?**	**RPD (%)**		
Date Sampled			**11-Aug-2021**	**28-Oct-2021**	**9-Aug-2021**	**11-Aug-2021**				
Time Sampled			**0:00**	**0:00**	**14:30**	**0:00**				
Rubidium (Rb)-Dissolved	0.00020	mg/L	<0.00020		0.00118	0.00114	YES	3.45		
Selenium (Se)-Dissolved	0.000050	mg/L	<0.000050		0.000161	0.000134	NO			
Silicon (Si)-Dissolved	0.050	mg/L	<0.050		2.01	1.94	YES	3.54		
Silver (Ag)-Dissolved	0.000010	mg/L	<0.000010		0.00001	0.00001	NO			
Sodium (Na)-Dissolved	0.050	mg/L	<0.050		1.76	1.79	YES	1.69		
Strontium (Sr)-Dissolved	0.00010	mg/L	<0.00010		0.0398	0.0389	YES	2.29		
Sulfur (S)-Dissolved	0.50	mg/L	<0.50		0.70	0.67	NO			
Tellurium (Te)-Dissolved	0.00020	mg/L	<0.00020		0.0002	0.0002	NO			
Thallium (Tl)-Dissolved	0.000010	mg/L	<0.000010		0.00001	0.00001	NO			
Thorium (Th)-Dissolved	0.00010	mg/L	<0.00010		0.00016	0.00016	NO			
Tin (Sn)-Dissolved	0.00010	mg/L	<0.00010		0.0001	0.0001	NO			
Titanium (Ti)-Dissolved	0.00030	mg/L	<0.00030		0.00913	0.00835	YES	8.92		
Tungsten (W)-Dissolved	0.00010	mg/L	<0.00010		0.0001	0.0001	NO			
Uranium (U)-Dissolved	0.000010	mg/L	<0.000010		0.000075	0.000071	YES	5.48		
Vanadium (V)-Dissolved	0.00050	mg/L	<0.00050		0.00084	0.00083	NO			
Zinc (Zn)-Dissolved	0.0010	mg/L	<0.0010		0.0033	0.0052	NO			
Zirconium (Zr)-Dissolved	0.00020	mg/L	<0.00020		0.00086	0.00080	NO			
Speciated Metals (Water)										
Methylmercury (as MeHg)-Total	0.000020	ug/L	<0.000020	<0.000020	0.000340	0.000345	YES	1.46		
Radiological Parameters (Water)										
Ra-226	0.011	Bq/L								

	Lowest Detection Limit	Units	Duplicates											
Client Sample ID			**NDR-MARLK**	**CNC-DUP-02**	**Calculate?**	**RPD (%)**	**MATR-02**	**DUP-01**	**Calculate?**	**RPD (%)**	**NDR-P-01**	**CNC-DUP-02**	**Calculate?**	**RPD (%)**
Date Sampled			**11-Aug-2021**	**11-Aug-2021**			**28-Oct-2021**	**28-Oct-2021**			**24-Oct-2021**	**24-Oct-2021**		
Time Sampled			**16:45**	**0:00**			**11:45**	**0:00**			**11:15**	**0:00**		
Physical Tests (Water)														
Conductivity	1.0	umhos/cm	120	119	YES	0.84	131		YES		49.9	50.6	YES	1.39
Hardness (as CaCO3)	0.50	mg/L	64.7	64.9	YES	0.31	73.1		YES		34.4	34.5	YES	0.29
pH	0.10	pH units	7.74	7.73	YES	0.13	8.01		YES		6.51	6.51	YES	0.00
Total Suspended Solids	3.0	mg/L	3	3	NO		4.1		NO		3	3	NO	
Total Dissolved Solids	10	mg/L	88	95	YES	7.65	86		NO		122	118	YES	3.33
Anions and Nutrients (Water)														
Alkalinity, Total (as CaCO3)	1.0	mg/L	63.3	62.8	YES	0.79	63.6		YES		20.0	21.7	YES	8.15
Ammonia, Total (as N)	0.010	mg/L	0.01	0.01	NO		0.019	0.018	NO		0.020	0.023	NO	
Bromide (Br)	0.10	mg/L	0.1	0.1	NO		0.1		NO		0.1	0.1	NO	
Chloride (Cl)	0.50	mg/L	0.5	0.5	NO		3.67		NO		0.5	0.5	NO	
Fluoride (F)	0.020	mg/L	0.030	0.031	NO		0.035		NO		0.02	0.02	NO	
Nitrate (as N)	0.020	mg/L	0.02	0.02	NO		0.100		NO		0.02	0.02	NO	
Nitrite (as N)	0.010	mg/L	0.01	0.01	NO		0.01		NO		0.01	0.01	NO	
Phosphorus (P)-Total	0.0010	mg/L	0.0166	0.0147	YES	12.14	0.0180	0.0180	YES	0.00	0.0196	0.0189	YES	3.64
Sulfate (SO4)	0.30	mg/L	0.33	0.33	NO		4.96		YES		0.3	0.3	NO	
Cyanides (Water)														

	Lowest Detection Limit	Units	Duplicates											
Client Sample ID			**NDR-MARLK**	**CNC-DUP-02**			**MATR-02**	**DUP-01**			**NDR-P-01**	**CNC-DUP-02**		
Date Sampled			**11-Aug-2021**	**11-Aug-2021**	**Calculate?**	**RPD (%)**	**28-Oct-2021**	**28-Oct-2021**	**Calculate?**	**RPD (%)**	**24-Oct-2021**	**24-Oct-2021**	**Calculate?**	**RPD (%)**
Time Sampled			**16:45**	**0:00**			**11:45**	**0:00**			**11:15**	**0:00**		
Physical Tests (Water)														
Cyanide, Weak Acid Diss	0.0020	mg/L	0.002	0.002	NO		0.002		NO		0.002	0.002	NO	
Cyanide, Total	0.0020	mg/L	0.002	0.002	NO		0.002		NO		0.002	0.002	NO	
Cyanide, Free	0.0020	mg/L	0.002	0.002	NO		0.002		NO		0.002	0.002	NO	
Inorganic Parameters (Water)														
Acidity (as CaCO3)	2.0	mg/L	2	2	NO		3.5		NO		8.7	8.2	NO	
Total Metals (Water)														
Aluminum (Al)-Total	0.0050	mg/L	0.0243	0.0237	NO		0.225	0.218	YES	3.16	0.201	0.198	YES	1.50
Antimony (Sb)-Total	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Arsenic (As)-Total	0.00010	mg/L	0.00060	0.00061	YES	1.65	0.00085	0.00087	YES	2.33	0.00118	0.00112	YES	5.22
Barium (Ba)-Total	0.00010	mg/L	0.00569	0.00631	YES	10.33	0.00877	0.00865	YES	1.38	0.00331	0.00324	YES	2.14
Beryllium (Be)-Total	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Bismuth (Bi)-Total	0.000050	mg/L	0.00005	0.00005	NO		0.00005	0.00005	NO		0.00005	0.00005	NO	
Boron (B)-Total	0.010	mg/L	0.01	0.01	NO		0.013	0.013	NO		0.01	0.01	NO	
Cadmium (Cd)-Total	0.0000050	mg/L	0.000005	0.000005	NO		0.0000171	0.0000134	NO		0.0000183	0.0000160	NO	
Calcium (Ca)-Total	0.050	mg/L	18.4	18.6	YES	1.08	20.7	19.3	YES	7.00	9.16	9.32	YES	1.73
Cesium (Cs)-Total	0.000010	mg/L	0.00001	0.00001	NO		0.000019	0.000020	NO		0.00001	0.00001	NO	
Chromium (Cr)-Total	0.00050	mg/L	0.0005	0.0005	NO		0.00070	0.00070	NO		0.00061	0.00063	NO	
Cobalt (Co)-Total	0.00010	mg/L	0.0001	0.0001	NO		0.00016	0.00017	NO		0.00014	0.00012	NO	
Copper (Cu)-Total	0.00050	mg/L	0.0005	0.0005	NO		0.00175	0.00156	NO		0.00070	0.00060	NO	
Iron (Fe)-Total	0.010	mg/L	0.132	0.132	YES	0.00	0.442	0.452	YES	2.24	0.631	0.629	YES	0.32
Lead (Pb)-Total	0.000050	mg/L	0.00005	0.00005	NO		0.000142	0.000142	NO		0.000160	0.000175	NO	
Lithium (Li)-Total	0.0010	mg/L	0.001	0.001	NO		0.001	0.001	NO		0.001	0.001	NO	
Magnesium (Mg)-Total	0.0050	mg/L	4.54	4.51	YES	0.66	5.18	5.03	YES	2.94	2.79	2.74	YES	1.81
Manganese (Mn)-Total	0.00050	mg/L	0.0234	0.0234	YES	0.00	0.0286	0.0289	YES	1.04	0.0160	0.0160	YES	0.00
Mercury (Hg)-Total	0.00050	ug/L	0.00113	0.00164	NO		0.00216	0.00201	NO		0.00076	0.00078	NO	
Molybdenum (Mo)-Total	0.000050	mg/L	0.000053	0.000058	NO		0.000152	0.000131	NO		0.00005	0.00005	NO	
Nickel (Ni)-Total	0.00050	mg/L	0.0005	0.0005	NO		0.00125	0.00116	NO		0.00056	0.0005	NO	
Phosphorus (P)-Total	0.050	mg/L	0.05	0.05	NO		0.05	0.05	NO		0.05	0.05	NO	
Potassium (K)-Total	0.050	mg/L	0.421	0.435	YES	3.27	0.585	0.573	YES	2.07	0.089	0.093	NO	
Rubidium (Rb)-Total	0.00020	mg/L	0.00093	0.00099	NO		0.00141	0.00153	YES	8.16	0.00055	0.00050	NO	
Selenium (Se)-Total	0.000050	mg/L	0.000069	0.000080	NO		0.000117	0.000116	NO		0.000147	0.000161	NO	
Silicon (Si)-Total	0.10	mg/L	0.94	0.83	YES	12.43	2.96	2.95	YES	0.34	1.58	1.57	YES	0.63
Silver (Ag)-Total	0.000050	mg/L	0.00005	0.00005	NO		0.00005	0.00005	NO		0.00005	0.00005	NO	
Sodium (Na)-Total	0.050	mg/L	1.30	1.28	YES	1.55	3.37	3.44	YES	2.06	0.655	0.653	YES	0.31
Strontium (Sr)-Total	0.0010	mg/L	0.0311	0.0316	YES	1.59	0.0338	0.0335	YES	0.89	0.0152	0.0147	YES	3.34
Sulfur (S)-Total	0.50	mg/L	0.53	0.5	NO		1.80	1.78	NO		0.5	0.5	NO	
Tellurium (Te)-Total	0.00020	mg/L	0.0002	0.0002	NO		0.0002	0.0002	NO		0.0002	0.0002	NO	
Thallium (Tl)-Total	0.000010	mg/L	0.00001	0.00001	NO		0.00001	0.00001	NO		0.00001	0.00001	NO	
Thorium (Th)-Total	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Tin (Sn)-Total	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Titanium (Ti)-Total	0.00030	mg/L	0.00079	0.00069	NO		0.00741	0.00742	YES	0.13	0.00296	0.00294	YES	0.68
Tungsten (W)-Total	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Uranium (U)-Total	0.000010	mg/L	0.000026	0.000026	NO		0.000077	0.000075	YES	2.63	0.000012	0.000012	NO	

	Lowest Detection Limit	Units	Duplicates											
Client Sample ID			**NDR-MARLK**	**CNC-DUP-02**			**MATR-02**	**DUP-01**			**NDR-P-01**	**CNC-DUP-02**		
Date Sampled			**11-Aug-2021**	**11-Aug-2021**	**Calculate?**	**RPD (%)**	**28-Oct-2021**	**28-Oct-2021**	**Calculate?**	**RPD (%)**	**24-Oct-2021**	**24-Oct-2021**	**Calculate?**	**RPD (%)**
Time Sampled			**16:45**	**0:00**			**11:45**	**0:00**			**11:15**	**0:00**		
Physical Tests (Water)														
Vanadium (V)-Total	0.00050	mg/L	0.0005	0.0005	NO		0.00067	0.00064	NO		0.0005	0.0005	NO	
Zinc (Zn)-Total	0.0030	mg/L	0.003	0.003	NO		0.0042	0.0035	NO		0.0077	0.0075	NO	
Zirconium (Zr)-Total	0.00020	mg/L	0.0002	0.0002	NO		0.00033	0.00031	NO		0.0002	0.0002	NO	
Dissolved Metals (Water)														
Aluminum (Al)-Dissolved	0.0010	mg/L	0.0144	0.0139	YES	3.53	0.0655	0.0666	YES	1.67	0.205	0.206	YES	0.49
Antimony (Sb)-Dissolved	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Arsenic (As)-Dissolved	0.00010	mg/L	0.00058	0.00058	YES	0.00	0.00078	0.00076	YES	2.60	0.00112	0.00112	YES	0.00
Barium (Ba)-Dissolved	0.00010	mg/L	0.00577	0.00576	YES	0.17	0.00725	0.00731	YES	0.82	0.00337	0.00336	YES	0.30
Beryllium (Be)-Dissolved	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Bismuth (Bi)-Dissolved	0.000050	mg/L	0.00005	0.00005	NO		0.00005	0.00005	NO		0.00005	0.00005	NO	
Boron (B)-Dissolved	0.010	mg/L	0.01	0.01	NO		0.015	0.015	NO		0.01	0.01	NO	
Cadmium (Cd)-Dissolved	0.0000050	mg/L	0.000005	0.000005	NO		0.0000105	0.0000108	NO		0.0000109	0.0000139	NO	
Calcium (Ca)-Dissolved	0.050	mg/L	19.1	18.5	YES	3.19	19.6	19.9	YES	1.52	9.90	9.91	YES	0.10
Cesium (Cs)-Dissolved	0.000010	mg/L	0.00001	0.00001	NO		0.00001	0.00001	NO		0.00001	0.00001	NO	
Chromium (Cr)-Dissolved	0.00010	mg/L	0.00020	0.00019	NO		0.00035	0.00041	NO		0.00061	0.00057	YES	6.78
Cobalt (Co)-Dissolved	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.00013	0.00012	NO	
Copper (Cu)-Dissolved	0.00020	mg/L	0.00031	0.00030	NO		0.00116	0.00119	YES	2.55	0.00049	0.00046	NO	
Iron (Fe)-Dissolved	0.010	mg/L	0.102	0.102	YES	0.00	0.239	0.241	YES	0.83	0.618	0.619	YES	0.16
Lead (Pb)-Dissolved	0.000050	mg/L	0.00005	0.00005	NO		0.000058	0.000061	NO		0.000137	0.000130	NO	
Lithium (Li)-Dissolved	0.0010	mg/L	0.001	0.001	NO		0.001	0.001	NO		0.001	0.001	NO	
Magnesium (Mg)-Dissolved	0.0050	mg/L	5.21	5.16	YES	0.96	5.10	5.07	YES	0.59	3.08	2.94	YES	4.65
Manganese (Mn)-Dissolved	0.00010	mg/L	0.00626	0.00616	YES	1.61	0.0163	0.0163	YES	0.00	0.0139	0.0140	YES	0.72
Molybdenum (Mo)-Dissolved	0.000050	mg/L	0.000052	0.000052	NO		0.000134	0.000132	NO		0.00005	0.00005	NO	
Nickel (Ni)-Dissolved	0.00050	mg/L	0.0005	0.0005	NO		0.00057	0.00056	NO		0.0005	0.0005	NO	
Phosphorus (P)-Dissolved	0.030	mg/L	0.03	0.03	NO		0.03	0.03	NO		0.03	0.03	NO	
Potassium (K)-Dissolved	0.050	mg/L	0.428	0.430	YES	0.47	0.535	0.536	YES	0.19	0.103	0.101	NO	
Rubidium (Rb)-Dissolved	0.00020	mg/L	0.00095	0.00099	NO		0.00133	0.00136	YES	2.23	0.00053	0.00054	NO	
Selenium (Se)-Dissolved	0.000050	mg/L	0.00005	0.000064	NO		0.000083	0.000073	NO		0.000201	0.000157	NO	
Silicon (Si)-Dissolved	0.050	mg/L	0.779	0.792	YES	1.65	2.76	2.73	YES	1.09	1.64	1.62	YES	1.23
Silver (Ag)-Dissolved	0.000010	mg/L	0.00001	0.00001	NO		0.00001	0.00001	NO		0.00001	0.00001	NO	
Sodium (Na)-Dissolved	0.050	mg/L	1.33	1.32	YES	0.75	3.25	3.32	YES	2.13	0.709	0.692	YES	2.43
Strontium (Sr)-Dissolved	0.00010	mg/L	0.0333	0.0325	YES	2.43	0.0334	0.0339	YES	1.49	0.0155	0.0157	YES	1.28
Sulfur (S)-Dissolved	0.50	mg/L	0.51	0.5	NO		1.81	2.01	NO		0.5	0.5	NO	
Tellurium (Te)-Dissolved	0.00020	mg/L	0.0002	0.0002	NO		0.0002	0.0002	NO		0.0002	0.0002	NO	
Thallium (Tl)-Dissolved	0.000010	mg/L	0.00001	0.00001	NO		0.00001	0.00001	NO		0.00001	0.00001	NO	
Thorium (Th)-Dissolved	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Tin (Sn)-Dissolved	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Titanium (Ti)-Dissolved	0.00030	mg/L	0.00043	0.00045	NO		0.00185	0.00188	YES	1.61	0.00267	0.00264	YES	1.13
Tungsten (W)-Dissolved	0.00010	mg/L	0.0001	0.0001	NO		0.0001	0.0001	NO		0.0001	0.0001	NO	
Uranium (U)-Dissolved	0.000010	mg/L	0.000024	0.000025	NO		0.000075	0.000073	YES	2.70	0.000011	0.000011	NO	
Vanadium (V)-Dissolved	0.00050	mg/L	0.0005	0.0005	NO		0.0005	0.0005	NO		0.0005	0.0005	NO	
Zinc (Zn)-Dissolved	0.0010	mg/L	0.001	0.001	NO		0.0019	0.0021	NO		0.0077	0.0078	YES	1.29
Zirconium (Zr)-Dissolved	0.00020	mg/L	0.0002	0.0002	NO		0.00025	0.00028	NO		0.00022	0.00022	NO	

	Lowest Detection Limit	Units	Duplicates											
Client Sample ID			**NDR-MARLK**	**CNC-DUP-02**			**MATR-02**	**DUP-01**			**NDR-P-01**	**CNC-DUP-02**		
Date Sampled			**11-Aug-2021**	**11-Aug-2021**	**Calculate?**	**RPD (%)**	**28-Oct-2021**	**28-Oct-2021**	**Calculate?**	**RPD (%)**	**24-Oct-2021**	**24-Oct-2021**	**Calculate?**	**RPD (%)**
Time Sampled			**16:45**	**0:00**			**11:45**	**0:00**			**11:15**	**0:00**		
Physical Tests (Water)														
Speciated Metals (Water)														
Methylmercury (as MeHg)-Total	0.000020	ug/L	0.000125	0.000120	YES	4.08		0.000157	NO		0.000133	0.000137	YES	2.96
Radiological Parameters (Water)														
Ra-226	0.011	Bq/L					0.0021	0.0022	NO					

Red shaded values indicate concentrations that exceed the data quality objective where the trip blank was greater than 2 times the reported detection limit.
YES denotes that the average of the two sample concentrations was greater than 5x the requested detection limit (RDL).
< denotes values that were less than the RDL.
Bold values indicate RPD values that were greater than 30%, and 40% for metals (inorganics and mercury), and PAHs respectively.

Table G1-2: Sediment Quality Data Assurance and Quality Control (2021)

Sample ID			WBR-S-04-S3	DUP-01-S	Calculate?	RPD (%)	NDR-MARLK-S1	DUP-02-S	Calculate?	RPD (%)
Date Sampled			24-Oct-2021	24-Oct-2021			27-Oct-2021	27-Oct-2021		
Time Sampled			16:10	0:00			15:00	0:00		
Parameter	**Lowest Detection Limit**	**Units**								
Physical Tests (Soil)										
pH	0.10	pH units	6.19	6.04	YES	2.45	5.88	5.58	YES	5.24
Particle Size (Soil)										
Gravel (4.75mm - 3in.)	1.0	%	1	1	NO		1	1	NO	
Medium Sand (0.425mm - 2.0mm)	1.0	%	47.1	47.6	YES	1.06	3.3	21.8	YES	**147.41**
Coarse Sand (2.0mm - 4.75mm)	1.0	%	3.7	3.0	NO		1	1.6	NO	
Fine Sand (0.075mm - 0.425mm)	1.0	%	35.5	35.8	YES	0.84	12.2	22.2	YES	**58.14**
Silt (0.002mm - 0.075mm)	1.0	%	8.4	9.8	YES	15.38	73.9	42.9	YES	**53.08**
Silt (0.005mm - 0.075mm)	1.0	%	6.2	8.5	YES	**31.29**	66.4	40.1	YES	**49.39**
Clay (0.002mm)	1.0	%	5.2	3.9	YES	28.57	10.6	10.9	YES	2.79
Clay (0.005mm)	1.0	%	7.4	5.1	YES	**36.80**	18.0	13.7	YES	27.13
Leachable Anions & Nutrients (Soil)										
Total Kjeldahl Nitrogen	0.12	%	0.054	0.056	NO		0.72	0.52	YES	**32.26**
Organic / Inorganic Carbon (Soil)										
Fraction Organic Carbon	0.0010	g/g	0.0146	0.0135	YES	7.83	0.151	0.132	YES	13.43
Total Organic Carbon	0.10	%	1.46	1.35	YES	7.83	15.1	13.2	YES	13.43
Metals (Soil)										
Aluminum (Al)	50	mg/kg	4270	4470	YES	4.58	11600	7800	YES	**39.18**
Antimony (Sb)	0.10	mg/kg	0.1	0.1	NO		0.16	0.14	NO	
Arsenic (As)	0.10	mg/kg	1.72	1.84	YES	6.74	4.10	3.19	YES	24.97
Barium (Ba)	0.50	mg/kg	22.7	22.0	YES	3.13	82.2	65.7	YES	22.31
Beryllium (Be)	0.10	mg/kg	0.14	0.15	NO		0.40	0.31	YES	25.35
Bismuth (Bi)	0.20	mg/kg	0.2	0.2	NO		0.2	0.2	NO	
Boron (B)	5.0	mg/kg	5	5	NO		6.4	7.8	NO	
Cadmium (Cd)	0.020	mg/kg	0.141	0.141	YES	0.00	0.728	0.583	YES	22.12
Calcium (Ca)	50	mg/kg	2290	2400	YES	4.69	12600	18000	YES	**35.29**
Chromium (Cr)	0.50	mg/kg	13.8	13.5	YES	2.20	27.0	23.0	YES	16.00
Cobalt (Co)	0.10	mg/kg	4.22	4.43	YES	4.86	6.98	6.14	YES	12.80
Copper (Cu)	0.50	mg/kg	3.48	3.61	YES	3.67	15.9	13.5	YES	16.33
Iron (Fe)	50	mg/kg	7360	7900	YES	7.08	14200	13400	YES	5.80
Lead (Pb)	0.50	mg/kg	3.17	3.47	YES	9.04	12.9	10.2	YES	23.38
Lithium (Li)	2.0	mg/kg	6.8	6.6	NO		17.4	13.7	YES	23.79
Magnesium (Mg)	20	mg/kg	2370	2340	YES	1.27	4770	5440	YES	13.12
Manganese (Mn)	1.0	mg/kg	333	339	YES	1.79	884	647	YES	**30.96**
Mercury (Hg)	0.0050	mg/kg	0.0129	0.0131	NO		0.100	0.0774	YES	25.48
Molybdenum (Mo)	0.10	mg/kg	0.1	0.1	NO		0.36	0.36	YES	0.00
Nickel (Ni)	0.50	mg/kg	7.70	7.65	YES	0.65	17.3	14.2	YES	19.68
Phosphorus (P)	50	mg/kg	255	315	YES	21.05	539	420	YES	24.82
Potassium (K)	100	mg/kg	430	470	YES	8.89	1400	960	YES	**37.29**
Selenium (Se)	0.20	mg/kg	0.2	0.2	NO		0.55	0.53	NO	
Silver (Ag)	0.10	mg/kg	0.1	0.1	NO		0.1	0.1	NO	

Sample ID			WBR-S-04-S3	DUP-01-S	Calculate?	RPD (%)	NDR-MARLK-S1	DUP-02-S	Calculate?	RPD (%)
Date Sampled			24-Oct-2021	24-Oct-2021			27-Oct-2021	27-Oct-2021		
Time Sampled			16:10	0:00			15:00	0:00		
Parameter	Lowest Detection Limit	Units								
Sodium (Na)	50	mg/kg	54	62	NO		123	116	NO	
Strontium (Sr)	0.50	mg/kg	9.34	7.75	YES	18.61	29.1	29.2	YES	0.34
Sulfur (S)	1000	mg/kg	1000	1000	NO		1700	1700	NO	
Thallium (Tl)	0.050	mg/kg	0.05	0.05	NO		0.131	0.132	NO	
Tin (Sn)	1.0	mg/kg	1	1	NO		1	1	NO	
Titanium (Ti)	1.0	mg/kg	298	311	YES	4.27	484	404	YES	18.02
Tungsten (W)	0.50	mg/kg	0.5	0.5	NO		0.5	0.5	NO	
Uranium (U)	0.050	mg/kg	0.268	0.322	YES	18.31	1.10	0.699	YES	**44.58**
Vanadium (V)	0.20	mg/kg	12.4	13.2	YES	6.25	24.8	20.5	YES	18.98
Zinc (Zn)	2.0	mg/kg	30.9	34.3	YES	10.43	114	90.5	YES	22.98
Zirconium (Zr)	1.0	mg/kg	1.5	1.6	NO		8.0	5.4	YES	**38.81**

YES denotes that the average of the two sample concentrations was greater than 5x the requested detection limit (RDL).
NO denotes values that were less than the RDL.
Bold values indicate RPD values that were greater than 30% and 40% for metals (inorganics and mercury) and PAHs, respectively.
All values less than the detection limit were set at the detection limit for analysis purposes.

Table G2-1: Surface Water Quality Data Assurance and Quality Control (2021)

Parameter	Lowest Detection Limit	WBR-S-03	CNC-DUP-02	Meets RPD Detection Limit Trigger?	RPD (%)	NDR-S-02	CNC-DUP-01	Meets RPD Detection Limit Trigger?	RPD (%)	MAT-R-02	CNC-DUP-02	Meets RPD Detection Limit Trigger?	RPD (%)
		2022-09-01	1-Sep-2022			2022-10-17	2022-10-17			2022-10-25	2022-10-25		
		13:15	0:00			13:15	0:00			15:15	0:00		
Physical Tests (Water)													
Conductivity (EC) as uS/cm	1.0	58.5	58.8	YES	0.51	86	83.60	YES	2.83	82.8	81.5	YES	1.58
Hardness (as CaCO3)	1	41.00	40.3	YES	1.72	51.00	49.50	YES	2.99	40.90	44.5	YES	8.43
pH (as pH units)	0.10	7.13	7.09	YES	0.56	7.38	7.50	YES	1.61	7.68	6.65	YES	14.38
Total Suspended Solids	3.00	8.8	9.6			3.4	5.80			5	5.7		
Total Dissolved Solids	10.0	105.00	113	YES	7.34	137.00	114.00	YES	18.33	90.00	85	YES	5.71
Acidity (as CaCO3)	2.00	3.00	3.0	NO		<2	<2			<2	<2		
Anions and Nutrients (Water)													
Alkalinity, Total (as CaCO3)	2.000	25	24.700	YES	1.21	35.5	34.90	YES	1.70	36.5	33.9	YES	7.39
Ammonia, Total (as N)	0.005	0.0315	0.0322	YES	2.20	0.0415	0.04	YES	5.96	0.014	0.0161	NO	
Bromide (Br)	0.100												
Chloride (Cl)	0.1000	<0.50	<0.50			2.98	3.09	YES	3.62	1.76	1.73	YES	1.72
Fluoride (F)	0.020	0.023	0.022	NO		<0.020	0.02			0.024	0.026	NO	
Nitrate (as N)	0.02	0.0590	0.054			0.02	0.02			0.0320	0.037		
Nitrite (as N)	0.01	<0.010	<0.010			<0.010	<0.010			<0.010	<0.010		
Phosphorus (P)-Total	0.002	0.0395	0.0054	YES	**151.89**	0.0129	0.01	YES	3.05	0.0047	0.0119	YES	**86.75**
Sulfate (SO4)	0.3	0.6	0.59			<0.30	<0.30			2.27	2.12		
Cyanides (Water)													
Cyanide, Weak Acid Diss	0.0020	<0.0020	0.002			<0.0020	<0.0020			<0.0020	<0.0020		
Cyanide, Strong Acid Dissociable (Total)	0.0020	<0.0020	<0.0020			<0.0020	0.00			<0.0020	<0.0020		
Cyanide, Free	0.00	<0.0020	<0.0020			<0.0020	<0.0020			<0.0020	<0.0020		
Inorganic Parameters													
Total Metals (Water)				NO				NO				NO	
Aluminum (Al)-Total	0.00300	0.8080	0.801	YES	0.87	0.2820	0.24	YES	15.27	0.315000	0.303	YES	3.88
Antimony (Sb)-Total	0.00010	<0.00010	<0.00010			<0.00010	<0.00010			<0.00010	<0.00010		
Arsenic (As)-Total	0.00010	0.0016	0.00154	YES	5.06	0.00105	0.00	YES	5.88	0.000620	0.00064	YES	3.17
Barium (Ba)-Total	0.000100	0.0104	0.0107	YES	2.84	0.0077	0.01	YES	8.48	0.007020	0.00705	YES	0.43
Beryllium (Be)-Total	0.000020	0.0000	0.000046	NO		<0.000020	<0.000020			<0.000020	<0.000020		
Bismuth (Bi)-Total	0.000	<0.000050	<0.000050			<0.000050	<0.000050			<0.000050	<0.000050		
Boron (B)-Total	0.0100000	<0.010	<0.010			<0.010	<0.010			<0.010	<0.010		
Cadmium (Cd)-Total	0.000	0.0000	0.000037	YES	10.26	0.000020	0.00	YES	19.46	0.000018	0.0000143	YES	23.46
Calcium (Ca)-Total	0.050000	11.60	11.8	YES	1.71	14.8	14.70	YES	0.68	12.700000	12.8	YES	0.78
Cesium (Cs)-Total	0.00001	0.0001	0.00007	YES	4.32	0.000014	<0.000010			0.000028	0.000028	NO	
Chromium (Cr)-Total	0.00010	0.0022	0.00209	YES	6.93	0.00083	0.00	YES	8.81	0.000910	0.00089	YES	2.22
Cobalt (Co)-Total	0.00010	0.0005	0.00047	YES	2.15	0.0002	0.00	NO		0.000180	0.00018	NO	
Copper (Cu)-Total	0.001	0.0024	0.002	YES	10.07	0.00092	0.00	NO		0.001250	0.00131	NO	
Iron (Fe)-Total	0.010000	1.48	1.450000	YES	2.05	0.78	0.71	YES	9.28	0.493000	0.478	YES	3.09
Lead (Pb)-Total	0.0001	0.000547	0.000555	YES	1.45	0.000265	0.00	YES	16.33	0.000190	0.000184	YES	3.21
Lithium (Li)-Total	0.0010	<0.0010	0.0013			<0.0010	<0.0010			<0.0010	<0.0010		
Magnesium (Mg)-Total	0.00500	2.99	3.0600	YES	2.31	3.52	3.44	YES	2.30	3.050000	3.06	YES	0.33
Manganese (Mn)-Total	0.00010	0.0639	0.06850	YES	6.95	0.08	0.06	YES	19.48	0.022400	0.0224	YES	0.00
Mercury (Hg)-Total	0.000100	5.26	7.22	YES	**31.41**	1.84	3.65	YES	**65.94**	4.620000	3.34	YES	**32.16**

Parameter	Lowest Detection Limit	WBR-S-03	CNC-DUP-02	Meets RPD Detection Limit Trigger?	RPD (%)	NDR-S-02	CNC-DUP-01	Meets RPD Detection Limit Trigger?	RPD (%)	MAT-R-02	CNC-DUP-02	Meets RPD Detection Limit Trigger?	RPD (%)
		2022-09-01	1-Sep-2022			2022-10-17	2022-10-17			2022-10-25	2022-10-25		
		13:15	0:00			13:15	0:00			15:15	0:00		
Molybdenum (Mo)-Total	0.00005	0.0001	0.000062	NO		0.000064	0.00	NO		0.000078	0.000083	NO	
Nickel (Ni)-Total	0.001	0.0018	0.00171	YES	3.45	0.0008	0.00	NO		0.000830	0.00081	NO	
Phosphorus (P)-Total	0.030	<0.050	0.051			<0.050	<0.050			<0.050	<0.050		
Potassium (K)-Total	0.05000	0.4190	0.40500	YES	3.40	0.271	0.25	YES	6.87	0.410000	0.416	YES	1.45
Rubidium (Rb)-Total	0.000200	0.0022	0.002120	YES	2.79	0.000840	0.00	YES	10.00	0.001320	0.00136	YES	2.99
Selenium (Se)-Total	0.00	0.0002	0.00018	YES	8.00	0.000151	0.00	NO		0.000118	0.00012	NO	
Silicon (Si)-Total	0.100000	3.53	3.48	YES	1.43	1.97	1.88	YES	4.68	2.970000	2.77	YES	6.97
Silver (Ag)-Total	0.000	<0.000010	<0.000010			<0.000010	<0.000010			<0.000010	<0.000010		
Sodium (Na)-Total	0.05000	1.08	0.9990	YES	7.79	2.73	2.68	YES	1.85	1.770000	1.75	YES	1.14
Strontium (Sr)-Total	0.0002	0.0263	0.028	YES	6.26	0.0259	0.03	YES	0.39	0.020700	0.0207	YES	0.00
Sulfur (S)-Total	0.50000	<0.50	0.69			<0.50	<0.50			0.980000	0.92	NO	
Tellurium (Te)-Total	0.000200	<0.00020	<0.00020			<0.00020	<0.00020			<0.00020	<0.00020		
Thallium (Tl)-Total	0.00001	0.0000	0.00001	NO		<0.000010	<0.000010			<0.000010	<0.000010		
Thorium (Th)-Total	0.00010	0.0002	0.00015	NO		<0.00010	<0.00010			<0.00010	<0.00010		
Tin (Sn)-Total	0.00010	<0.00010	<0.00010			<0.00010	<0.00010			<0.00010	<0.00010		
Titanium (Ti)-Total	0.00030	0.0298	0.0294	YES	1.35	0.00799	0.01	YES	23.81	0.010400	0.0103	YES	0.97
Tungsten (W)-Total	0.000100	<0.00010	<0.00010			<0.00010	<0.00010	#VALUE!		<0.00010	<0.00010		
Uranium (U)-Total	0.00001	0.0001	0.000072	YES	1.40	0.000039	0.00	YES	5.00	0.000062	0.000059	YES	4.96
Vanadium (V)-Total	0.0005	0.0020	0.0018	YES	7.37	0.00071	0.00	NO		0.000800	0.00076	NO	
Zinc (Zn)-Total	0.00300	0.0081	0.0077	NO		0.0064	0.01	NO		0.004100	0.0043	NO	
Zirconium (Zr)-Total	0.00020	0.0009	0.00079	YES	10.78	0.00033	0.00	NO		0.000340	0.00033	NO	
Dissolved Metals (Water)													
Aluminum (Al)-Dissolved	0.00100	0.331	0.307	YES	7.52	0.171	0.17	YES	1.16	0.106000	0.18	YES	**51.75**
Antimony (Sb)-Dissolved	0.00010	<0.00010	<0.00010			<0.00010	<0.00010			<0.00010	<0.00010		
Arsenic (As)-Dissolved	0.000100	0.00150	0.00150	YES	0.00	0.00091	0.00	YES	0.00	0.000510	0.00054	YES	5.71
Barium (Ba)-Dissolved	0.000100	0.007320	0.00706	YES	3.62	0.00640	0.01	YES	3.38	0.005100	0.00633	YES	21.52
Beryllium (Be)-Dissolved	0.000	0.000026	0.000027	NO		<0.000020	<0.000020			<0.000020	<0.000020		
Bismuth (Bi)-Dissolved	0.0000500	<0.000050	<0.000050			<0.000050	<0.000050			<0.000050	<0.000050		
Boron (B)-Dissolved	0.010	<0.010	<0.010			<0.010	<0.010			<0.010	<0.010		
Cadmium (Cd)-Dissolved	0.000005	0.000030	0.000030	YES	0.34	0.000016	0.00	NO		0.000012	0.0000146	NO	
Calcium (Ca)-Dissolved	0.05000	11.8	11.4	YES	3.45	14.3	13.60	YES	5.02	11.400000	12.5	YES	9.21
Cesium (Cs)-Dissolved	0.00001	<0.000010	<0.000010			<0.000010	<0.000010			<0.000010	0.000013		
Chromium (Cr)-Dissolved	0.00010	0.00107	0.00104	YES	2.84	0.00058	0.00	YES	0.00	0.000570	0.00065	YES	13.11
Cobalt (Co)-Dissolved	0.000	0.00015	0.00015	NO		0.00014	0.00	NO		<0.00010	0.00013		
Copper (Cu)-Dissolved	0.000200	0.00199	0.002	YES	0.50	0.00078	0.00	YES	0.00	0.001020	0.00116	YES	12.84
Iron (Fe)-Dissolved	0.0100	0.76	0.749000	YES	1.59	0.59	0.57	YES	1.90	0.218000	0.344	YES	**44.84**
Lead (Pb)-Dissolved	0.0001	0.000276	0.000281	YES	1.80	0.000152	0.00	NO		0.000068	0.000148	NO	
Lithium (Li)-Dissolved	0.00100	<0.0010	<0.0010			<0.0010	<0.0010			<0.0010	<0.0010		
Magnesium (Mg)-Dissolved	0.00500	2.81	2.8700	YES	2.11	3.71	3.78	YES	1.87	3.030000	3.22	YES	6.08
Manganese (Mn)-Dissolved	0.000100	0.04	0.036	YES	3.28	0.06	0.06	YES	2.10	0.010400	0.0209	YES	**67.09**
Molybdenum (Mo)-Dissolved	0.00010	0.000052	0.00005	NO		<0.000050	<0.000050			0.000072	0.000071	NO	
Nickel (Ni)-Dissolved	0.001	0.00	0.00111	NO		0.00063	0.00	NO		0.000550	0.00064	NO	
Phosphorus (P)-Dissolved	0.030	<0.050	<0.050			<0.050	<0.050			<0.050	<0.050		
Potassium (K)-Dissolved	0.05000	0.31	0.30600	YES	0.65	0.23	0.23	YES	1.75	0.321000	0.373	YES	14.99

Parameter	Lowest Detection Limit	WBR-S-03	CNC-DUP-02	Meets RPD Detection Limit Trigger?	RPD (%)	NDR-S-02	CNC-DUP-01	Meets RPD Detection Limit Trigger?	RPD (%)	MAT-R-02	CNC-DUP-02	Meets RPD Detection Limit Trigger?	RPD (%)
		2022-09-01	1-Sep-2022			2022-10-17	2022-10-17			2022-10-25	2022-10-25		
		13:15	0:00			13:15	0:00			15:15	0:00		
Rubidium (Rb)-Dissolved	0.000200	0.00119	0.001160	YES	2.55	0.00062	0.00	NO		0.000880	0.00102	YES	14.74
Selenium (Se)-Dissolved	0.000	0.00	0.00020	YES	4.51	0.000151	0.00	NO		0.000108	0.000108	NO	
Silicon (Si)-Dissolved	0.050000	2.73	2.71	YES	0.74	1.71	1.70	YES	0.59	2.280000	2.52	YES	10.00
Silver (Ag)-Dissolved	0.000	<0.000010	<0.000010			<0.000010	<0.000010			<0.000010	<0.000010		
Sodium (Na)-Dissolved	0.05000	1	1.0500	YES	4.88	2.73	2.78	YES	1.81	1.670000	1.69	YES	1.19
Strontium (Sr)-Dissolved	0.00020	0.0253	0.0254	YES	0.39	0.0260	0.03	YES	2.33	0.020200	0.0205	YES	1.47
Sulfur (S)-Dissolved	0.50	0.61	0.62	NO		<0.50	<0.50			0.940000	0.86	NO	
Tellurium (Te)-Dissolved	0.00020	<0.00020	<0.00020			<0.00020	<0.00020			<0.00020	<0.00020		
Thallium (Tl)-Dissolved	0.000010	<0.000010	<0.000010			<0.000010	<0.000010			<0.000010	<0.000010		
Thorium (Th)-Dissolved	0.00010	0.00	0.00017	NO		<0.00010	<0.00010			<0.00010	<0.00010		
Tin (Sn)-Dissolved	0.00010	<0.00010	<0.00010			<0.00010	<0.00010			<0.00010	<0.00010		
Titanium (Ti)-Dissolved	0.00030	0.0100	0.00873	YES	13.26	0.003000	0.00	YES	4.88	0.002170	0.00506	YES	**79.94**
Tungsten (W)-Dissolved	0.00010	<0.00010	<0.00010			<0.00010	<0.00010			<0.00010	<0.00010		
Uranium (U)-Dissolved	0.000010	0.000060	0.000061	YES	1.65	0.000033	0.00	NO		0.000047	0.000051	YES	8.16
Vanadium (V)-Dissolved	0.00050	0.00094	0.0009	NO		<0.00050	<0.00050			<0.00050	0.0005		
Zinc (Zn)-Dissolved	0.0010	0.01	0.00770	YES	12.41	0.005400	0.01	YES	1.83	0.003200	0.0041	YES	24.66
Zirconium (Zr)-Dissolved	0.0003	0.00079	0.00079	NO		<0.00030	0.00030			<0.00030	0.00033		
Speciated Metals (Water)													
Methylmercury (as ug/L)	0.000020		0.00204				0.00	NO			0.000086	NO	

Red shaded values indicate concentrations that exceed the data quality objective where the trip blank was greater than 2 times the reported detection limit.
YES denotes that the average of the two sample concentrations was greater than 5x the requested detection limit (RDL).
< denotes values that were less than the RDL.
Bold values indicate RPD values that were greater than 30%, and 40% for metals (inorganics and mercury), and PAHs respectively.

Table G2-2: Sediment Quality Data Assurance and Quality Control (2022)

Parameter	Lowest Detection Limit	Units	NDR-GERLK-02	CNC-DUP-01	Meets RPD Detection Limit Trigger?	RPD (%)	NDR-S-01-02	CNC-DUP-02	Meets RPD Detection Limit Trigger?	RPD (%)
			19-Oct-2022	19-Oct-22			23-Oct-2022	23-Oct-22		
			13:00	12:00			10:30	12:00		
Physical Tests										
Loss on Ignition @ 550 C	1	%								
Moisture	0.25	%	81	80.2	YES	1.12	74	78.8	YES	6.42
pH (1:2 soil:water)	0.10	pH units	6.23	6.51	YES	4.40	5.36	6.23	YES	15.01
Particle Size										
Coarse Sand/Gravel (>2mm)	1.0	%	<1.0	<1.0			<1.0	<1.0		
Medium Sand (0.5mm-2.0mm)	1.0	%	<1.0	<1.0			<1.0	<1.0		
Fine Sand (0.63mm-0.5mm)	1.0	%	15.8	11.2	YES	**34.07**	13.9	14.5	YES	4.23
Silt (0.004mm-0.063mm)	1.0	%	50.9	32.9	YES	**42.96**	68.9	65.2	YES	5.52
Clay (<0.004mm)	1.0		32.8	55.8	YES	**51.92**	16.9	20	YES	16.80
Nutrients & Organics										
Fraction Organic Carbon	0.0010	g/g		11.1				15.1		
Total Kjeldahl Nitrogen	0.020	%	0.54	0.446	YES	18.88	0.70	0.643	YES	7.77
Total Organic Carbon	0.050	%	11.9				15.4			
Metals										
Aluminum (Al)	50	mg/kg	17000	19200	YES	12.15	13100	12900	YES	1.54
Antimony (Sb)	0.10	mg/kg	0.18	0.20	NO		<0.10	<0.10		
Arsenic (As)	0.10	mg/kg	4.43	6.64	YES	**39.93**	1.83	1.77	YES	3.33
Barium (Ba)	0.50	mg/kg	168.0	179.00	YES	6.34	67.6	66.90	YES	1.04
Beryllium (Be)	0.10	mg/kg	0.61	0.63	YES	3.23	0.35	0.34	YES	2.90
Bismuth (Bi)	0.20	mg/kg	0.26	0.30	NO		<0.20	<0.20		
Boron (B)	5.0	mg/kg	12	9.3	NO		<5.0	<5.0		
Cadmium (Cd)	0.020	mg/kg	1.00	0.67	YES	**39.23**	0.64	0.56	YES	12.37
Calcium (Ca)	50	mg/kg	25600	26700	YES	4.21	10600	10000	YES	5.83
Chromium (Cr)	0.50	mg/kg	43.1	49.10	YES	13.02	26.8	26.00	YES	3.03
Cobalt (Co)	0.10	mg/kg	11.80	11.6	YES	1.71	5.05	4.94	YES	2.20
Copper (Cu)	0.50	mg/kg	21.2	28.60	YES	29.72	13.2	13.50	YES	2.25
Iron (Fe)	50	mg/kg	38100	38200	YES	0.26	9860	9640	YES	2.26
Lead (Pb)	0.50	mg/kg	20.2	24.70	YES	20.04	9.9	9.35	YES	5.82
Lithium (Li)	2.0	mg/kg	25.4	26.8	YES	5.36	13.6	13.3	YES	2.23
Magnesium (Mg)	20	mg/kg	15200	15300.00	YES	0.66	3470	3420.00	YES	1.45
Manganese (Mn)	1.0	mg/kg	914	897	YES	1.88	256	252	YES	1.57
Mercury (Hg)	0.0050	mg/kg								
Molybdenum (Mo)	0.10	mg/kg	0.39	0.61	YES	**44.00**	0.24	0.24	NO	
Nickel (Ni)	0.50	mg/kg	28.6	33	YES	14.29	12.3	12	YES	2.47
Phosphorus (P)	50	mg/kg	1110	768.00	YES	**36.42**	902	907.00	YES	0.55
Potassium (K)	100	mg/kg	2540	2800	YES	9.74	950	950	YES	0.00
Selenium (Se)	0.20	mg/kg	0.60	0.55	NO		0.68	0.66	YES	2.99
Silver (Ag)	0.10	mg/kg	0.12	0.13	NO		<0.10	<0.10		
Sodium (Na)	50	mg/kg	283	307.00	YES	8.14	116	120.00	NO	
Strontium (Sr)	0.50	mg/kg	43.1	40.3	YES	6.71	32.5	34.2	YES	5.10
Sulfur (S)	1000	mg/kg	1500	3400.00	NO		1200	1300.00	NO	
Thallium (Tl)	0.050	mg/kg	0.174	0.18	YES	3.39	0.127	0.119	NO	

Parameter	Lowest Detection Limit	Units	NDR-GERLK-02 19-Oct-2022 13:00	CNC-DUP-01 19-Oct-22 12:00	Meets RPD Detection Limit Trigger?	RPD (%)	NDR-S-01-02 23-Oct-2022 10:30	CNC-DUP-02 23-Oct-22 12:00	Meets RPD Detection Limit Trigger?	RPD (%)
Tin (Sn)	1.0	mg/kg	<2.0	<2.0			<2.0	<2.0		
Titanium (Ti)	1.0	mg/kg	651	650	YES	0.15	291	312	YES	6.97
Tungsten (W)	0.50	mg/kg	<0.50	<0.50			<0.50	<0.50		
Uranium (U)	0.050	mg/kg	0.642	0.665	YES	3.52	4.580	4.04	YES	12.53
Vanadium (V)	0.20	mg/kg	38.5	42.20	YES	9.17	22.7	23.00	YES	1.31
Zinc (Zn)	2.0	mg/kg	145.0	133	YES	8.63	59.4	57	YES	4.12
Zirconium (Zr)	1.0	mg/kg	11.9	12.00	YES	0.84	3.0	2.60	NO	

YES denotes that the average of the two sample concentrations was greater than 5x the requested detection limit (RDL).
NO denotes values that were less than the RDL.
Bold values indicate RPD values that were greater than 30% and 40% for metals (inorganics and mercury) and PAHs, respectively.
All values less than the detection limit were set at the detection limit for analysis purposes.

Table G3-1: Surface Water Quality Data Assurance and Quality Control (2023)

	Lowest Detection Limit	Blanks			Duplicates			
Sample ID		**TRIP BLANK**	**FIELD BLANK**	**FIELD BLANK**	**WBR-S-04**	**SW-DUP**		
Date Sampled		**07-Jul-2023**	**16-Jun-2023**	**17-Jul-2023**	**17-Jul-2023**	**17-Jul-2023**	**Calculate?**	**RPD (%)**
Time Sampled		**00:00**	**00:00**	**15:00**	**15:00**	**00:00**		
Physical Tests (Water)								
Conductivity	1.0	1.3	1.1	1.2	83.3	87.5	YES	4.92
Acidity (as CaCO3)	2.0	<2.0	<2.0	<2.0	3.3	3.2	NO	
Alkalinity, total (as CaCO3)	1.0	<1.0	<1.0	<1.0	47.7	61.5	YES	25.27
Hardness (as CaCO3), dissolved	0.50	<0.50	<0.50	<0.50	48.6	51.1	YES	5.02
Solids, total dissolved [TDS]	10	<10	<10	<10	92	94	YES	2.15
Solids, total suspended [TSS]	3.0	<3.0	<3.8	<3.0	5.9	3.5	NO	
pH	0.10	5.69	5.81	5.63	7.55	7.57	YES	0.26
Anions and Nutrients (Water)								
Ammonia, total (as N)	0.0050	<0.0050	0.0243	<0.0050	0.0284	0.0268	YES	5.80
Bromide	0.10	<0.10	<0.10	<0.10	<0.10	<0.10		
Chloride	0.50	<0.50	<0.50	<0.50	<0.50	<0.50		
Fluoride	0.020	<0.020	<0.020	<0.020	0.028	0.028	NO	
Nitrate (as N)	0.020	<0.020	<0.020	<0.020	0.032	0.041	NO	
Nitrite (as N)	0.010	<0.010	<0.010	<0.010	<0.010	<0.010		
Phosphorus, total	0.0020	<0.0020	0.0027	0.0411	0.0390	0.0349	YES	11.10
Sulfate (as SO4)	0.30	<0.30	<0.30	<0.30	0.44	0.51	NO	
Cyanides (Water)								
Cyanide, free	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020		
Cyanide, strong acid dissociable (Total)	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020		
Cyanide, weak acid dissociable	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020		
Total Metals (Water)							NO	
Aluminum, total	0.0030	<0.0030	<0.0030	<0.0030	1.01	0.762	YES	27.99
Antimony, total	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Arsenic, total	0.00010	<0.00010	<0.00010	<0.00010	0.00148	0.00152	YES	2.67
Barium, total	0.00010	<0.00010	<0.00010	<0.00010	0.0123	0.0110	YES	11.16
Beryllium, total	0.000020	<0.000020	<0.000020	<0.000020	0.000052	0.000040	NO	
Bismuth, total	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050		
Boron, total	0.010	<0.010	<0.010	<0.010	<0.010	<0.010		
Cadmium, total	0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000257	0.0000265	YES	3.07
Calcium, total	0.050	<0.050	<0.050	<0.050	14.5	15.1	YES	4.05
Cesium, total	0.000010	<0.000010	<0.000010	<0.000010	0.000101	0.000072	YES	**33.53**
Chromium, total	0.00050	<0.00050	<0.00050	<0.00050	0.00250	0.00195	NO	
Cobalt, total	0.00010	<0.00010	<0.00010	<0.00010	0.00059	0.00045	YES	26.92
Copper, total	0.00050	<0.00050	<0.00050	<0.00050	0.00221	0.00198	NO	
Iron, total	0.010	<0.010	<0.010	<0.010	1.51	1.27	YES	17.27

	Lowest Detection Limit	Blanks			Duplicates			
Sample ID		**TRIP BLANK**	**FIELD BLANK**	**FIELD BLANK**	**WBR-S-04**	**SW-DUP**		
Date Sampled		**07-Jul-2023**	**16-Jun-2023**	**17-Jul-2023**	**17-Jul-2023**	**17-Jul-2023**	**Calculate?**	**RPD (%)**
Time Sampled		**00:00**	**00:00**	**15:00**	**15:00**	**00:00**		
Lead, total	0.000050	<0.000050	<0.000050	<0.000050	0.000674	0.000551	YES	20.08
Lithium, total	0.0010	<0.0010	<0.0010	<0.0010	0.0018	0.0014	NO	
Magnesium, total	0.0050	<0.0050	<0.0050	<0.0050	3.65	3.79	YES	3.76
Manganese, total	0.00010	<0.00010	<0.00010	<0.00010	0.0807	0.0742	YES	8.39
Mercury, total	0.50	<0.50	<0.0000050	<0.50	3.12	2.93	YES	6.28
Molybdenum, total	0.000050	<0.000050	<0.000050	<0.000050	0.000101	0.000097	NO	
Nickel, total	0.00050	<0.00050	<0.00050	<0.00050	0.00199	0.00155	NO	
Phosphorus, total	0.050	<0.050	<0.050	<0.050	0.051	<0.050		
Potassium, total	0.050	<0.050	<0.050	<0.050	0.515	0.453	YES	12.81
Rubidium, total	0.00020	<0.00020	<0.00020	<0.00020	0.00256	0.00209	YES	20.22
Selenium, total	0.000050	<0.000050	<0.000050	<0.000050	0.000150	0.000166	NO	
Silicon, total	0.10	0.22	0.19	<0.10	3.21	2.79	YES	14.00
Silver, total	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		
Sodium, total	0.050	<0.050	<0.050	<0.050	1.28	1.40	YES	8.96
Strontium, total	0.00020	<0.00020	<0.00020	<0.00020	0.0307	0.0318	YES	3.52
Sulfur, total	0.50	<0.50	<0.50	<0.50	<0.50	<0.50		
Tellurium, total	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020		
Thallium, total	0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010		
Thorium, total	0.00010	<0.00010	<0.00010	<0.00010	0.00018	0.00018	NO	
Tin, total	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Titanium, total	0.00030	<0.00030	<0.00030	<0.00030	0.0394	0.0295	YES	28.74
Tungsten, total	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Uranium, total	0.000010	<0.000010	<0.000010	<0.000010	0.000088	0.000085	YES	3.47
Vanadium, total	0.00050	<0.00050	<0.00050	<0.00050	0.00250	0.00207	NO	
Zinc, total	0.0030	<0.0030	<0.0030	<0.0030	0.0072	0.0050	NO	
Zirconium, total	0.00020	<0.00020	<0.00020	<0.00020	0.00112	0.00106	YES	5.50
Dissolved Metals (Water)							NO	
Aluminum, dissolved	0.0010	<0.0010	<0.0010	<0.0010	0.169	0.165	YES	2.40
Antimony, dissolved	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Arsenic, dissolved	0.00010	<0.00010	<0.00010	<0.00010	0.00134	0.00128	YES	4.58
Barium, dissolved	0.00010	<0.00010	<0.00010	<0.00010	0.00635	0.00658	YES	3.56
Beryllium, dissolved	0.000020	<0.000020	<0.000020	<0.000020	0.000023	<0.000020		
Bismuth, dissolved	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050		
Boron, dissolved	0.010	<0.010	<0.010	<0.010	<0.010	<0.010		
Cadmium, dissolved	0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000198	0.0000203	NO	
Calcium, dissolved	0.050	<0.050	<0.050	<0.050	13.7	14.5	YES	5.67
Cesium, dissolved	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		

	Lowest Detection Limit	Blanks			Duplicates			
Sample ID		**TRIP BLANK**	**FIELD BLANK**	**FIELD BLANK**	**WBR-S-04**	**SW-DUP**		
Date Sampled		**07-Jul-2023**	**16-Jun-2023**	**17-Jul-2023**	**17-Jul-2023**	**17-Jul-2023**	**Calculate?**	**RPD (%)**
Time Sampled		**00:00**	**00:00**	**15:00**	**15:00**	**00:00**		
Chromium, dissolved	0.00050	<0.00050	<0.00050	<0.00050	0.00072	0.00074	NO	
Cobalt, dissolved	0.00010	<0.00010	<0.00010	<0.00010	0.00016	0.00015	NO	
Copper, dissolved	0.00020	<0.00020	<0.00020	<0.00020	0.00139	0.00150	YES	7.61
Iron, dissolved	0.010	<0.010	<0.010	<0.010	0.537	0.549	YES	2.21
Lead, dissolved	0.000050	<0.000050	<0.000050	<0.000050	0.000205	0.000207	NO	
Lithium, dissolved	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010		
Magnesium, dissolved	0.0050	<0.0050	<0.0050	<0.0050	3.49	3.61	YES	3.38
Manganese, dissolved	0.00010	<0.00010	<0.00010	<0.00010	0.0609	0.0570	YES	6.62
Molybdenum, dissolved	0.000050	<0.000050	<0.000050	<0.000050	0.000082	0.000102	NO	
Nickel, dissolved	0.00050	<0.00050	<0.00050	<0.00050	0.00070	0.00072	NO	
Phosphorus, dissolved	0.050	<0.050	<0.050	<0.050	<0.050	<0.050		
Potassium, dissolved	0.050	<0.050	<0.050	<0.050	0.241	0.267	YES	10.24
Rubidium, dissolved	0.00020	<0.00020	<0.00020	<0.00020	0.00088	0.00092	NO	
Selenium, dissolved	0.000050	<0.000050	<0.000050	<0.000050	0.000151	0.000181	NO	
Silicon, dissolved	0.050	0.177	0.150	<0.050	1.56	1.64	YES	5.00
Silver, dissolved	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		
Sodium, dissolved	0.050	<0.050	<0.050	<0.050	1.21	1.34	YES	10.20
Strontium, dissolved	0.00020	<0.00020	<0.00020	<0.00020	0.0297	0.0315	YES	5.88
Sulfur, dissolved	0.50	<0.50	<0.50	<0.50	<0.50	<0.50		
Tellurium, dissolved	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020		
Thallium, dissolved	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		
Thorium, dissolved	0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00014	NO	
Tin, dissolved	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Titanium, dissolved	0.00030	<0.00030	<0.00030	<0.00030	0.00654	0.00656	YES	0.31
Tungsten, dissolved	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Uranium, dissolved	0.000010	<0.000010	<0.000010	<0.000010	0.000066	0.000068	YES	2.99
Vanadium, dissolved	0.00050	<0.00050	<0.00050	<0.00050	0.00089	0.00092	NO	
Zinc, dissolved	0.0010	<0.0010	<0.0010	<0.0010	0.0023	0.0022	NO	
Zirconium, dissolved	0.00030	<0.00030	<0.00030	<0.00030	0.00069	0.00074	NO	
Dissolved metals filtration location	-	Field	Field	Field	Field	Field		
Speciated Metals (Water)								
Methylmercury (as MeHg), total	0.000020	<0.000020	-	<0.000020	0.000105	0.000156	YES	

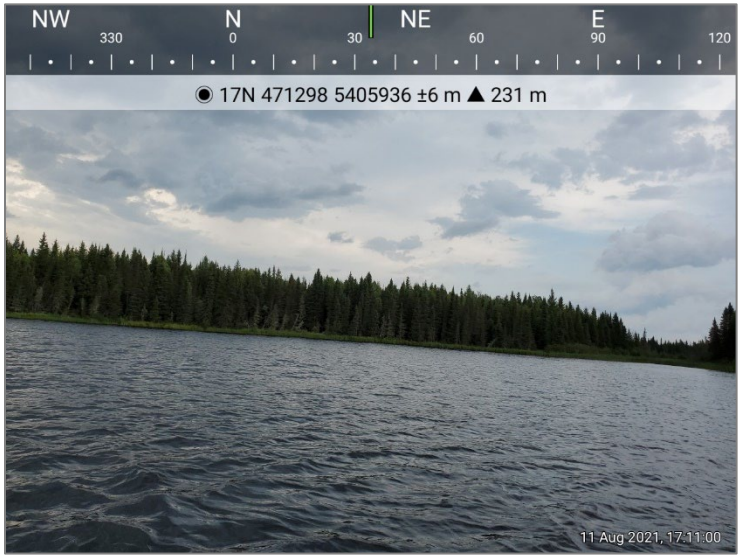
Red shaded values indicate concentrations that exceed the data quality objective where the trip blank was greater than 2 times the reported detection limit.
YES denotes that the average of the two sample concentrations was greater than 5x the requested detection limit (RDL).
< denotes values that were less than the RDL.
Bold values indicate RPD values that were greater than 30%, and 40% for metals (inorganics and mercury), and PAHs respectively.

Table G3-2: Environmental DNA Freshwater Fish Species Quality Control Summary (2023)

Kit ID	NMID	Client Label	Sample Type	Volume Filtered	Date Received	DNA Amplified	Sequencing QC	Target OTUs Detected	% Target	% Non-Target	Reported	Comment
NAS-01-04790	32025_PC	Matt-Meta-01	Client Sample	3000ml	01/6/23	Yes	Yes	Yes	100	0	Yes	Sample reported
NAS-01-04791	32026_PC	Matt-Meta-02	Client Sample	3000ml	01/6/23	Yes	Yes	Yes	100	0	Yes	Sample reported
NAS-01-04792	32027_PC	Matt-Meta-03	Client Sample	3000ml	01/6/23	Yes	Yes	Yes	100	0	Yes	Sample reported
NAS-01-04793	32028_PC	eDNA-NC-01	Client Blank	4000ml	01/6/23	No	N/A	N/A	N/A	N/A	No	No contamination detected
NAS-01-04794	32029_PC	eDNA-NC-02	Client Blank	4000ml	01/6/23	Yes	Yes	Yes	100	0	Yes	Field contamination detected, treat OTUs detected in this sample with caution throughout the Species Data Tables
NAS-01-04795	32030_PC	eDNA-NC-03	Client Blank	4000ml	01/6/23	Yes	Yes	Yes	100	0	Yes	Field contamination detected, treat OTUs detected in this sample with caution throughout the Species Data Tables

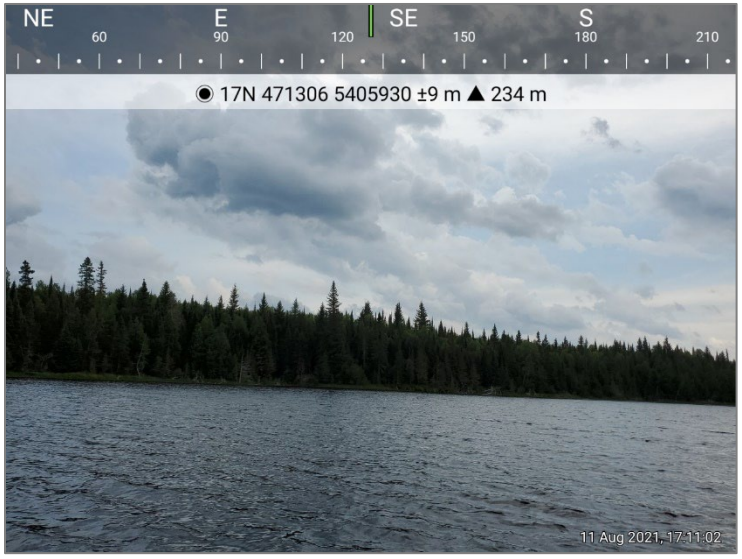
APPENDIX H

Photographic Site Record



Gerry Lake facing northeast (August 2021)

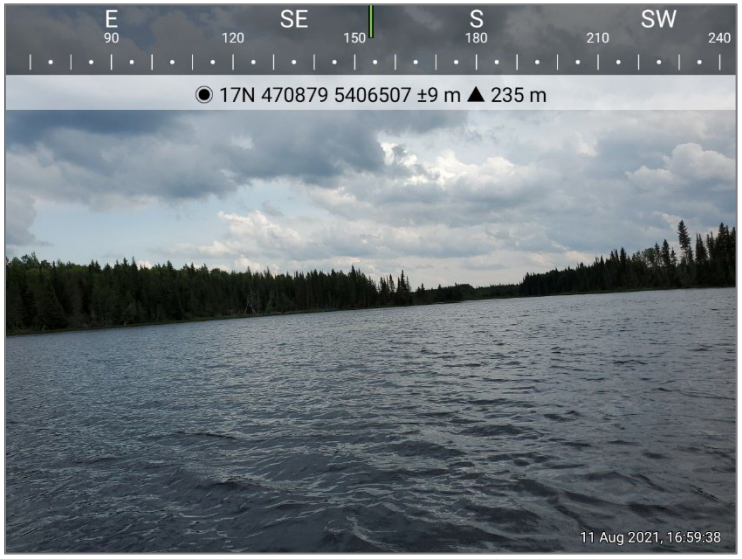

Gerry Lake facing north (October 2021)



Gerry Lake facing southeast (August 2021)


Gerry Lake facing southwest (October 2021)

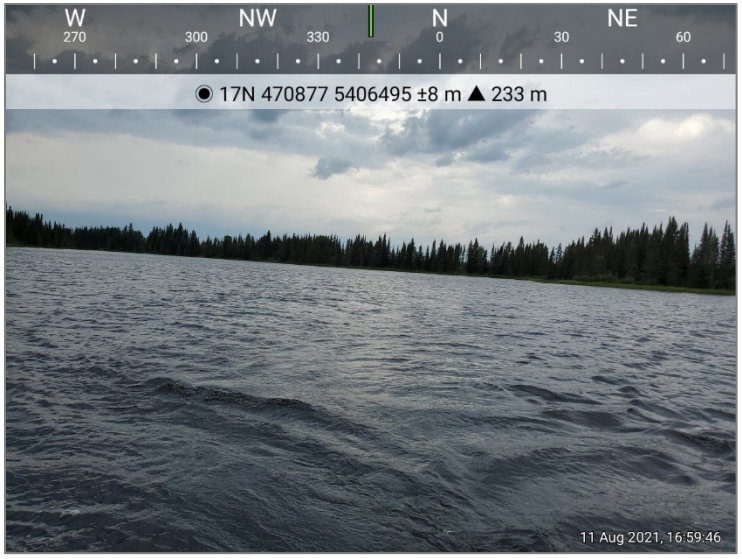
Plate H1-1: Gerry Lake (NDR-GERLK)



Martin Lake facing southeast (August 2021)



Martin Lake facing southeast (October 2021)



Martin Lake facing northwest (August 2021)



Martin Lake facing north (October 2021)

Plate H1-2: Martin Lake (NDR-MARLK)



NDR-TRIB-01 facing northwest (August 2021)



NDR-TRIB-01 facing northwest (October 2021)



NDR-TRIB-01 facing southwest (August 2021)



NDR-TRIB-01 facing southwest (October 2021)

Plate H1-3: NDR-TRIB-01



NDR-P-02 facing south (October 2021)



NDR-P-02B facing east (October 2021)

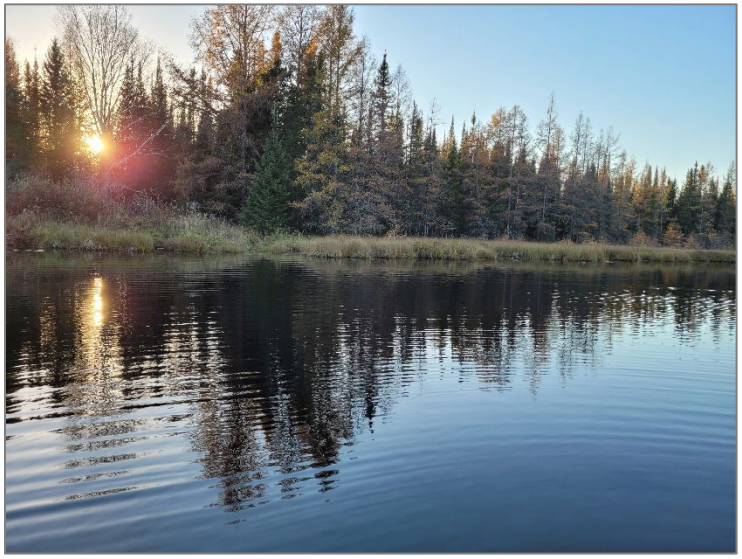


NDR-P-02B facing south (October 2021)



NDR-P-02B facing west (October 2021)

Plate H1-4: NDR-P-02/02B



NDR-P-04 facing west (October 2021)



NDR-P-04 facing north (October 2021)



NDR-P-04 facing east (October 2021)



NDR-P-04 facing south (October 2021)

Plate H1-5: NDR-P-04



NDR-P-03 facing east (October 2021)



NDR-P-03 facing south (October 2021)



NDR-P-03 Iowa Darter (*Etheostoma exile*, October 2021)



NDR-P-03 Loosely consolidated organic sediment (October 2021)

Plate H1-6: NDR-P-03



NDR-S-02 facing southeast (August 2021)



NDR-S-02 facing southeast (October 2021)



NDR-S-02 facing northwest (August 2021)



NDR-S-02 facing northwest (October 2021)

Plate H1-7: NDR-S-02



NDR-TRIB-02 facing northeast (October 2021)



NDR-TRIB-02 facing southwest (October 2021)



NDR-S-04 facing northeast (October 2021)



NDR-S-04 facing southwest (October 2021)

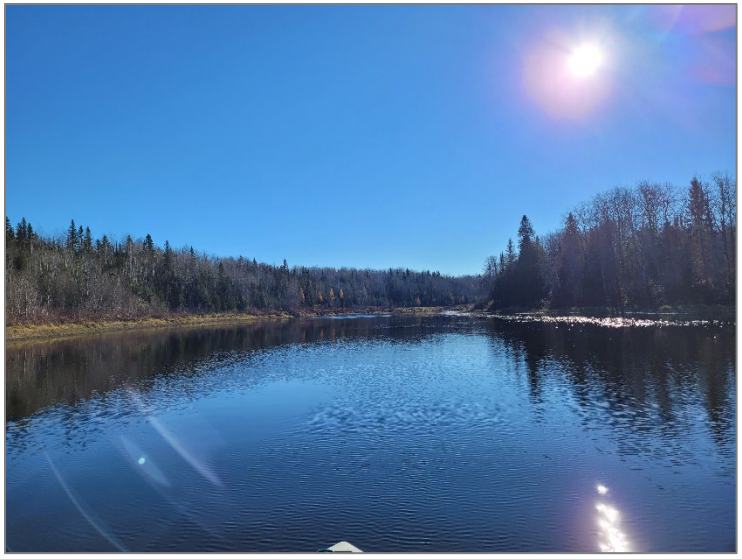
Plate H1-8: NDR-TRIB-02 and NDR-S-04



MATR-01 facing south (October 2021)



MATR-01 facing north (October 2021)



MATR-02 facing southeast (October 2021)



MATR-02 facing northwest (October 2021)

Plate H1-9: Mattagami River (MATR-01 and MATR-02)



NDR-S-01 facing south (October 2021)



NDR-S-01 facing west (October 2021)



NDR-S-01 facing north (October 2021)



NDR-S-01 *Chrosomus sp*. (October 2021)

Plate H1-10: NDR-S-01



WBR-S-01 facing south (August 2021)

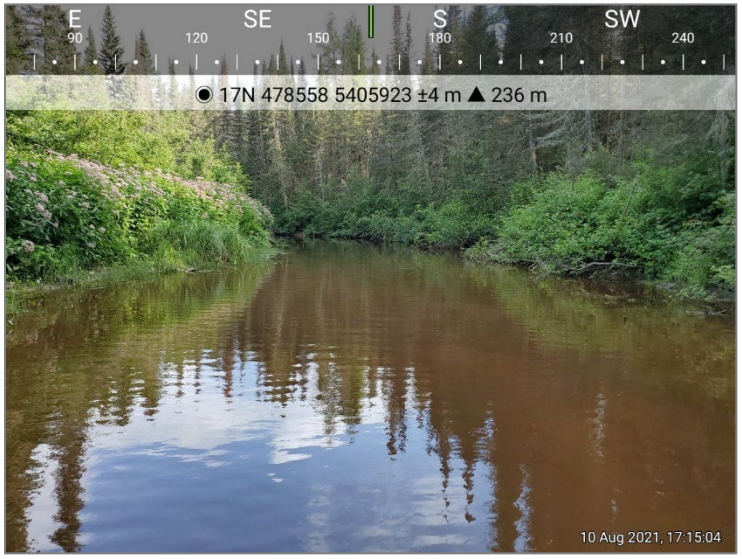

WBR-S-01 facing south (October 2021)



WBR-S-01 facing north (August 2021)


WBR-S-01 facing north (October 2021)

Plate H1-11: WBR-S-01



WBR-S-02 facing south (August 2021)



WBR-S-02 facing south (October 2021)



WBR-S-02 facing north (August 2021)



WBR-S-02 facing north (October 2021)

Plate H1-12: WBR-S-02



WBR-S-03 facing south (August 2021)



WBR-S-03 facing south (October 2021)

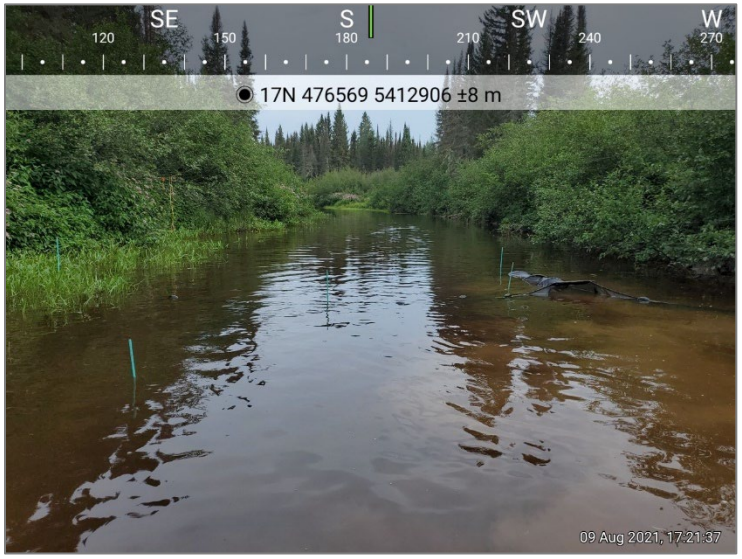


WBR-S-03 facing north (August 2021)



WBR-S-03 facing north (October 2021)

Plate H1-13: WBR-S-03



WBR-S-04 facing south (August 2021)



WBR-S-04 facing south (October 2021)

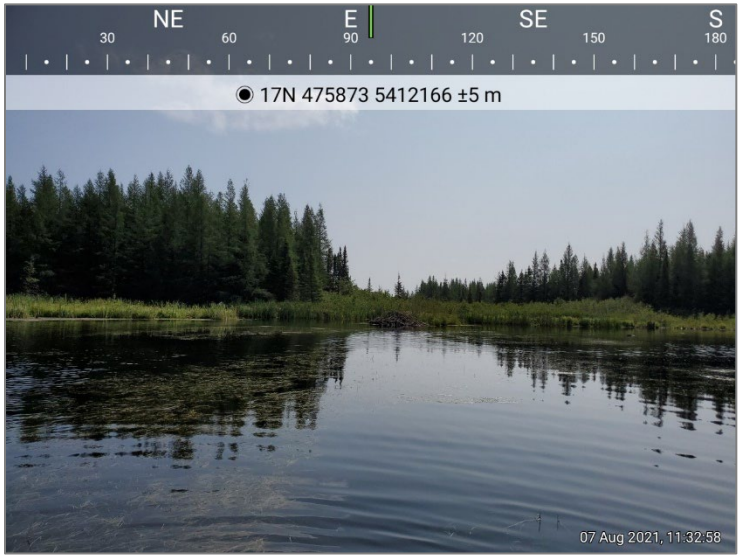


WBR-S-04 facing north (August 2021)



WBR-S-04 facing north (October 2021)

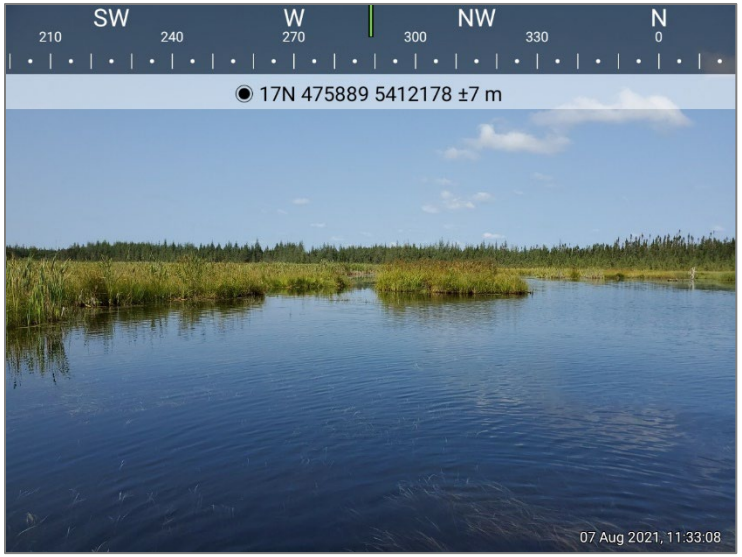
Plate H1-14: WBR-S-04



WBR-P-02 facing east (August 2021)



WBR-P-02 facing east (October 2021)

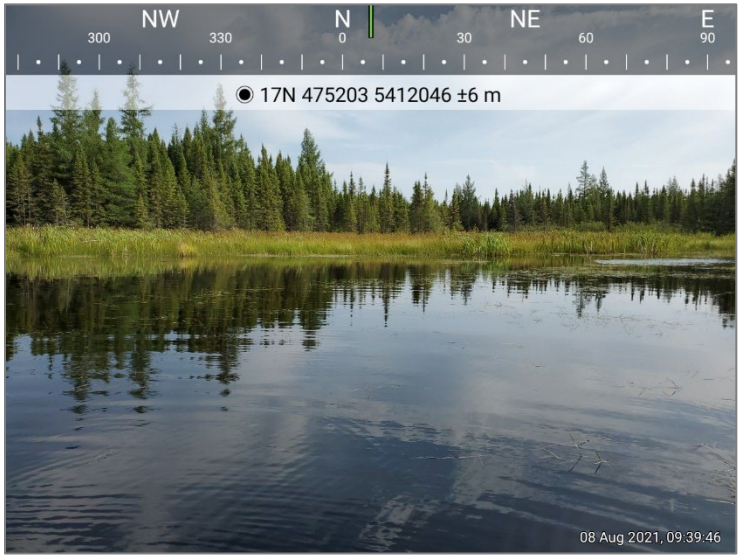


WBR-P-02 facing west (August 2021)



WBR-P-02 facing west (October 2021)

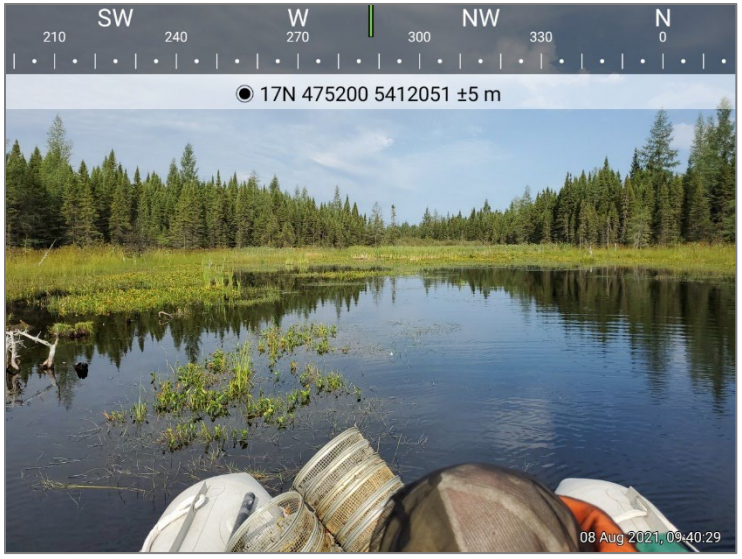
Plate H1-15: WBR-P-02



WBR-P-01 facing north (August 2021)



WBR-P-01 facing north (October 2021)



WBR-P-01 facing west (August 2021)



WBR-P-01 facing west (October 2021)

Plate H1-16: WBR-P-01



Trout-perch (*Percopsis omiscomaycus*, August 2021)



White Sucker (*Catostomus commersonii*, August 2021)



Northern Pike (*Esox lucius*, August 2021)



Juvenile Northern Pike (October 2021)

Plate H1-17: Common Fish Species



Site overview of Davis Lake (Spring 2022)



Site overview of Davis Lake (Spring 2022)



Site overview of Sutherland Lake facing southeast (Fall 2022)



Site overview of Sutherland Lake facing southwest (Fall 2022)

Plate H2-1: Davis Lake and Sutherland Lake



Site overview facing west of NDR-S-04 (Summer 2022)



Site overview of NDR-P-07 (Fall 2022)



Site overview of NDR-P-05 (Spring 2022)



Site overview of NDR-S-06 (Spring 2022)

Plate H2-2: North Driftwood River Streams and Ponds



Site overview (Spring 2022)



Clear water with woody debris and sand bottom (Spring 2022)



Site overview (Spring 2022)



Mixed deciduous and coniferous forest line lake edge (Fall 2022)

Plate H2-3: Jack Lake



Site overview facing west (Fall 2022)



Site overview (Fall 2022)



Yellow Perch (*Perca flavescens*) captured from Martin Lake (Spring 2022)



Golden Shiner (*Notemigonus crysoleucas*) captured from Martin Lake (Spring 2022)

Plate H2-4: Martin Lake



Site overview facing southeast (Fall 2022)



Site overview facing northeast (Fall 2022)



Site overview (Spring 2022)



Site overview (Spring 2022)

Plate H2-5: Gerry Lake



Site overview facing northwest (Fall 2022)



Site overview facing northeast (Fall 2022)

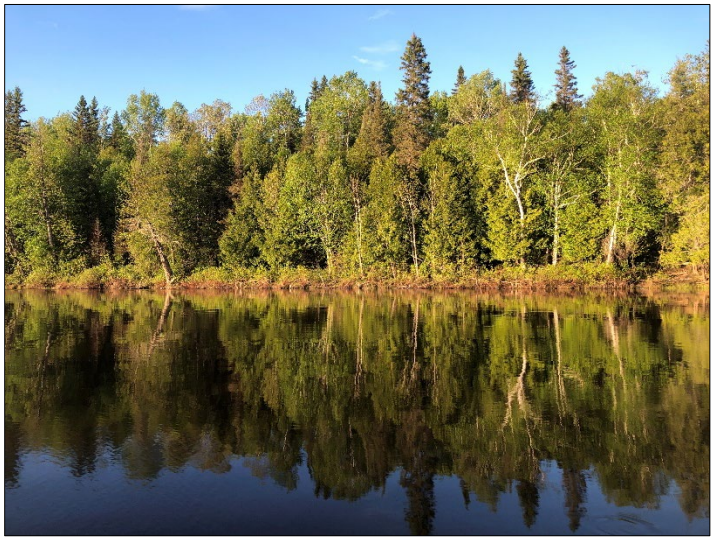


Site overview (Spring 2022)



Site overview (Spring 2022)

Plate H2-6: Jocko Creek



Site overview of Mattagami River (Spring 2022)



Site overview of Mattagami River (Spring 2022)

Plate H2-7: Mattagami River



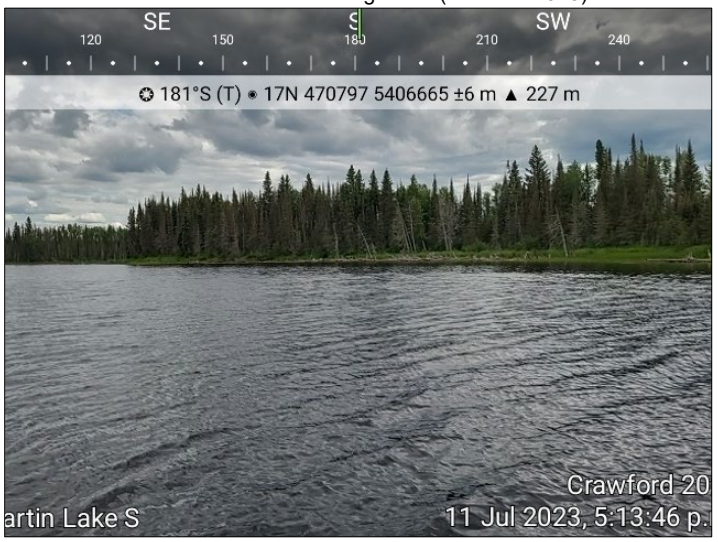
Site overview of Sutherland Lake facing south (Spring 2023)



Site overview of Sutherland Lake facing south (Summer 2023)

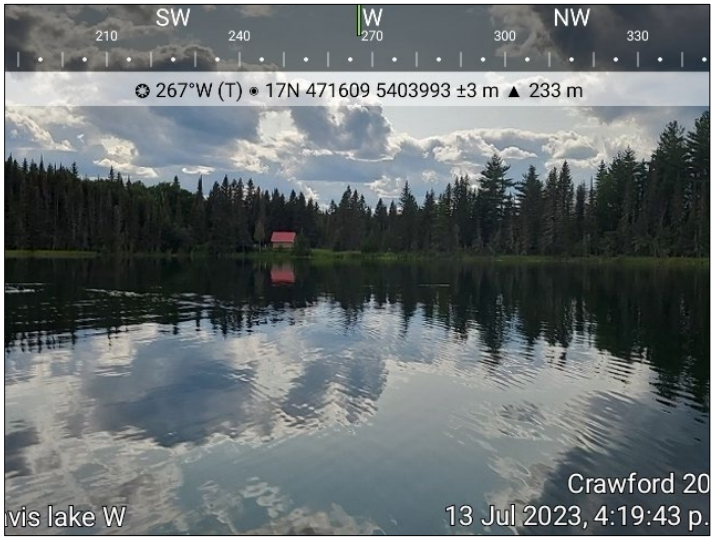


Site overview of Martin Lake facing south (Spring 2023)



Site overview of Martin Lake facing south (Summer 2023)

Plate H3-1: Sutherland Lake (NDR-SUTHLK) and Martin Lake (NDR-MARLK)



Site overview of Davis Lake facing west (Summer 2023)



Site overview of Davis Lake facing north (Summer 2023



Site overview of Gerry Lake facing southeast along the north shore (Spring 2023)



Site overview of Gerry Lake facing east along the north shore (Summer 2023)

Plate H3-2: Davis Lake (NDR-DVSLK) and Gerry Lake (NDR-GERLK)



Site overview of NDR-S-04 facing downstream (Spring 2023)



Downstream overview of NDR-S-04 (Spring 2023)



Upstream overview of NDR-S-06 facing southeast (Summer 2023)



Facing downstream in NDR-S-06 middle of site (Summer 2023)

Plate H3-3: (NDR-S-04) and (NDR-S-06)



Site overview of NDR-S-06B facing south from T2 (Spring 2023)



Site overview of NDR-S-06B facing north from T2 (Summer 2023)



Site overview of WBR-P-04 facing northeast (Spring 2023)



Site overview of WBR-P-04 facing northeast (Summer 2023)

Plate H3-4: NDR-S-06B and WBR-P-04



Spring 2023 Burbot (*Lota lota*) fingerling caught while sampling WBR-S-04



Site overview of WBR-S-04, facing downstream (Summer 2023)



Site overview facing upstream at WBR-S-07 (Spring 2023)



Overview of WBR-S-07, facing downstream (Summer 2023).

Plate H3-5: WBR-S-04 and WBR-S-07



Site overview of JCRK-0,1 facing north (Spring 2023)



Overview of JCRK-01, facing north (Summer 2023)



Site overview of JCRK-03, facing upstream from the bridge (Spring 2023)



Site overview of JCRK-03, facing upstream from the bridge (Spring 2023)

Plate H3-6: JCRK-01 and JCRK-03



Site overview of RDAL-01, facing downstream (Summer 2023)



Overview of a relic timber bridge at the proposed RDAL-01 site (Summer 2023)



Site overview of RDAL-02, facing upstream (Spring 2023)



Site overview of RDAL-02, facing upstream (Summer 2023)

Plate H3-7: RDAL-01 and RDAL-02



Field reconnaissance at RDAL-03. No watercourse was present (Spring 2023)



Field reconnaissance at RDAL-05. No watercourse was present (Summer 2023)



Overview of RDAL-04, facing south (Spring 2023)



Overview of RDAL-04, facing north (Spring 2023)

Plate H3-8: RDAL-03, RDAL-05 and RDAL-04



Overview of RDAL-06, facing upstream (Spring 2023)



Overview of RDAL-06, facing upstream (Summer 2023)



Site overview of MATR-02, facing downstream (Summer 2023).



Northern pearl dace (*Margariscus nachtriebi*) caught at JC-S-01 (Spring 2023)

Plate H3-9: RDAL-06, MATR-02 and JC-S-01



Finescale dace (*Chrosomus neogaeus*) caught at NDR-S-04 (Spring 2023)



Brook stickleback (*Culaea inconstans*) caught at NDR-S-06B (Spring 2023)



White sucker (*Catostomus commersonii*) caught at WBR-S-04 (Summer 2023)



Burbot (*Lota lota*) caught at WBR-S-04 (Summer 2023)

Plate H3-10: NDR-S-04, NDR-S-06B and WBR-S-04 Fish Species



Mottled sculpin (*Cottus bairdii*) caught at WBR-S-04 (Summer 2023)



Longnose dace (*Rhinichthys cataractae*) caught while sampling at WBR-S-04



Logperch (*Percina caprodes*) caught at WBR-S-04 (Summer 2023)



Johnny darter (*Etheostoma nigrum*) caught at WBR-S-04 (Summer 2023)

Plate H3-11: WBR-S-04 Fish Species

APPENDIX I

Field Notes

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Gerty	Gerty Lake	11/08/21	
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
Ormeng 2002		Overcast	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	1730	8	MGTB	11/08/21	(☒ Same as above)

Air Temperature:	23.65	°C	108.3 DO:	108.3	%
H2O Temperature:	23.65	°C	9.17 DO:	9.17	mg/L
pH:	7.90		0.180 TDS:	0.180	g/L
Conductivity:	270	µS/cm or mS/cm	ORP:	157.8	mV
Sample Depth:		m	Duplicate Taken:	NO	

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(☐ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	18 m	Total Water Depth	m	Total Water Depth	m
No. Tows Required	1	No. Tows Required		No. Tows Required	
Sample Date	11/08/21	Sample Date		Sample Date	
Sample Time	17:15	Sample Time		Sample Time	
Vertical Tow Length	17 m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers	1	No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

MW407

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-MARLK	Martin Lake	11/08/2021	0470885 5406511 17U
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
OMEMA 2002		Overcast / windy 25°	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	1645	3	MG	11/08/21	(☒ Same as above)

Air Temperature:	25	°C	DO:	90.8	%
H2O Temperature:	23.68	°C	DO:	7.69	mg/L
pH:	7.10		TDS:	0.079	g/L
Conductivity:	119	µS/cm or mS/cm	ORP:	106.3	mV
Sample Depth:	0.5	m	Duplicate Taken:	CNC-DUP-02	

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(☐ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID	NDR-MarLK	Sample ID		Sample ID	
Sample Location	see above	Sample Location		Sample Location	
Total Water Depth	1.05 m	Total Water Depth	m	Total Water Depth	m
No. Tows Required	1	No. Tows Required		No. Tows Required	
Sample Date	11/08/21	Sample Date		Sample Date	
Sample Time	16:45	Sample Time		Sample Time	
Vertical Tow Length	1.5 m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers	1	No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-01		08/08/21	0473172 5406511 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Ormen 2002		Rainy 21°C	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	16:30	8	MATB	08/08/21	(☒ Same as above)

Air Temperature:		°C	DO:	74.3	%
H2O Temperature:	20.82	°C	DO:	6.61	mg/L
pH:	5.79		TDS:	0.041	g/L
Conductivity:	57	µS/cm or mS/cm	ORP:	210.3	mV
Sample Depth:	0.5	m	Duplicate Taken:		

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(☐ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMC 2002

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
NDR-P-01	08/08/21 16:30	08/08/21 09:30	Beaver Pond

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1	See Net Form: Y/N
NDR-P-01-MT1	10	See GPS (MULTIPLE LOCATIONS)	MGTB		

MT

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fil.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
DSB	1		–	52	1.25	NO	NONE	N	1+	dead
DSB	2		–	57	1.31	"	"	"	1+	dead
DSB	3		–	50	0.87	"	"	"	YOY	(R) (LARGER YOY)
FSD	4		32	36	0.32	"	"	"	YOY	(R) (" ")
FSD	5		32	36	0.33	"	"	"	YOY	(R) (SMALLER YOY)
* FSD	6		20	23	0.18	"	"	"	YOY	(R) (" ")
* FSD	7		17	21	0.11	"	"	"	YOY	(R) (" ")

Dip net

Species Box Tally Area / Site Comments:

Dip net 1 – 15 freshly YOY
2 – 5 " "
3 – 3 " "
4 – 1 " –
5 – 16 freshly YOY

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fil. - Fillet or Dorsal Epaxial

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION					
Project # OMem a2002	Project Description: CNC Crawford				Date: 08/08/21
Collectors: MH + TB	Time Started: 16:30				Time Finished:
Weather Conditions: Rain/overcast					Air Temp (°C): 21°
Surface Conditions:					
Calm ○	Rippled ⊘	Wavy ○	Rough ○		
Photos Numbers and Descriptions:					

LOCATION		
Name of Waterbody: NDR-Pol	Station #:	Location of Station:
GPS Coordinates:	MTO Chainage:	
Township:	MNRF District: Timmins	

LAND USE AND POLLUTION	
Surrounding Land Use/Terrain: meadow/wetland	Sources of Pollution: overland flow

WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ○	Pond ⊘	Reservoir ○	Dug-out ○	Wetland ○
Intermittent ○	Run-off ○	Spring-Fed ○	In-stream ⊘	Bypass ○	Not connected ○

Waterbody Dimensions:	
Length (m)	Mean Width (m)

WATER CHEMISTRY
Water Colour:

					30		40		30

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	Ø	O

IN-WATER HABITAT

Underwater Cover (% surface area): 60

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
		30		70	

Vegetation Type:

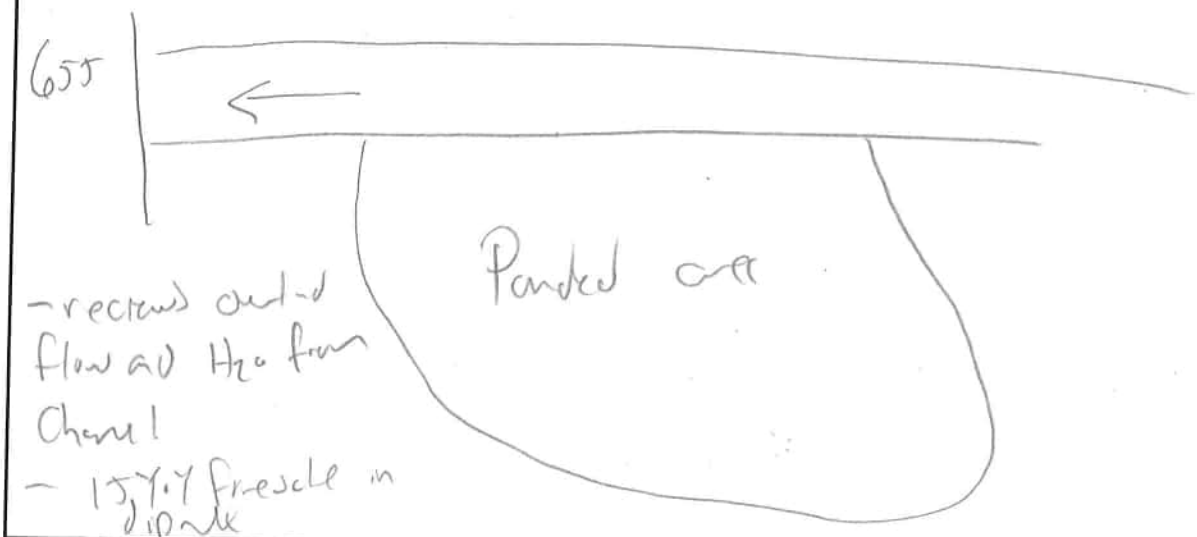
Vegetation Type (%)	Submerged 40	Floating	Emergent 60	None O
Predominant Species:	milfoil		Horsetail	

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent
		beaver dam at culvert at GJJ

POTENTIAL SIGNIFICANT HABITAT

- wetland / pond area. re.



- receives overland flow and H2O from Channel
- 15Y.Y freeze in ditch

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION			
Project #	Project Description:		Date: Aug 7/21
Collectors: MK + TD	Time Started:		Time Finished:
Weather Conditions: Sun			Air Temp (°C): 22
Surface Conditions:			
Calm ○	Rippled ○	Wavy ○	Rough ○
Photos Numbers and Descriptions:			

LOCATION		
Name of Waterbody: NDR_P-02	Station #:	Location of Station:
GPS Coordinates: 17N 040354 5408140	MTO Chainage:	
Township:	MNRF District:	

LAND USE AND POLLUTION	
Surrounding Land Use/Terrain: Forest/meadow	Sources of Pollution: Overland flow

WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ○	Pond ○	Reservoir ○	Dug-out ⊘	Wetland ○
Intermittent ○	Run-off ○	Spring-Fed ○	In-stream ○	Bypass ○	Not connected ○

Waterbody Dimensions:	
Length (m)	Mean Width (m)

WATER CHEMISTRY
Water Colour:

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	O	O

IN-WATER HABITAT

Underwater Cover (% surface area):

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other

Vegetation Type:

Vegetation Type (%)	Submerged	Floating	Emergent	None
Predominant Species:				O

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent

POTENTIAL SIGNIFICANT HABITAT

- dry
- not fish habitat
- man made
- seasonally wet
- low lying.

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NOR-P-02A	UNNAMED POND	05/08/2021	0470354 5408267
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
DIAVIA 2002	FB PHONE	HAZY, WARM, 25°C	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
NOR-P-02A	10:00	8	MGTD	05/08/2021	(☒ Same as above)	
Air Temperature:		°C		DO:	97.1	%
H2O Temperature:	22.6	°C		DO:	8.37	mg/L
pH:	7.93			TDS:	—	g/L
Conductivity:	150	µS/cm or mS/cm		ORP:	194.2	mV
Sample Depth:	0.5	m		Duplicate Taken:	N	
Comments: ORIGINAL LOCATION (-02) WAS DRY. SAMPLED NEAREST UNNAMED POND						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
					(☐ Same as above)	
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION			
Project #	Project Description: Crawford		Date: Aug 4
Collectors: MG + TB	Time Started: 13:15		Time Finished:
Weather Conditions:			Air Temp (°C):
Surface Conditions:			
Calm ⊘	Rippled ○	Wavy ○	Rough ○
Photos Numbers and Descriptions:			

LOCATION		
Name of Waterbody: NDR-P-02A	Station #:	Location of Station:
GPS Coordinates: 17U 0470354 5408267	MTO Chainage:	
Township:	MNRF District:	

LAND USE AND POLLUTION	
Surrounding Land Use/Terrain: Meadow / forest	Sources of Pollution: Overland flow

WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ○	Pond ⊘	Reservoir ○	Dug-out ○	Wetland ○
Intermittent ○	Run-off ○	Spring-Fed ○	In-stream ○	Bypass ○	Not connected ○

Waterbody Dimensions:	
Length (m)	Mean Width (m)

WATER CHEMISTRY
Water Colour:

				10	10	60	10		10

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	Ø	O

IN-WATER HABITAT

Underwater Cover (% surface area): 50

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
				100	

Vegetation Type:

Vegetation Type (%)	Submerged 60	Floating	Emergent 40	None O
Predominant Species:	milfoil - stonewort - algae	/	cattails horsetails	

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent
		X

POTENTIAL SIGNIFICANT HABITAT

- Potentially man made
- leeches / frogs
- no fish observed
- no flow in/out

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Minnow Traps

Project Site / Project Number: Crawford

wood.

Waterbody or Watercourse Name: NDR-P-02A

Start Date: (DD/MMM/YY) / **Time:** (24HR) 04/08/21 13:30

End Date: (DD / MMM / YY) / Time (24HR): 05/08/21 10:15

Area Description: (Habitat Type / Site Features) Pond / dug-out

Sample ID: NDR-P-02A

Method Effort: (Traps/Rods/Dips) 8

UTM Coordinates: (mN, mE, Zone, Acc.) Multiple See GPS

Samplers In. MCTB

Page: 1 of _____

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION			
Project #	Project Description: Crawford Cannidal		Date: Aug 4/21
Collectors: MGTB	Time Started: 12:50		Time Finished:
Weather Conditions: Sunny			Air Temp (°C): 22
Surface Conditions:			
Calm ⊘	Rippled ○	Wavy ○	Rough ○
Photos Numbers and Descriptions:			

LOCATION		
Name of Waterbody: NDR-P-02-C	Station #:	Location of Station:
GPS Coordinates: 17U 0470295 / 5408256	MTO Chainage:	
Township:	MNRF District:	

LAND USE AND POLLUTION	
Surrounding Land Use/Terrain:	Sources of Pollution:

WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ○	Pond ⊘	Reservoir ○	Dug-out ⊘	Wetland ○
Intermittent ○	Run-off ⊘	Spring-Fed ⊘	In-stream ○	Bypass ○	Not connected ○

Waterbody Dimensions:	
Length (m)	Mean Width (m)

WATER CHEMISTRY
Water Colour:

					10	50	20		20

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	⊘	O	O

IN-WATER HABITAT

Underwater Cover (% surface area): 90

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
		10		90	

Vegetation Type:

Vegetation Type (%)	Submerged	Floating	Emergent	None
	60	10	30	O
Predominant Species:	milfoil Starwort	Pondweed	cattail	

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent
		X

POTENTIAL SIGNIFICANT HABITAT

- Potential spring fed / 2 cell pond
- Man made?
- heavy veg/aquatic veg cover
- bankfull height +/- 0.5m
- bankfull width +/- 1.0m
- leeches + frogs.
- no fish observed
- & 4 minnow traps

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: Crawford

wood.

Waterbody or Watercourse Name: NDR-P-02C

Start Date: (DD/MMM/YY) / **Time:** (24HR): 04/08/21 13:00

End Date: (DD / MMM / YY) / Time (24HR): 05/08/21 10:00

Area Description: (Habitat Type / Site Features): Pond

Sample ID: NDR-P-02C-

Method Effort: (Traps/Rod#/Dips): 4

UTM Coordinates: (mN, mE, Zone, Acc.): Multiple see GPS

Samplers In.: MG TB

Page: 1 of _____

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-R03	UNNAMED POND	05/08/2021	4669847 5409437
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
OMEA2002	FB PHONE	HAZY, HOT, 25°C	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (☐ Same as above)	
NDR-P-03	12:45	9	NAM	05/08/2021		
Air Temperature:		°C		DO:	100.8	%
H2O Temperature:	23.13	°C		DO:	8.59	mg/L
pH:	7.64			TDS:	—	g/L
Conductivity:	82	µS/cm or mS/cm		ORP:	155.8	mV
Sample Depth:	0.5	m		Duplicate Taken:	NONE	
Comments: LIGHT BROWN, CLOUDY						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (☐ Same as above)	
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION			
Project #	Project Description: Crawford		Date: 5 Aug 2021
Collectors: MG + TB	Time Started: 12:00		Time Finished:
Weather Conditions: Hazy and humid			Air Temp (°C): 27
Surface Conditions:			
Calm ⊘	Rippled ○	Wavy ○	Rough ○
Photos Numbers and Descriptions:			

LOCATION		
Name of Waterbody: NDR-P-03	Station #:	Location of Station:
GPS Coordinates: 17U 4669847 5409437	MTO Chainage:	
Township:	MNRF District: Timmins.	

LAND USE AND POLLUTION	
Surrounding Land Use/Terrain: Forest (conifrous)	Sources of Pollution: overland flw / Argo Rd

WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ○	Pond ⊘	Reservoir ○	Dug-out ○	Wetland ○
Intermittent ○	Run-off ○	Spring-Fed ○	In-stream ○	Bypass ○	Not connected ○

Waterbody Dimensions:	
Length (m)	Mean Width (m)

WATER CHEMISTRY
Water Colour:

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	Ø	O

IN-WATER HABITAT

Underwater Cover (% surface area): 30

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
		20		80	

Vegetation Type:

Vegetation Type (%)	Submerged	Floating	Emergent	None
	50		50	O
Predominant Species:	Stone wort Richardson pond weed		White water lily	

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent
	Beaver dam	

POTENTIAL SIGNIFICANT HABITAT

- Uniform habitat thruout pond
- margins lined w aquatic veg
- open water thruout the centre of pond
- fish observed (cyprinidae)
- Loon + frogs.

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) ~~Dip Net~~ Minnow Trap

Project Site / Project Number: Crawford

wood.

Waterbody or Watercourse Name: NDR-P-03

Start Date: (DD/MMM/YY) / Time: (24HR) 05/08/21 13:00

End Date: (DD / MMM / YY) / Time (24HR): 06/08/21 10:00

Area Description: (Habitat Type / Site Features) Pond

Sample ID:

Method Effort: (Traps/Rods/Dips) 27

UTM Coordinates: (mN, mE, Zone, Acc.) See GPS

Samplers In.

Page: 1 of 2

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fil.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NRD	1		56	60	1.77					
	2		57	61	2.03					NRD-92+7+50+26+1
	3		54	58	2.04					
	4		47	50	1.29					
	5		54	58	1.96					
	6		56	60	2.25					
	7		58	62	2.37					
	8		52	56	1.48					
	9		57	60	1.85					
	10		48	52	1.42					
	11		52	56	1.69					
	12		59	63	2.60					
	13		52	56	1.51					
	14		52	56	1.87					
	15		57	61	2.01					
	16		52	56	1.73					
	17		46	50	1.85					
	18		48	51	1.54					
	19		50	53	1.41					
NRD	20		55	59	2.96					
BSB	21		—	48	0.81					48
	22		/	45	0.70					
	23		/	47	0.99					
	24		/	57	1.49					
	25		/	48	0.80					
	26		/	49	1.01					
	27		/	49	0.84					
	28		/	45	0.68					
	29		/	46	0.67					
	30		/	47	0.78					
	31		/	48	0.96					
	32		/	47	0.77					
	33		/	48	0.83					
	34		/	46	0.81					
	35		/	55	1.18					
	36		/	54	1.28					
	37		/	48	0.86					
	38		/	53	1.21					
	39		/	48	0.76					
	40		/	47	0.84					
Johnny Darter	41		/	32	0.23					
" "	42		/	35	0.24					
FHM	43		56	60	1.74					
	44		42	45	0.98					
	45		57	60	2.37					

Species Box Tally Area / Site Comments:

50 = 1.109

Bath weight 1 - NRD 50 = 1.109

" " 2 - NRD 26 = 50g

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fil. - Fillet or Dorsal Epaxial

0.15

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: Crawford

wood.

Waterbody or Watercourse Name: NDR-P-03

Start Date: (DD/MMM/YY) / Time: (24HR): 05/08/21 13:00

End Date: (DD / MMM / YY) / Time (24HR): 06/08/21 10:00

Area Description: (Habitat Type / Site Features): Pond

Sample ID:

Method Effort: (Traps/Rods/Dips): 27

UTM Coordinates: (mN, mE, Zone, Acc.): See GPS

Samplers In.

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FHM	46		40	42	0.75					
	47		55	60	2.00					
	48		59	64	2.67					
	49		55	60	2.30					
	50		45	48	0.96					
	51		55	59	1.37					
	52		40	43	0.68					
	53		40	43	0.65					
	54		40	43	0.64					
	55		62	66	3.24					
	56		65	69	2.13					
	57		60	66	2.97					
	58		60	65	2.52					
	59		38	41	0.81					
	60		40	43	0.85					
	61		38	41	0.72					
	62		55	59	2.31					
FHM	63		53	57	1.64					
										71
										Totals 175 - NRD - FHM - BSB

Species Box Tally Area / Site Comments: Batch weight 3 - FHM - 18 = 50g
" " 4 - BSB - 50 = 600g

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NOR-P-03-GN1	Unnamed Lake			CNC Cleanwater	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
GN	1½"	17V	0469947	5409347	4	3
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				
—	15.24	DE, MU, SE				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
FB MG	05/AUG/21	12:00	15.24	0	90	0.25	0.65	1.0

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
FB MG	05/AUG/21	15:30	1	25	23	1

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)
90	00	W	25	1	1	2.5H

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
No Catch						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By: FB

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NDR-P-03-GN2	UNNAMED LAKE			CNC CEAMON	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
GILLNET	2"	17V	0469894	5409443	4	3
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				
–	15.24	SE, MU				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
~~TB~~ MG	5-AUG-21	12:15	1	0	90	0.25	0.60	1.0

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
~~TB~~ MG	5-AUG-21	15:30	1	25	23	1

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)
90	00	W	25	1	1	2.25H

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
NO CATCH						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By: TB/MC

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NOR-P-03-GN3	UNNAMED LAKE			CRAWFORD	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr) / (cover)
GILL NET	3"	17U	0469792	5409593	4 / 3
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)			
–	15.24	MU, SI			

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
[illegible] MG	5-AUG-21	12:30	15.24	0	90	0.30	0.70	1.10

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
[illegible] MG	5-AUG-21	15:30	1	25	23	1

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)
90	00	W	25	1	1	2H

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
NO CATCH						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By: [illegible]

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NOR-P-03-GN4	UNNAMED LAKE			CRAWFORD	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr) (cover)
GILL NET	1"	17V	0469730	5409511	4 3
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)			
-	15.24	SI, MU			

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
~~FB~~								
MG								
	5-AUG-21	13:00	15.24	0	90	0.40	0.60	0.70

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)
~~FB~~						
MG						
		15:45	1	25	23	1

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)
90	00	W	25	1	1	2.75H

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
NO CATCH						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By: FB

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-04	UNNAMED POND	05/08/2021	0470331 5408339 17V
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
OMEA2002	TO PHONE	HAZY, WARM, 25°C	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
NDR-P-04	09:00	8	MGB	05/08/21	See above	(☒ Same as above)
Air Temperature:		°C		DO:	73.0	%
H2O Temperature:	21.31	°C		DO:	6.45	mg/L
pH:	5.64			TDS:	—	g/L
Conductivity:	148	µS/cm ~~or mS/cm~~		ORP:	212.6	mV
Sample Depth:	0.5	m		Duplicate Taken:	NONE	
Comments:	oil retreat / Sheen potentially from drilling equipment on Surface					

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
						(☐ Same as above)
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L	pH		Depth (m)	SW Temp (deg C)	DO %	DO mg/L		
4	16.6	9.2	0.85	6.3							
Comments:											

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION			
Project #	Project Description: Crawford		Date: Aug 7/21
Collectors: MG + TD	Time Started: 11:20		Time Finished:
Weather Conditions: Sunny 22°C			Air Temp (°C): 22
Surface Conditions:			
Calm ⊘	Rippled ○	Wavy ○	Rough ○
Photos Numbers and Descriptions:			

LOCATION		
Name of Waterbody: NDR-P-04	Station #:	Location of Station:
GPS Coordinates: 17U 0470331 5408339	MTO Chainage:	
Township:	MNRF District:	

LAND USE AND POLLUTION	
Surrounding Land Use/Terrain:	Sources of Pollution:

WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ○	Pond ⊘	Reservoir ○	Dug-out ○	Wetland ○
Intermittent ○	Run-off ○	Spring-Fed ○	In-stream ○	Bypass ○	Not connected ○

Waterbody Dimensions:	
Length (m)	Mean Width (m)

WATER CHEMISTRY
Water Colour: Mostly clear, slight tea colour

					25	25	25		25

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	⊘	O

IN-WATER HABITAT

Underwater Cover (% surface area): 10%

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
		100%			

Vegetation Type:

Vegetation Type (%)	Submerged	Floating	Emergent	None
Predominant Species:	millfoil	water lily	grasse	O

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent
✓		

POTENTIAL SIGNIFICANT HABITAT Notes

- Deep (30ft) at center of pond.
- potential spring fed?
- historic beaver activity.
- leached, aquatic invets.
- one frog.

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Traps

Project Site / Project Number: TC

wood.

Waterbody or Watercourse Name: NDR-P-04

Start Date: (DD/MMM/YY) / **Time:** (24HR): 04/AUG/21 // 1200

End Date: (DD / MMM / YY) / Time (24HR): 05/AUG/21 // 09:30

Area Description: (Habitat Type / Site Features): DEEP POND

Sample ID: NDR-P-04-MT1

Method Effort: (Traps/Rods/Dips): 15

UTM Coordinates: (mN, mE, Zone, Acc.): MULTIPLE UTM (SEE TB GPS)

Samplers In.: FB/MG

Page: 1 of _____

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NOR-S-01		08/08/2021	0457543 9 5406474 17V
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Omenica 2021			

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (☒ Same as above)	
NOR-S-01	14:15	9	MLMB	08/08/21		
Air Temperature:	23	°C		DO:	66.4	%
H2O Temperature:	19.79	°C		DO:	6.06	mg/L
pH:	4.54			TDS:	0.038	g/L
Conductivity:	53	µS/cm or mS/cm		ORP:	278.1	mV
Sample Depth:	0.5	m		Duplicate Taken:		
Comments:						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (☐ Same as above)	
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION					
Project #: OMEMA 2002	Project Description: CNC Crawford				Date: 08/08/21
Collectors: MG + TD	Time Started: 14:30				Time Finished:
Weather Conditions: Overcast / windy					Air Temp (°C): 23
Surface Conditions:					
Calm: O	Rippled: Ø	Wavy: O	Rough: O		
Photos Numbers and Descriptions:					

LOCATION		
Name of Waterbody:	Station #:	Location of Station:
GPS Coordinates: 17N 0457543 5406474	MTO Chainage:	
Township:	MNRF District: Timmins	

LAND USE AND POLLUTION	
Surrounding Land Use/Terrain: Meadow / wetland	Sources of Pollution:

WATERBODY TYPE AND MORPHOLOGY					
Large Lake: O	Small Lake: O	Pond: Ø	Reservoir: O	Dug-out: O	Wetland: O
Intermittent: O	Run-off: O	Spring-Fed: O	In-stream: Ø	Bypass: O	Not connected: O

Waterbody Dimensions:	
Length (m)	Mean Width (m)

WATER CHEMISTRY
Water Colour:

					40	40	20		

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	⊘	O

IN-WATER HABITAT

Underwater Cover (% surface area): 10

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
		40		60	

Vegetation Type:

Vegetation Type (%)	Submerged	Floating	Emergent	None
	30		70	O
Predominant Species:	milfoil		Lily pad cattails	

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent
		X beaver dam

POTENTIAL SIGNIFICANT HABITAT

- large beaver dam mid stream creating large ponded habitat
- meadow / wetland surrounding
- typical beaver habitat.

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: CNC Crawford

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
	09/08/21 15:00	09/08/21 10:30	Bear Pond

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of _____
NDR-S-01	14 ~~11~~	05575439 5706474	MG+TB	See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fil.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Pearl dace	1		102	111	11.89					
Pearl dace	2		108	117	13.28					
PD	3		106	114	15.79					
PD	4		96	103	10.00					
PD	5		97	104	9.63					
PD	6		90	97	8.48					
PD	7		89	94	8.08					Bath weight - 50 = 230
	8		60	64	2.79					
	9		60	64	2.59					
	10		47	50	1.37					
	11		48	52	1.13					
	12		54	59	1.72					
	13		51	56	1.59					
	14		53	57	1.98					
	15		48	52	1.24					
	16		68	73	2.89					
	17		90	98	8.01					
	18		97	104	10.23					
	19		63	68	2.24					
PD	20		67	72	3.25					
FS	21		67	71	5.58					
FS	22		57	61	1.98					
FS	23		62	65	2.59					
FS	24		37	40	0.69					Bath weight - 50 = 130
FS	25		40	43	0.87					
FS	26		48	52	1.23					
FS	27		54	58	1.79					
FS	28		39	42	0.77					
FS	29		54	58	1.63					
Fine Scale	30		49	52	1.35					
NRD	31		51	54	1.59					NRD: 1
NRD	32		43	46	0.97					
NRD	33		57	61	2.03					
NRD	34		44	47	1.35					
NRD	35		54	58	2.03					
NRD	36		44	47	1.04					
NRD	37		49	52	1.52					
NRD	38		43	47	0.88					
NRD	39		47	50	1.03					
NRD	40		47	51	1.03					
FHM	41		43	46	1.00					FHM:
DSB	42		-	42	0.34					DSB
BSB	43		-	51	1.18					
BSB	44		-	46	0.96					
FHM	45		55	59	1.87					

Species Box Tally Area / Site Comments:

~~Bathtub~~

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fil. - Fillet or Dorsal Epaxial

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-02		11/08/21	0472050 5408740 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMEMG2002		Mostly sunny	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
NDR-S-02	10:30	8	MG+DB	11/08/21	0472050 5408740 17U	(□ Same as above)
Air Temperature:	24	°C		DO:	~~38.1~~ 60.7	%
H2O Temperature:	20.70	°C		DO:	3.40 5.18	mg/L
pH:	6.62			TDS:	0.093	g/L
Conductivity:	131	µS/cm or ~~mS/cm~~		ORP:	90.3	mV
Sample Depth:	0.5	m		Duplicate Taken:	NO	
Comments:						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
						(□ Same as above)
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. ____ of ____ Page No. 1 of 1

Stream Name

Date (yyyy-mm-dd) 2011-09-11

Stream Code: NDR-S-02

Site Code: NDR-S02

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 20.+
Right Entrenchment Width (m): 26.+
Total Entrenchment Width (m): 46.+

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): ____
Point Spacing (m): ____

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	1.0	320	☐ Yes ☐ No
Right BFD	12.66	0	
Max. Chann. Depth	5.0	930	
Left Active Chann.	2.28	320	
Right Active Chann.	11.61	320	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	1.0	0				.
02	1.1	160	0			.
03	1.3	200	0			.
04	1.5	230	0			.
05	1.7	250	0			.
06	1.9	260	0			.
07	2.2	290	0			.
08	2.28	320	0			.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
09	2.4		30			.
10	2.5		180			.
11	3.0		420			.
12	3.5		580			.
13	4.0		690			.
14	4.5		850			.
15	5.0		930			.
16	5.5		890			.
17	6.0		880			.
18	6.5		860			.
19	7.0		870			.
20	7.5		890			.

Comments: See Trav for GPS

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey Must be filled out for processing

Transect No. ____ of ____ Page No. 2 of 2

Stream Name

Date (yyyy-mm-dd) 2021-08-11

Stream Code: NOR-S-02

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others

L

R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	8.0		880			
22	8.5		830			
23	9.0		760			
24	9.5		610			
25	10.0		470			
26	10.5		240			
27	11.0		160			
28	11.5		120			
29	11.7		60			
30	11.81	320	0			
31	12.0	290	0			
32	12.2	280	0			
33	12.4	190	0			
34	12.5	100	0			
35	12.6	60	0			
36	12.66	0				

Comments

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected

Rapid Assessment Methodology Field Form

Mandatory Fields In Grey
Must be filled out for processing

Stream Code | Site Code | Sample

Date: YY 2021 – MM 08 – DD 11

Site Type: ☐ Calibration ☐ Survey

Stream Name: NDR-S-02

Crew Leader (initial & last name):

Crew: MG + TB

Recorder: MG

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm								
101 - 600 mm		12						
601 - 1000 mm	04	08						
> 1000 mm	05	01						
Total # Points	09	21						

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points	+	+	06	20	03	+

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle	30			
Maximum Particle	23	07		

Bank Stability

Mean Stream Width (m): . | Mean Depth at Crossover (mm): | Maximum Particle Size (mm):

Eroding Bank		Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank	.	Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank		Angle > 45°, non-erodible material/soil
Deposition Zone	10	Angle < 45°, (gradual slope from river), fine grained sediments

Comments: 5 transects of 6 observation points

Ent/Scanned | Verified | Corrected

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Seine net

Project Site / Project Number: CNC Crawford

wood.

Waterbody or Watercourse Name: NDR-S-02

Start Date: (DD/MMM/YY) / **Time:** (24HR): 10/09/21 11:00

End Date: (DD / MMM / YY) / Time (24HR): 10/09/21

Area Description: (Habitat Type / Site Features): River

Sample ID: NDR-S-02

Method Effort: (Traps/Rods/Dips)

UTM Coordinates: (mN, mE, Zone, Acc.): See GPS

Samplers In. MC + TD

Page: 1 of _____

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Shiner SP										Seine ☒ ☒
Golden Shiner	1		57	63	1.61					
GS	2		54	61	1.61					
GS	3		55	62	2.54					
Blacknose Shiner	4		53	60	1.46					
GS	5		63	71	2.56					
GS	6		53	61	1.85					
N. Pike	7		98	104	5.81					
W. Sucker	8		37	40	0.46					
W.S.	9		38	42	0.58					
W.S.	10		42	46	0.65					
W.S	11		39	42	0.57					
W.S	12		49	53	1.04					
W.S	13		40	43	0.68					
W.S	14		43	46	0.75					
G.S.	15		55	62	1.51					
G.S	16		55	62	1.54					
G.S.	17		57	62	1.60					
Blacknose	18		50	57	1.54					
GS	19		52	59	1.37					
GS	20		53	60	1.30					
GS	21		56	64	1.75					
GS	22		47	52	1.86					
GS	23		55	62	1.63					
GS	24		52	59	1.30					
GS	25		33	37	0.30					
Pearl dace	26		43	47	0.87					
Pearl dace	27		43	46	0.80					
Pearl dace	28		43	47	0.82					

Species Box Tally Area / Site Comments:

White Sucker - 12 Tally

YOY Cyprinid - 21

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Dipnet

Project Site / Project Number: omemc2002

wood.

Waterbody or Watercourse Name: NDR-S-02

Start Date: (DD/MMM/YY) / **Time:** (24HR): 11/08/21 10:15

End Date: (DD / MMM / YY) / Time (24HR):

Area Description: (Habitat Type / Site Features): River

Sample ID: NDR-S-02

Method Effort: (Traps/Rods/Dips): 2

UTM Coordinates: (mN, mE, Zone, Acc.)

Samplers In.: TB

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Northern Pike	1								YOY	Dipnet 1
YOY Cyprinid										12 dipnet 2

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-04		06/08/2021	0470370 5412387 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMEMA2002			

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	13:15	9	MG/TS	06/08/21	(☒ Same as above)

Air Temperature:		°C	DO:	42.8	%
H2O Temperature:	19.7	°C	DO:	3.92	mg/L
pH:	6.7		TDS:	0.106	g/L
Conductivity:	147	µS/cm or mS/cm	ORP:	165.4	mV
Sample Depth:	0.5	m	Duplicate Taken:	NO	

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(☐ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

ELECTROFISHING FORM

Project Site / Project Number: CNC Crowfoot

wood.

Waterbody or Watercourse Name:	Date: (DD / MMM / YY)	Water Temp:	Shocking Method:	Pg: 1 of 1 Run: 1 of 1
NDR-S-04	06/08/21	19.7u	backpack	

UTM Start: 17u	Start Time: (24 hrs)	Stop Time: (24 hrs)	Netters:	Site Area / Description: (Length X Width)
0470369 5412362	13:00	13:30	Mat Tb	
UTM End: 0470382 5412405				

Sample ID:	Elapsed Time: (hours)	Effort: (seconds)	Voltage / % Power:	Frequency / Range (high/low):	Pulse:
		670	350	35	

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
N. Pike	1		143	153	16.98	/	/	/	1+	
BSB	2		—	48	0.75	/	/	/	1+	
~~SD~~ BSB	3		—	42	0.67	/	/	/	1+	
BSB	4		/	26	0.14	/	/	/	YOY	
—	~~5~~									

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch	QA/QC By:
				Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Seine Net 1 / 2

Project Site / Project Number: CNC Crawford

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
NDR-S-04	06/08/21 13:30	06/08/21 14:20	Stream

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1
	2	17U 0470379 5412598	MG/TB	See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fil.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Golden Shiner	1		49	54	1.34					Seine 1
GS	2		48	53	1.01					
GS	3		43	49	0.77					
GS YOY	4		41	46	0.71					
Spottail YOY	5		29	33	0.23					
Spottail YOY	6		23	26	0.12					
BSB	7		-	25	0.14					
GS	8		39	46	0.62					Seine 1
WS YOY	9		41	44	0.75					Seine 2
BSB	10		-	43	0.74					
JD	11		-	32	0.25					
JD	12		-	26	0.17					
JD	13		-	28	0.18					
WS	14		166	179	51.58					

Species Box Tally Area / Site Comments:

S - Spottail - SN1

2 - Spottail - SN2

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fil. - Fillet or Dorsal Epaxial

Rapid Assessment Methodology Field Form

Mandatory Fields In Grey
Must be filled out for processing

Stream Code: NOR-S-04
Site Code:
Sample:
Date: YY 2021 – MM 08 – DD 06
Site Type: ☐ Calibration ☑ Survey
Stream Name:
Crew Leader (initial & last name): T BAETZ
Crew: MG
Recorder: MG

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm		01						
101 - 600 mm	03	24						
601 - 1000 mm	01	01						
> 1000 mm								
Total # Points	04	26						

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points	06	01	08	15	01	

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle	15	11	05	
Maximum Particle	09	14	07	

MAX
.56
-110
-540

Bank Stability

Mean Stream Width (m): . Mean Depth at Crossover (mm): Maximum Particle Size (mm):

Eroding Bank	06	Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank	02	Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank	02	Angle > 45°, non-erodible material/soil
Deposition Zone		Angle < 45°, (gradual slope from river), fine grained sediments

Comments

5 TRANSECTS WITH 6 OBSERVATION POINTS = ~50 m REACH
T1 - DS of beaver dam
T3 - Placed Stone at crossing

Ent/Scanned	Verified	Corrected

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. ____ of ____ | Page No. 2 of 2

Stream Name

Date (yyyy-mm-dd) 2021-08-06

Stream Code

Site Code NDR-S-04

Sample

Record only on the 1st transect.

Site Length (m) ____.____

Transect Spacing (m) ____.____

Discharge Approximates Baseflow?
☐ Yes ☐ No

Obstructions to Flow
(Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m) ____.____

Right Entrenchment Width (m) ____.____

Total Entrenchment Width (m) ____.____

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m) ____.____

Point Spacing (m) ____.____

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	____.____		☐ Yes ☐ No
Right BFD	____.____		
Max. Chann. Depth	____.____		
Left Active Chann.	____.____		
Right Active Chann.	____.____		

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	8.0		080			.____
22	8.2		045			.____
23	8.34	380		0		.____
24	8.5	360		0		.____
25	8.8	360		0		.____
26	9.0	350		0		.____
27	9.1	150		0		.____
28	9.15	100		0		.____
29	9.20	050	6			.____
30	9.24	000	0			.____

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
29	9.20	050	6			.____
30	9.24	000	0			.____
	.____					.____
	.____					.____
	.____					.____
	.____					.____
	.____					.____
	.____					.____
	.____					.____
	.____					.____
	.____					.____
	.____					.____
	.____					.____

Comments

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 5 | Page No. 1 of 2

Stream Name:

Date (yyyy-mm-dd): 2021-08-06

Stream Code: NOR-S-04

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m): ~50.0

Transect Spacing (m): ~10.0

Discharge Approximates Baseflow? ☑ Yes ☐ No

Obstructions to Flow (*Check all applicable types*)

- ☑ None Present
- ☐ Armouring
- ☐ Trampled Banks
- ☐ Inlets
- ☐ Wood Deflectors
- ☐ Other
- ☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☑	☑
Bank Material	☑	☑
Top of Point Bar	☐	☐
Vegetation	☑	☑
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	1.0	0	☑ Yes ☐ No
Right BFD	9.24	0	
Max. Chann. Depth	5.0	840	
Left Active Chann.	1.62	380	
Right Active Chann.	8.34	380	

Velocity Measurements (*Recommended depth ratio from stream bottom is 0.4 m*)

	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Left Active Chann.	160			
Right Active Chann.	0			

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	1.05	110	0			
02	1.16	205	0			
03	1.30	235	0			
04	1.40	240	0			
05	1.50	280	0			
06	1.60	340	0			
07	1.62	380	160			
08	1.80		280			
09	2.0		280			
10	2.5		270			
11	3.0		290			
12	3.5		310			
13	4.0		350			
14	4.5		380			
15	5.0		460			
16	5.5		430			
17	6.0		390			
18	6.5		290			
19	7.0		270			
20	7.5		200			

Comments: 170 - 0470349 5412381

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-TRIB-01		11/08/2021	0471523 5406902 17U
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-TRIB-01	1545	8	TB	11/08/21	(☒ Same as above)

Air Temperature:	25.5	°C	DO:	26.1	%
H2O Temperature:	21.65	°C	DO:	2.30	mg/L
pH:	6.39		TDS:	0.091	g/L
Conductivity:	130	µS/cm or mS/cm	ORP:	118.7	mV
Sample Depth:	0.5	m	Duplicate Taken:		

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(☐ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

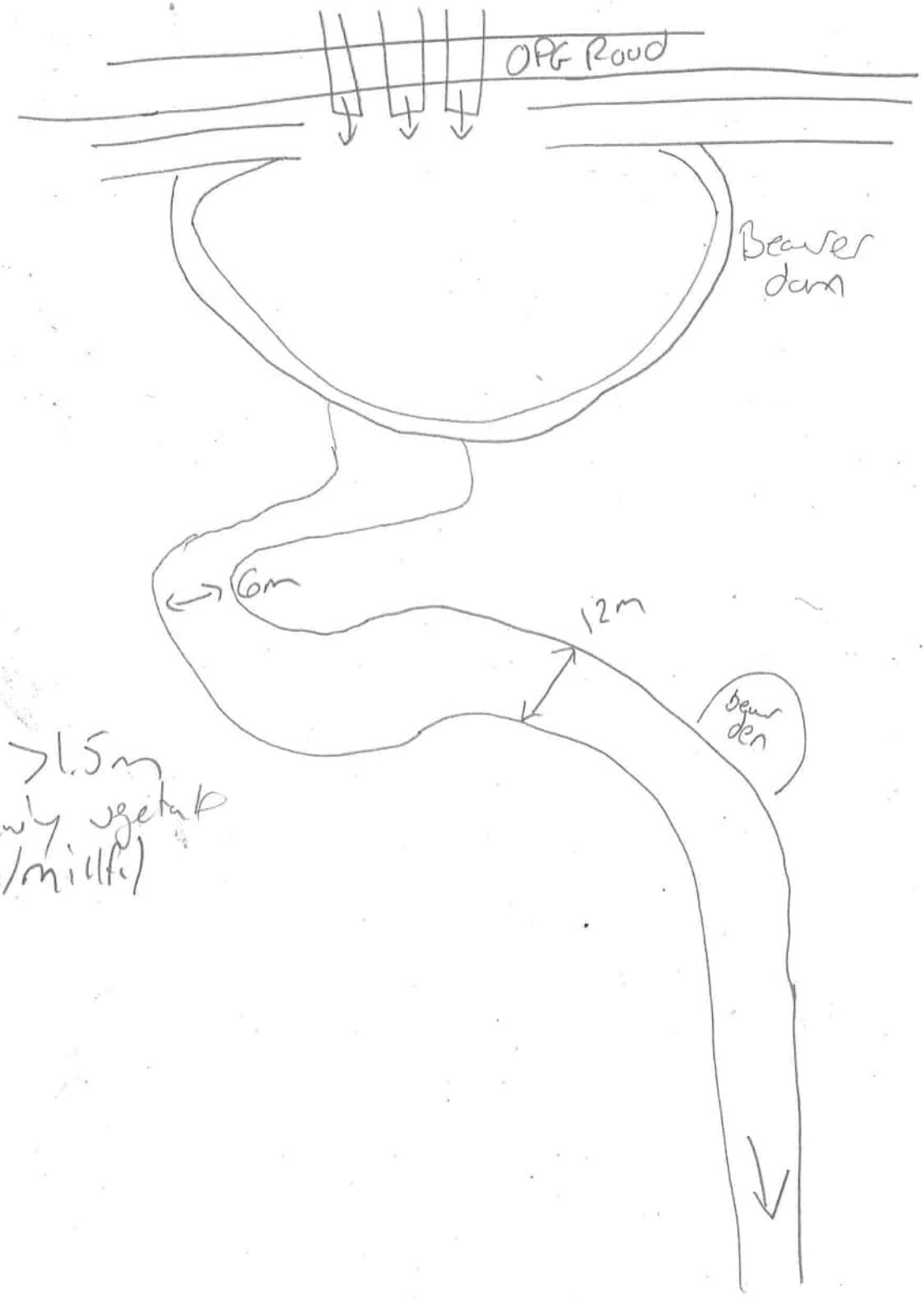
Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.



deep >1.5m
- banks newly vegetated
- horsetails / milfoil

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) 17V
NOR-TMD-02		11/08/21	0471050 5709487
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
		Partly Cloudy 2°C	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	13:00	8	MeTB	11/08/21	(Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:	13.93	°C	DO:		mg/L
pH:	2.97		TDS:		g/L
Conductivity:	44	µS/cm or mS/cm	ORP:		mV
Sample Depth:	~~0.5~~ 1.0	m	Duplicate Taken:		

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	13:00	8			(□ Same as above)

Air Temperature:	~~10.14~~	°C	DO:	7.0	%
H2O Temperature:	10.17	°C	DO:	0.66	mg/L
pH:	5.53		TDS:	0.026	g/L
Conductivity:	55	µS/cm or mS/cm	ORP:	122.3	mV
Sample Depth:	~~0.5~~ 0.5	m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

Rapid Assessment Methodology Field Form

Mandatory Fields In Grey
Must be filled out for processing

Stream Code | Site Code | Sample

Date YY MM DD: 2011 - 08 - 11

Site Type: ☐ Calibration ☐ Survey

Stream Name: ~~ARD~~ NDR. Trib 02

Crew Leader (initial & last name) | Crew | Recorder

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm								
101 - 600 mm								
601 - 1000 mm								
> 1000 mm	03	09						
Total # Points	03	09						

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points			03	04	06	

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle	09			
Maximum Particle	09			

Bank Stability

Mean Stream Width (m): 1.60 | Mean Depth at Crossover (mm): | Maximum Particle Size (mm):

Eroding Bank	06	Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank		Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank		Angle > 45°, non-erodible material/soil
Deposition Zone		Angle < 45°, (gradual slope from river), fine grained sediments

Comments: 3 observation at 3 transect

Ent/Scanned | Verified | Corrected

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Dipnet

Project Site / Project Number:

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
	11/08/21 13:00	11/08/21	Stream

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1
NDR-TR.5-02		0471050 5409487	MCB	See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fil.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Finescale YoY										

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. ____ of ____ Page No. 1 of ____

Stream Name

Date (yyyy-mm-dd) 2021-08-11

Stream Code: NOR-T15-02

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow?
☐ Yes ☐ No

Obstructions to Flow
(Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	1.4	0	☐ Yes ☐ No
Right BFD	0.0	160	
Max. Chann. Depth	0.5	114	
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	1.4		105			.
02	1.1		110			.
03	0.9		114			.
04	0.5		110			.
05	0.2		101			.
06	0.0	0				.
	.					.
	.					.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

Comments

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) 17V
	WBR-P-61	07/08/21	0475225 5412044
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Omen 2002			

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	13:30	8	MG TB	07/08/21	(☒ Same as above)

Air Temperature:		°C	DO:	71.4	%
H2O Temperature:	21.41	°C	DO:	6.32	mg/L
pH:	6.21		TDS:	0.036	g/L
Conductivity:	52	µS/cm or mS/cm	ORP:	165.1	mV
Sample Depth:	0.5	m	Duplicate Taken:	N	

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(☐ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

0.47

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: CNC Crawford

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
	07/08/21 13:30	08/08/21 09:30	Beaver Pond

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of _____	See Net Form: Y / N
WBR-P-01	14	See GPS	MG TB		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FineScale	1		85	90	7.62					
FineScale	2		48	52	1.3					
FS	3		52	56	1.73					
FS	4		55	59	1.96					
FS	5		50	54	1.46					
FS	6		50	54	1.24					
FS	7		70	77	3.79					
FS	8		68	75	3.32					
FS	9		42	45	0.83					
FS	10		62	66	2.51					
NRD	11		50	54	1.36					
NRD	12		60	65	2.42					-tumor ?
NRD	13		47	50	1.13					
NRD	14		48	52	1.37					
NRD	15		52	56	1.53					
NRD	16		54	58	1.83					
NRD	17		52	56	1.48					
NRD	18		48	52	1.01					
NRD	19		47	50	1.04					
NRD	20		50	54	1.45					
Pearl Dace	21		87	92	6.64					
PD	22		75	81	4.89					
PD	23		90	98	6.86					
PD	24		95	103	8.85					
PD	25		79	87	4.91					
PD	26		110	123	16.00					
PD	27		97	104	8.71					
PD	28		113	121	14.24					
PD	29		80	86	4.75					
Pearl Dace	30		72	79	3.58					
BSB	31		-	51	1.00					
PD	32		98	105	9.42					
PD	33		110	119	13.99					
PD	34		83	89	5.20					
PD	35		72	80	3.53					
PD	36		70	75	3.17					
Fathead	37		78	83	5.02					
	38									
	39									
	40									
	41									
	42									
	43									
	44									
	45									

38

Species Box Tally Area / Site Comments:

NRD hybrid

FineScale ☒ ☒ ☒ ☒ ☐

NRD ☒

Tally - 50 FS = 110g

- 50 NRD = 80g

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION			
Project #	Project Description: CNC Crawford		Date: 07/08/21
Collectors: MG + TB	Time Started: 13:10		Time Finished: 14:00
Weather Conditions: Sunny			Air Temp (°C): 21
Surface Conditions:			
Calm ⊘	Rippled ⊘	Wavy ○	Rough ○
Photos Numbers and Descriptions:			

LOCATION		
Name of Waterbody: WBR-P-01	Station #:	Location of Station:
GPS Coordinates: 17U 0475225 5412044	MTO Chainage:	
Township:	MNRF District: Timmins	

LAND USE AND POLLUTION	
Surrounding Land Use/Terrain: Meadow/ Wetland	Sources of Pollution: NA

WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ○	Pond ⊘	Reservoir ○	Dug-out ○	Wetland ○
Intermittent ○	Run-off ⊘	Spring-Fed ○	In-stream ⊘	Bypass ○	Not connected ○

Waterbody Dimensions:	
Length (m)	Mean Width (m)

WATER CHEMISTRY
Water Colour:

					30	10	30 ~~40~~		30

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	⊗	O

IN-WATER HABITAT

Underwater Cover (% surface area): 30

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
		40		60	

Vegetation Type:

Vegetation Type (%)	Submerged 30	Floating	Emergent 70	None O
Predominant Species:	milfoil		Lily, cattail	

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent Beaver dam X

POTENTIAL SIGNIFICANT HABITAT

- large, active beaver pond
- fish observed
- Pearl dace + fresrcle dace captred in 12 minnow traps

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-P-02		07/08/21	047 5876 5412164
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
	11:45	8	TD	07/08/21	(☒ Same as above)	
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
					(☐ Same as above)	
Air Temperature:		°C		DO:	59.8	%
H2O Temperature:	19.72	°C		DO:	5.47	mg/L
pH:	5.95			TDS:	0.029	g/L
Conductivity:	40	µS/cm or mS/cm		ORP:	141.0	mV
Sample Depth:	0.5	m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		
Comments:											

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

APPENDIX C2: PONDS/LAKES FIELD COLLECTION FORM

GENERAL INFORMATION			
Project #: GMeMa2002	Project Description: CNC Crawford		Date: 7 Aug 2021
Collectors: MG+TB	Time Started: 11:30		Time Finished:
Weather Conditions: Sunny, Clear			Air Temp (°C): 14
Surface Conditions:			
Calm: ⊘	Rippled: O	Wavy: O	Rough: O
Photos Numbers and Descriptions:			

LOCATION		
Name of Waterbody:	Station #: WBR-P-02	Location of Station:
GPS Coordinates: 0475876 5412164	MTO Chainage:	
Township:	MNRF District: Timmins	

LAND USE AND POLLUTION	
Surrounding Land Use/Terrain:	Sources of Pollution:

WATERBODY TYPE AND MORPHOLOGY					
Large Lake: O	Small Lake: O	Pond: ⊘	Reservoir: O	Dug-out: O	Wetland: O
Intermittent: O	Run-off: O	Spring-Fed: O	In-stream: ⊘	Bypass: O	Not connected: O
Waterbody Dimensions:					
Length (m)		Mean Width (m)			

WATER CHEMISTRY
Water Colour:

					40		30		30

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	O	O

IN-WATER HABITAT

Underwater Cover (% surface area): 40

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
		30		70	

Vegetation Type:

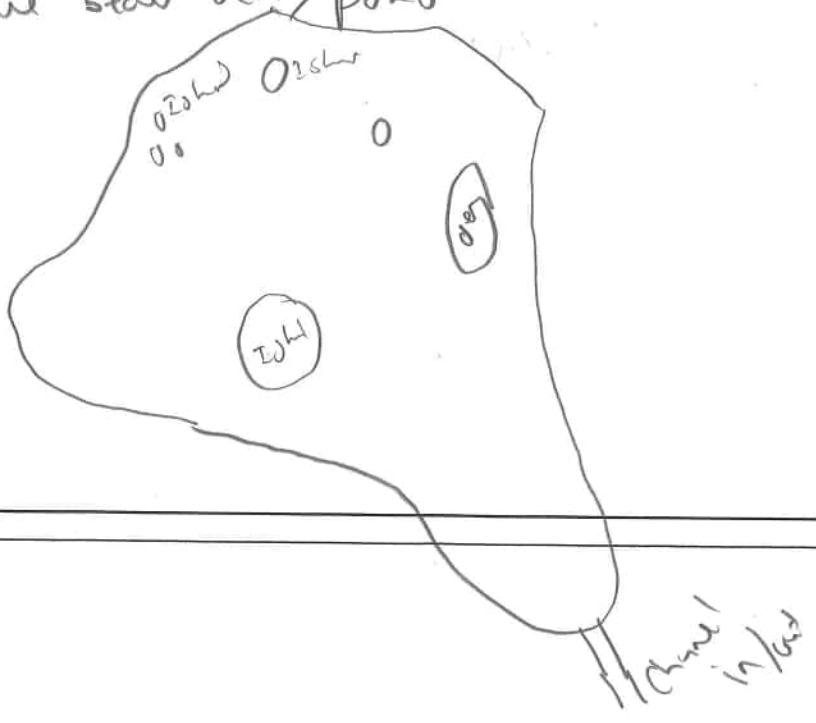
Vegetation Type (%)	Submerged	Floating	Emergent	None
	30		70	O
Predominant Species:	milfoil		Lily (white) Aquatic grass	

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent
	X	

POTENTIAL SIGNIFICANT HABITAT

- NRD capture (adult/YOY)
- active beaver den/pond
-



BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Traps

Project Site / Project Number: CNC (Courtesy)

wood.

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / Time: (24HR): 07/08/21 11:45

End Date: (DD / MMM / YY) / Time (24HR): 08/08/21

Area Description: (Habitat Type / Site Features): Beaver Pond

Sample ID: WBR-P-02

Method Effort: (Traps/Rods/Dips): 12

UTM Coordinates: (mN, mE, Zone, Acc.): See GPS

Samplers In.: MGTD

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
PD	1		73	80	5.03					Dead
	2		90	97	8.99					
	3		89	95	8.55					
	4		64	70	3.36					
	5		67	72	3.52					
	6		74	81	4.69					Tally ⊠⊠⊠ ⊠..
	7		65	71	3.29					
	8		71	76	4.12					
	9		104	112	10.82					
	10		92	101	8.86					
	11		66	71	4.00					
	12		63	68	2.78					
	13		61	65	2.31					
	14		76	81	5.00					
	15		45	50	1.01					
	16		58	62	2.00					
	17		65	71	3.18					
	18		72	78	4.02					Dead
	19		130	139	23.83					⊠ Alive
PD	20		72	78	2.89					Dead
BSB	21		-	48	0.83				dead	
BSB	22		-	49	1.17				dead	Female/Prgnt/eggs
BSB	23		-	47	1.11				dead	" " "
BSB	24		-	48	1.24				dead	
BSB	25		-	48	2.15				dead	NRD ⊠
BSB	26		-	53	1.70				Alive	FD ⊠
BSB	27		-	50	1.00					
BSB	28		-	58	1.33					

Total
42 PD
7 NRD
7 FD
8 BSB

Species Box Tally Area / Site Comments:

lots of fish dead in traps likely due to ANGX conditions at bottom

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Dipnets

Project Site / Project Number:

wood.

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / **Time:** (24HR)

End Date: (DD / MMM / YY) / Time (24HR):

Area Description: (Habitat Type / Site Features)

Sample ID: WBR-P-02

Method Effort: (Traps/Rods/Dips) Dips

UTM Coordinates: (mN, mE, Zone, Acc.)

Samplers In.

Page: _____ **of** _____

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fil.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NRB YoY	17 to 6									Dip net 1 - 6 NRB
BSB "										" 2 - 8 NRB - 1 RJB
NRB "										" 3 8 NRD

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fil. - Fillet or Dorsal Epaxial

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBRS-01	Prosser Creek	10/08/21	0478677 5405877 17U
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
OMEMG2002		overcast, humid	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
	15:30	9	MG TP	10/08/21		(☒ Same as above)
Air Temperature:		°C		DO:	75.5	%
H2O Temperature:	20.90	°C		DO:	6.82	mg/L
pH:	7.10			TDS:	0.043	g/L
Conductivity:	131	µS/cm or mS/cm		ORP:	148.2	mV
Sample Depth:	0.5	m		Duplicate Taken:		
Comments:						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
						(☐ Same as above)
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		
Comments:						Epilimnion: upper, lighter water layer Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter Hypolimnion: lower, heavy, cool water layer					

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

Rapid Assessment Methodology Field Form

Mandatory Fields In Grey
Must be filled out for processing

Stream Code: WBR-S-01 | Site Code: | Sample:

Date: YY 21 MM 08 DD 10

Site Type: ☐ Calibration ☐ Survey

Stream Name: Prosser Creek

Crew Leader (initial & last name):

Crew: MG+KD

Recorder: MG

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm		01						
101 - 600 mm		11						
601 - 1000 mm								
> 1000 mm								
Total # Points	00	12	00	00	00	00	00	09

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points	00	00	07	00	11	00

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle	12	00	00	00
Maximum Particle	12	00	00	

Bank Stability

Mean Stream Width (m): . | Mean Depth at Crossover (mm): | Maximum Particle Size (mm):

Eroding Bank	04	Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank		Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank		Angle > 45°, non-erodible material/soil
Deposition Zone	12	Angle < 45°, (gradual slope from river), fine grained sediments

Comments

3 transects of 4 observations = 20

17U 0478677 5405872

Ent/Scanned | Verified | Corrected

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. ____ of ____ Page No. 1 of 2

Date (yyyy-mm-dd) 2021-08-10

Stream Name: Prosser Creek

Stream Code: WBR-S-01

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L ____ R ____

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 1.48

Right Entrenchment Width (m): 2.2

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): ____ Point Spacing (m): ____

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	2.0	400	☐ Yes ☐ No
Right BFD	5.2	0	
Max. Chann. Depth	.		
Left Active Chann.	2.13	400	
Right Active Chann.	4.47	400	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	2.0	400	0			.
02	2.10	370	0			.
03	2.13	400	0			.
04	2.20		90			.
05	2.40		270			.
06	2.60		270			.
07	2.80		270			.
08	3.0		300			.
09	3.20		340			.
10	3.4		320			.
11	3.6		280			.
12	3.8		230			.
13	4.0		240			.
14	4.2		150			.
15	4.3		90			.
16	4.4		30			.
17	4.47	400	0			.
18	4.5	390	0			.
19	4.7	270	0			.
20	4.9	150	0			.

Comments: 17U - 0478677 5405872

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
MG + TB				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. ____ of ____ Page No. 2 of 2

Stream Name: Prosser Creek

Date (yyyy-mm-dd): 2021-08-16

Stream Code: WBR-S-01

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	5.0	110	0	
22	5.1	065	0	
23	5.2			
	5.30		350	

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)

Comments: depest 17V-

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-02	W.B. River	10/08/21	0478566 5405896 17U
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
OMPMS 2002			

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
	16:30	8	MGTR	10/08/21	(☒ Same as above)	
Air Temperature:		°C		DO:	(10.3)	%
H2O Temperature:	21.32	°C		DO:	5.87	mg/L
pH:	6.96			TDS:	0.074	g/L
Conductivity:	106	µS/cm or mS/cm		ORP:	145.5	mV
Sample Depth:	0.5	m		Duplicate Taken:	NO	
Comments:						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
					(□ Same as above)	
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		
Comments:						Epilimnion: upper, lighter water layer Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter Hypolimnion: lower, heavy, cool water layer					

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

Rapid Assessment Methodology Field Form

Mandatory Fields In Grey
Must be filled out for processing

Stream Code | Site Code | Sample

Date YY MM DD: 2021-08-10

Site Type: ☐ Calibration ☐ Survey

Stream Name: WBR-S-02

Crew Leader (initial & last name)

Crew: MG+TB

Recorder: MG

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm								
101 - 600 mm	06	17						
601 - 1000 mm	03	04						
> 1000 mm								
Total # Points	09	21						

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points	02	06	13	11	01	00

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle	23	07	00	00
Maximum Particle	16	09	05	00

Max
90
420

Bank Stability

Mean Stream Width (m) | Mean Depth at Crossover (mm) | Maximum Particle Size (mm)

Eroding Bank	08	Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank	00	Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank	00	Angle > 45°, non-erodible material/soil
Deposition Zone	02	Angle < 45°, (gradual slope from river), fine grained sediments

Comments

5 transects of 6 observations

Ent/Scanned	Verified	Corrected

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. ____ of ____ Page No. 1 of 2

Stream Name

Date (yyyy-mm-dd) 2021-08-10

Stream Code

Site Code: WBR-S-02

Sample

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 20.

Right Entrenchment Width (m): 6.56

Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	2.0	0	☐ Yes ☐ No
Right BFD	12.36	0	
Max. Chann. Depth	.		
Left Active Chann.	2.60	320	
Right Active Chann.	11.8	320	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	2.0	80				.
02	2.3	190				.
03	2.5	280				.
04	2.6	320	0			.
05	3.8		120			.
06	3.0		220			.
07	3.5		300			.
08	4.0		400			.
09	4.5		570			.
10	5.0		580			.
11	5.5		590			.
12	6.0		630			.
13	6.5		620			.
14	7.0		620			.
15	7.5		660			.
16	8.0		580			.
17	8.5		565			.
18	9.0		560			.
19	9.5		470			.
20	10		380			.

Comments

Not entrenched
17J- 0479569 5405899

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. ____ of ____ Page No. 2 of 2

Stream Name

Stream Code

Site Code: WBR-S-02

Sample: 1

Date (yyyy-mm-dd): 2 0 1 _ - _ _ - _ _

Record only on the 1st transect.

Site Length (m): ____.__

Transect Spacing (m): ____.__

Discharge Approximates Baseflow?
☐ Yes ☐ No

Obstructions to Flow
(Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): ____.__
Right Entrenchment Width (m): ____.__
Total Entrenchment Width (m): ____.__

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): ____.__
Point Spacing (m): ____.__

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD	____.__	
Right BFD	____.__	
Max. Chann. Depth	____.__	
Left Active Chann.	____.__	
Right Active Chann.	____.__	

Ht. Represents Bankfull? ☐ Yes ☐ No

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	10.5		330			.__
22	11.0		280			.__
23	11.5		170			.__
24	11.75		110			.__
25	11.87	320	0			.__
26	11.90	310	0			.__
27	12.0	280				.__
28	12.1	230				.__
29	12.2	190				.__
30	12.3	95				.__
31	12.36	0				.__
						.__
	6.30					.__
						.__
						.__
						.__
						.__
						.__
						.__
						.__

Comments

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-03	WBR	10/08/21	0476696 5412340 17V
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMPM92002			

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
WBR-S-03	10:00	8	NA/TB	10/08/21	(☒ Same as above)	
Air Temperature:		°C		DO:	72.5	%
H2O Temperature:	20.62	°C		DO:	6.50	mg/L
pH:	6.11			TDS:	0.77	g/L
Conductivity:	109	µS/cm or mS/cm		ORP:	162.3	mV
Sample Depth:	0.5	m		Duplicate Taken:	N	
Comments:						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
					(☐ Same as above)	
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		
Comments:											

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

3.7um - 475 mdep

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 7 of 7 | Page No. 1 of 2

Stream Name: WR2-S-07

Date (yyyy-mm-dd): 2021-08-10

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others: Beaver dam directly upstream

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 2.85
Right Entrenchment Width (m): 2.71
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	1.0	400	☐ Yes ☐ No
Right BFD	10.90		
Max. Chann. Depth	3.		
Left Active Chann.	.		
Right Active Chann.	9.05	400	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	1.0	400	180			
02	1.5		320			
03	2.0		330			
04	2.5		400			
05	3.0		440			
06	3.5		465			
07	4.0		445			
08	4.5		420			
09	5.0	~~465~~	465			
10	5.5	~~240~~	240			
11	6.0	~~245~~	245			
12	6.5	~~200~~	200			
13	7.0	~~195~~	195			
14	8.0	~~130~~	130			
15	8.5	~~180~~	180			
16	9.0	~~63~~	63			
17	9.05		20			
18	9.5	370	0			
19	10.	355				

Comments:
LBD - undercut of 190mm
Transect location TY of RAM

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
MG + TB	MG			

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. ____ of ____ | Page No. 2 of 2

Stream Name: WBR-SL-03

Date (yyyy-mm-dd): 201_-__-__

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m): ____.__

Transect Spacing (m): ____.__

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L ____ R ____

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): ____.__

Right Entrenchment Width (m): ____.__

Total Entrenchment Width (m): ____.__

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): ____.__

Point Spacing (m): ____.__

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD	____.	
Right BFD	____.	
Max. Chann. Depth	____.	
Left Active Chann.	____.	
Right Active Chann.	____.	

Ht. Represents Bankfull? ☐ Yes ☐ No

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
20	10.2	320	0			.
21	10.3	310	0			.
22	10.5	170	0			.
23	10.7	100	0			.
24	10.9	0				.
	.					.
	3.7		475			.
	.					.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.
	____.					____.

Comments: > Max depth

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected

Rapid Assessment Methodology Field Form

Mandatory Fields In Grey
Must be filled out for processing

Stream Code | Site Code | Sample

Date: YY 2021 – MM 08 – DD 16

Site Type: ☐ Calibration ☐ Survey

Stream Name: WBR-S-03

Crew Leader (initial & last name):

Crew: MG + TP

Recorder: MC

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm		01						
101 - 600 mm		24						
601 - 1000 mm	03	02						
> 1000 mm								
Total # Points								

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points		02	21	23	04	

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle	23	07	00	
Maximum Particle	17	12	01	

Max 160

Bank Stability

Mean Stream Width (m): . | Mean Depth at Crossover (mm): | Maximum Particle Size (mm):

Eroding Bank		Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank		Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank		Angle > 45°, non-erodible material/soil
Deposition Zone		Angle < 45°, (gradual slope from river), fine grained sediments

Comments

17U - 0476696 5412340

5 transects of 6 observations

Ent/Scanned	Verified	Corrected

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Seine Net

Project Site / Project Number: CNC Crawford

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
WbR-S-03	10/08/21 10:15	10/08/21	River

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of _____ See Net Form: Y / N
	2	See GPS	MW/TB	

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Common Shiner	1		69	76	3.20					
CS	2		70	78	3.61					
CS	3		95	102	10.15					
CS	4		73	81	4.52					
CS	5		78	85	4.99					
CS	6		86	93	6.78					
Shiner sp	7		26	29	0.14				YOY	
Shiner sp	8		24	27	0.18				YOY	
Shiner sp	9		25	29	0.15				YOY	
Pearl dace	10		35	39	0.46					
Shiner sp	11		—	—	—				YOY	

Species Box Tally Area / Site Comments: Emerald YOY - 12 in Seine net 2

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-04		09/08/21	0476574 5412898 17V
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
ORena.002		Overcast 24°	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
WBR-S-04	14:30	9	TM/MK	09/08/21		(☑ Same as above)
Air Temperature:	23	°C		DO:	83.1	%
H2O Temperature:	20.62	°C		DO:	7.46	mg/L
pH:	5.55			TDS:	0.073	g/L
Conductivity:	103	µS/cm or mS/cm		ORP:	176.5	mV
Sample Depth:	0.5	m		Duplicate Taken:	Y (WC-DUP-01	
Comments:						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
						(☐ Same as above)
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
WBR-S-04					
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
Seine		17U	047			
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Minnow Fyke (MINI)

Project Site / Project Number: CNC Crait...

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
WBR	09/08/21 16:00	10/08/21 9:30	River

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1
WBR-S-04-MINI			MH TB	See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
N. Pike	1		378	405	320					upstream fyke
W. Sucker	2		319	338	380					
W. Sucker	3		345	368	480					
W. Sucker	4		280	298	250					upstream fyke
Trout Perch	5		70	77	3.88					Downstream fyke
Trout Perch	6		102	119	16.17					
Trout Perch	7		85	92	7.40					
Log Perch	8		—	58	1.43					
Pearl dace	9		38	41	0.57					
Burbot	10		—	62	2.66					Downstream fyke

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number:

wood.

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / **Time:** (24HR): 09/08/21 14:30

End Date: (DD / MMM / YY) / Time (24HR): 10/08/21 09:20

Area Description: (Habitat Type / Site Features): River

Sample ID: WBR-S-04

Method Effort: (Traps/Rods/Dips): 10

UTM Coordinates: (mN, mE, Zone, Acc.): 0476574 5412898 17 (S-esPS)

Samplers In.: MG KM

Page: 1 of _____

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Trout Perch	1		67	73	3.30					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) G Seine Net

Project Site / Project Number: CNC Crawford

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
	09/08/21 15:00	09/08/21 15:45	Stream / river

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of _____	See Net Form: Y / N
WBR-S-04	3	See GPS	MG KG		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fil.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Trout Perch	1		83	91	7.43					Seine 1
Trout Perch	2		67	75	3.30					Seine 2
Emerald Shiner	3		52	57	1.03					
Emerald Shiner	4		47	52	1.01					
Pearl dace	5		43	46	0.76				YOY	
Pearl dace	6		40	43	0.62				YOY	
Pearl dace	7		41	44	0.78					
PD	8		42	46	0.98					
Log Perch	9		-	32	0.51					Seine 2
PD	10		40	44	0.64					Seine 3
PD	11		40	44	0.70					
PD	12		45	49	1.00					
PD	13		42	46	0.67					
PD	14		44	48	0.77					
PD	15		41	45	0.68					
Common Shiner	16		-	-	-					escaped
Trout Perch	17		32	35	0.39				YOY	
N. Pike	18		310	331	190					
BSB	19		-	-	-					Dropped

Species Box Tally Area / Site Comments:

Seine 1 - YoY Cyprinidae - 24
Seine 2 - " " - 21
Seine 3 - " " - 17

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fil. - Fillet or Dorsal Epaxial

Rapid Assessment Methodology Field Form

Mandatory Fields In Grey
Must be filled out for processing

Stream Code | Site Code | Sample

Date: YY 2021 – MM 08 – DD 09

Site Type: ☐ Calibration ☐ Survey

Stream Name: WBR-S-04

Crew Leader (initial & last name):

Crew: MG + TD

Recorder: MG

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm		02						
101 - 600 mm	02	17						
601 - 1000 mm	05	04						
> 1000 mm								
Total # Points								

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points	04	01	12	11	05	

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle	17	10	03	
Maximum Particle	12	15	03	

Max
120
111

Bank Stability

Mean Stream Width (m): . | Mean Depth at Crossover (mm): | Maximum Particle Size (mm):

Eroding Bank	06	Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank		Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank		Angle > 45°, non-erodible material/soil
Deposition Zone	04	Angle < 45°, (gradual slope from river), fine grained sediments

Comments

6 Observation Points W 5 transects
Transect 2 = same as dry natic channel stabilizing location

Ent/Scanned	Verified	Corrected

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 1 | Page No. 1 of 2

Stream Name: WBR-S-04

Date (yyyy-mm-dd): 2021-08-09

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (*Check all applicable types*)

- ☒ None Present
- ☐ Armouring
- ☐ Trampled Banks
- ☐ Inlets
- ☐ Wood Deflectors
- ☐ Other
- ☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 6.32

Right Entrenchment Width (m): 7.36

Total Entrenchment Width (m): 13.68

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?	Velocity Measurements (*Recommended depth ratio from stream bottom is 0.4 m*) Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Left BFD	2.0	0	☐ Yes ☐ No				
Right BFD	14.0	0					
Max. Chann. Depth	7.7	980					
Left Active Chann.	2.45	320		0			
Right Active Chann.	13.59	320		0			
Observ. 01	2.1	50		0			
02	2.2	240		0			
03	2.3	260		0			
04	2.4	290		0			
05	2.45	320		0			
06	2.60			100			
07	3.0			200			
08	3.5			345			

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
09	4.0	~~420~~ 0	420			
10	5.0		550			
11	5.5		585			
12	6.0		605			
13	6.5		640			
14	7.0		650			
15	7.5		650			
16	8.0		645			
17	8.5		620			
18	9.0		600			
19	9.5		590			
20	10.0		545			

Comments: 170-0476575 5412905

Crew Leader (init. & last name): JBaet2

Crew	Recorder	Ent/Scanned	Verified	Corrected
	ML			

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 1 | Page No. 2 of 2

Stream Name: WBR-S-04

Date (yyyy-mm-dd): 201 - -

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m): .

Transect Spacing (m): .

Discharge Approximates Baseflow?
☐ Yes ☐ No

Obstructions to Flow
(Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): .

Right Entrenchment Width (m): .

Total Entrenchment Width (m): .

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): .

Point Spacing (m): .

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	10.5		540			.
22	11.0		520			.
23	11.5		500			.
24	12.0		435			.
25	12.5 ~~13.5~~		355			.
26	13.0		205			.
27	13.5		40			.
28	13.59	320	0			.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
29	13.70	220	0			.
30	13.80	180	0			.
31	13.9	120	0			.
32	13.95	80	0			.
33	14.0	0	0			.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

Comments

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected

DETAILED BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Gillnet

wood.

Waterbody Name:	Start Date (DD MMM YYYY) / Time (24HR):	End Date (DD MMM YYYY) / Time (24HR):	Area Description (Habitat Type):
NDR-Cur Lk	26/10/21	27/10/21	Lake

Sample ID:	Method #: (Traps/ Rods/ Dips)	Project Number:	UTM Coordinates (mN, mE, Zone, Acc.):	Samplers In:	Page: 1 of 1
				MG/KD	see Net Form ☐

Species	Fish #	Species Code	Length (mm) Fork	Length (mm) Total	Round Weight Body (oz)	Round Weight L. Tissue (g)	Round Weight R. Tissue (g)	Round Weight Liver (g)	Round Weight Gonad (g)	Sex (M/F)	Maturity (M/ IM / 9)	Aging Structures (Sc, Pr, Dr, Oto)	Retained for Analysis (Y/N)	Age Class (YOY / 1+)	Comments (Hg / Condition / etc.)
N. Pike	1		118	124	10 oz	24	20	—	—	F		Sc, Cl			fish in stomach
N. Pike	2		112	119	10 oz	6.8	9.4			F		Sc, Cl			digested fish
N. Pike	3		125	132	10 oz	19	14			M					empty
	4		146	159	1lb 2 oz	19	16			M					"
	5		174	189	1lb 12 oz	52	44			F					"
	6		592	620	2lb	56	48			F					"
	7		900	950	1lb 10 oz	58	77			F					empty
	8		1020	1068	1lb 6 oz	136	68			F					liquidy
N. Pike	9		see lengths below in mm												
	1		340	362											
	2		340	354											
	3		375	390											
	4		444	460											
	5		501	530											
			548	566											

Species Box Tally Area / Site Comments:

Species	Catch	Species	Catch
		Total #	

QA/QC By:

Date:

Aging Structures Legend:
Sc - Scales
Cl - Cleithrum
Pr - Pectoral Ray
Oto - Otoliths
Ds - Dorsal Spine
YOY - Young Of the Year
1+ - Older than "yoy"

DETAILED BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Gillnet

wood.

Waterbody Name:	Start Date (DD MMM YYYY) / Time (24HR):	End Date (DD MMM YYYY) / Time (24HR):	Area Description (Habitat Type):
NDR-MacLk	26/10/21	27/10/21	Lake

Sample ID:	Method #: (Traps/ Rods/ Dips)	Project Number:	UTM Coordinates (mN, mE, Zone, Acc.):	Samplers in:	Page: 1 of 1
					see Net Form ☐

Species	Fish #	Species Code	Length (mm)		Round Weight					Sex	Maturity	Aging Structures	Retained for Analysis	Age Class	Comments
			Fork	Total	Body (g /kg)	L. Tissue (g)	R. Tissue (g)	Liver (g)	Gonad (g)	(M/F)	(M/ IM/ 9)	(Sc, Pr, Dr, Oto)	(Y/N)	(YOY / 1+)	(Hg / Condition / etc.)
N. Pike	1		548	566	2lb 2oz	62	50			F	M				empty
	2		530	551	2lb 1oz	40	64			F	M				
	3		610	630	3lb 6oz	137	66			F	M				partially digested
N. Pike	4		734	771	6lb 15oz	88	51			F	M				empty

M.G

Species Box Tally Area / Site Comments:

QA/QC By:

Date:

Species	Catch	Species	Catch
		Total #	

Aging Structures Legend:
Sc - Scales
Cl - Cleithrum
Pr - Pectoral Ray
Oto - Otoliths
Ds - Dorsal Spine
YOY - Young Of the Year
1+ - Older than "yoy"

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
MatRad	Mattagami River	28/10/21	
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMEMC 2021			

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
MatRad	11:45	8	28/10/21	(☐ Same As Above)

Comments (bottles field filtered, sample odour): Radium

Air Temperature		°C	DO	87.0	%	OTHER:	
H2O Temperature	9.4	°C	DO	9.59	mg/L		
pH	7.75	pH	TDS		g/L		
Conductivity	96.6	µS/cm ~~or mS/cm~~	ORP	126.4	mV		
Turbidity		NTU	Depth	0.5	m		

Comments (water colour, sheen, plankton/algal bloom): Radium

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

SITE INFORMATION

wood.

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
Mat R-02	Mattagami River	28/10/21	0462924 5412397 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
3Mercury2			

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
Mat R-02	11:00	8	28/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C		DO	86.9	%	OTHER:
H2O Temperature	8.9	°C		DO	9.83	mg/L	
pH	7.70	pH		TDS	/	g/L	
Conductivity	95.7	µS/cm or mS/cm		ORP	104.6	mV	
Turbidity	/	NTU		Depth	0.5	m	

Comments (water colour, sheen, plankton/algal bloom):

Radium - Dup 01 taken

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
Ger LK	Grey Lake	26/10/21	0471204 5406118 170
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-GerLK	16:50	7	26/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C	DO	57.9	%	OTHER:	
H2O Temperature	8.2	°C	DO	6.58	mg/L		
pH	7.71	pH	TDS		g/L		
Conductivity	193.1	µS/cm or mS/cm	ORP	222.8	mV		
Turbidity		NTU	Depth	0.5	m		

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-GerLK-S1-3			P. Ponar	(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	10:50	1-1.5		1 0471195 5406131 → 10:50
2		1.5-1.7		2 0471399 5406016 → 11:15
3		1.5		3 0471233 5405877 → 12:00
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-GerLK-B1-3			P. Ponar	See above for GPS location (☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-GerLk	Gerry Lake	27/10/21	647361 5405956 17J
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Omeru 2021			

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID	NDR-GerLk	Sample ID		Sample ID	
Sample Location	MIO-lake	Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required	1	No. Tows Required		No. Tows Required	
Sample Date	27/10/21	Sample Time		Sample Date	
Sample Time	11:45	Vertical Tow Length	m	Sample Time	
Vertical Tow Length	2 m	No. Containers		Vertical Tow Length	m
No. Containers	1	Comments		No. Containers	
Comments	Sed GPS about			Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NDR-GeLk	NDR GeLk				
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
Gillnet x 5			See GPS			
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
M. Godard R. Dibblee	26/10/21	16:00	~~60~~ 1	tied to shore	~~80~~ 90°	5.3m		

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
M. Godard R. Dibblee	27/10/21	10:15				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
10:15 pull N. Pike		4				
12:30 pull N. Pike		5				1 released small

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:
- 4 Pike GN
- all nets reset at 10:15, checked again at 12:30 & pulled

See Bio Sheet Data (Y / N)

QA/QC By:

Page: _____ of _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NOR-Grey Lk	Grey Lk				
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
Minnow Trap	x 14		See	GPS		
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
Mat RD								
	26/10/21							

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
	27/10/21	12:30				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
Yellow Perch		7				
Fowa Darter		1				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments: Lots of small fish observed in lake near minnow traps

See Bio Sheet Data (Y / N)

QA/QC By:

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

Page: _____ of _____

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-MarLK	Marten Lake	27/10/21	0470672 5406764 17U
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
		Partly cloudy. C°	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID	NDR-MarLK	Sample ID		Sample ID	
Sample Location	Mid lake	Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required	1	No. Tows Required		No. Tows Required	
Sample Date	27 Oct 21	Sample Date		Sample Date	
Sample Time	15:30	Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood.

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Mar1k	Martin Lk	26/10/21	0470631 5406795 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Mar1k	1720	7	26/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C	DO	58.2	%	OTHER:
H2O Temperature	8.2	°C	DO	10.69	mg/L	
pH	7.40	pH	TDS	/	g/L	
Conductivity	83.3	µS/cm or ~~mS/cm~~	ORP	205.1	mV	
Turbidity	/	NTU	Depth	0.5	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Mar1k-S1	15:00			(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	15:00			Sed 1 - 0470659 / 5406708
2	15:20			Sed 2 - 0470569 / 5406886
3	16:00			Sed 3 0470479 / 5406813
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

Dup taken at Sed 1 - 15:00 - 27 oct 2021

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDL-Mar1k-B1				(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				See above
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NOR-MarLk	Martin Lk				
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr) (cover)
Gillnet x 3		17U	Sep	GPS	
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)			

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
MGT RD								
	26/10/21	17:45						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
MGT RD						
	27/10/21	13:30				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
N. Pike		4				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:
1 ♂ Pike GN 3
3 ♂ Pike GN

See Bio Sheet Data (Y / N)

QA/QC By:

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]		
NDE-Mark	Martin Lk					
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
MT x 13		17U	See	GPS		
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
MG + RD								
	26/10/21	17:15						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
MG + RD						
	27/10/21	13:30				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
NO Catch						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-01		25/10/21	
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMAM 2002			

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-01	11:15	7	24/10/21	0473187 / 5406480 17U (☐ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C	DO	58.4	%	OTHER:	
H2O Temperature	4.7	°C	DO	7.31	mg/L		
pH	6.02	pH	TDS		g/L		
Conductivity	30.7	µS/cm or ~~mS/cm~~	ORP	199.7	mV		
Turbidity		NTU	Depth	0.5	m		

Comments (water colour, sheen, plankton/algal bloom):

Duplicate Dup-02

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-01-S	17:15		P. Ponar	See below (☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1			17:15	1 473206 / 5406526
2			17:15	2 473184 / 5406527
3			1810	3 473176 / 5406514
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-01-B		P. Ponar	P. Ponar	(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				See grab
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NDR-P-01					
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
MT x 18						
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
MC + RD								
	23/10/21	16:30						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
MC + RD						
	24/10/21	11:15				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
B. Stickleback		21				
[illegible]						
Fathead		1				
Pearl dace		8				
Finescale		1				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER / SEDIMENT / BENTHIC SAMPLING FORM

SITE INFORMATION

wood.

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NOR-P-02A	—	19/10/21	0470356 / 5408270
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Omeme 2002		Clear 16°	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NOR-P-025	17:45	—	19/10/21	(☑ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C	DO	103.3	%	OTHER:
H2O Temperature	10.7	°C	DO	11.07	mg/L	
pH	7.96	pH	TDS	—	g/L	
Conductivity	131.5	µS/cm or mS/cm	ORP	257.4	mV	
Turbidity	—	NTU	Depth	0.5	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

SITE INFORMATION

wood.

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-03		20/10/21	
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Meme 2062			

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-03	08:40	7	20/10/21	0469821 / 5409435 170 (☐ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	4.6	°C	DO	79.6	%	OTHER:	
H2O Temperature	10.9	°C	DO	8.55	mg/L		
pH	6.82	pH	TDS	–	g/L		
Conductivity	61.1	µS/cm or mS/cm	ORP	200.9	mV		
Turbidity	–	NTU	Depth	1	m		

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-03-S	0855	6/3	P. Ponar	(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	~~0846~~ 0855	1		1. 0469886 / 5409399
2	– 09:40	1		2. 0469779 / 5409416
3	–	1		3. 0469816 / 5409537
~~4~~	/			
~~5~~				
~~6~~				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
	0855	3		(☑ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	08:55	1		1 See above
2	09:40	1		2 See above
3		1		3 See above
4	/			
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]		
NOL-P-03				OMenq 2004		
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
M. Trap x27						
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophytes NC = no cover
LT = log/tree

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
MG + RD 27 MT								
	19/10/21	12:16:00						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
	20/10/21	12:00				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
Fathead Minnow		12+6+4+	5+9+2+2	+2		
B. Stickleback		13+10+7+	8+4+23+1			
Pearl dace		12+6+11+	11			40
NR dace		105				
Blacknose Shiner						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments
Johnny Darter						
Rainbow darter						
Finescale Dace						
NRBS/Fin Hybrid						

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments:
2.6 2.5 2.5 2.6
2.5 2.4 2.5

2.2

See Bio Sheet Data (Y / N)

QA/QC By:

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

Page: _____ of _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NDR-P-03					
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr) (cover)
MT x 16			See	GPS	
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)			

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
MG x RD								
	21/10/21	10:30						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
	22/10/21	9:40				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	~~Length-tallied~~ [SUBCNT]	~~Bio-sampled~~ [BIOCNT]	~~Struct. Taken~~ [STRUCT]	Comments
Fathead minnow		26+1=27				
Brook stickleback		25				
Iowa Darter		2				
Pearl Dace		2+9=11				
Northern Redbelly Dace		56				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

NDR-P-03-MTOL-NRDComp(1-2)

DETAILED BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow traps x 27

wood.

Waterbody Name:	Start Date (DD MMM YYYY) / Time (24HR):	End Date (DD MMM YYYY) / Time (24HR):	Area Description (Habitat Type):
NDR-P-03	19/10/21 16:00	20/10/21 12:00	Pond

Sample ID:	Method #: (Traps/ Rods/ Dips)	Project Number:	UTM Coordinates (mN, mE, Zone, Acc.):	Samplers In.	Page: 1 of 3
			See GPS	MG RD	see Net Form ☐

Species	Fish #	Species Code	Length (mm) Fork	Length (mm) Total	Round Weight Body (g /kg)	L. Tissue (g)	R. Tissue (g)	Liver (g)	Gonad (g)	Sex (M/F)	Maturity (M/ IM / 9)	Aging Structures (Sc, Pt, Di, Oto)	Retained for Analysis (Y/N)	Age Class (YOY / 1+)	Comments (Hg / Condition / etc.)
NRD	1		61	64	2.75										Comp 1
	2		58	63	2.516										
	3		58	62	2.08										
	4		54	58	1.85										
	5		54	58	1.98										
	6		56	60	2.15										
	7		59	63	2.19										
	8		56	59	1.99										
	9		57	61	2.23										
	10		57	61	2.44										
	11		58	62	2.29										
	12		64	67	3.02										Comp 1 = 51.61g
	13		57	61	2.31										
	14		57	62	2.32										
	15		57	61	2.10										
	16		56	60	2.21										
	17		58	62	2.48										
	18		52	57	1.85										
	19		54	58	1.85										
	20		56	60	2.03										
	21		59	63	2.52										
	22		55	59	2.12										
NRD	23		58	62	2.33										Comp 1
	24		54	58	1.75										Comp 2
	25		52	55	1.56										
	26		56	60	2.20										
	27		56	60	1.88										
	28		54	58	1.71										
	29		56	60	1.86										
	30		55	58	1.86										~~Hg~~
	31		54	58	1.72										
	32		54	58	1.96										
	33		52	54	1.37										
	34		51	54	1.47										
	35		52	54	1.33										
	36		56	60	2.01										→ 2268
	37		56	60	2.05										
	38		57	60	1.99										MTOL
	39		57	60	2.04										
	40		51	55	1.62										

Comp 2 = 50.65g

Species Box Tally Area / Site Comments:
NDR-P-03-MTOL-NRD01
48151/1.03

QA/QC By:
Date:

Species	Catch	Species	Catch
		Total #	

Aging Structures Legend:
Sc - Scales
Cl - Cleithrum
Pr - Pectoral Ray
Oto - Otoliths
Ds - Dorsal Spine
YOY - Young Of the Year
1+ - Older than "yoy"

NDR-P-03 - MTOZ-NRD Comp(2-

DETAILED BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine)

wood.

Waterbody Name:	Start Date (DD MMM YYYY) / Time (24HR):	End Date (DD MMM YYYY) / Time (24HR):	Area Description (Habitat Type):
NDR-P-03	20/10/21 10:30	21/10/21 9:40	

Sample ID:	Method #: (Traps/ Rods/ Dips)	Project Number:	UTM Coordinates (mN, mE, Zone, Acc.):	Samplers In:	Page: 2 of 3
			See GPS	MC, AR	see Net Form ☐

Species	Fish #	Species Code	Length (mm) Fork	Length (mm) Total	Round Weight Body (g /kg)	L. Tissue (g)	R. Tissue (g)	Liver (g)	Gonad (g)	Sex (M/F)	Maturity (M/ IM / 9)	Aging Structures (Sc, Pr, Dr, Oto)	Retained for Analysis (Y/N)	Age Class (YOY / 1+)	Comments (Hg / Condition / etc.)
NRD	41		53	56	1.35										
	42		51	55	1.62										
	43		52	56	1.77										3713
	44		53	56	1.55										
	45		57	60	1.83										
	46		56	60	1.92										
	47		50	53	1.28										
	48		58	61	2.07										
	49		54	57	1.7										
	50		52	56	1.73										
	51		53	56	1.57										
NRD	52		53	56	1.67										Comp 2
NRD	53		57	60	1.95										Comp 3
	54		58	62	2.16										
	55		57	61	2.14										
	56		57	60	1.89										
	57		58	61	2.32										
	58		58	62	2.11										
	59		58	61	2.16										
	60		62	65	2.66										
	61		59	63	2.59										
	62		64	68	3.01										
	63		62	66	2.9										
	64		63	66	3.14										
	65		64	68	3.17										
	66		61	65	2.75										
	67		63	67	3.16										
	68		63	66	2.79										
	69		63	67	2.69										
	70		62	65	2.72										
	71		59	63	2.56										
	72		59	63	2.59										
NRD	73		57	61	2.18										Comp 3
	~~74~~														
	~~75~~														
	76														

50 60 g

Comp 2 - 1

Comp 3 - 5 fish 53.64 g

Species Box Tally Area / Site Comments:

QA/QC By:

Date:

Species	Catch	Species	Catch
		Total #	

Aging Structures Legend:
Sc - Scales
Cl - Cleithrum
Pr - Pectoral Ray
Oto - Otoliths
Ds - Dorsal Spine
YOY - Young Of the Year
1+ - Older than "yoy"

NDR-P-03 - MT01 - NRBD

DETAILED BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Traps x 27

wood.

Waterbody Name:	Start Date (DD MMM YYYY) / Time (24HR):	End Date (DD MMM YYYY) / Time (24HR):	Area Description (Habitat Type):
NDR-P-03	19/10/21 16:00	20/10/21 12:00	Pond

Sample ID:	Method #: (Traps/ Rods/ Dips)	Project Number:	UTM Coordinates (mN, mE, Zone, Acc.):	Samplers In:	Page: 3 of 3
		Ontario 1002	See GPS	MGRD	see Net Form ☐

Species	Fish #	Species Code	Length (mm)		Round Weight					Sex	Maturity	Aging Structures	Retained for Analysis	Age Class	Comments
			Fork	Total	Body (g /kg)	L. Tissue (g)	R. Tissue (g)	Liver (g)	Gonad (g)	(M/F)	(M/ IM / 9)	(Sc, Pr, Dr, Oto)	(Y/N)	(YOY / 1+)	(Hg / Condition / etc.)
NRD	1		48	51	1.03										
	2		58	62	2.19										
	3		59	62	2.21										
	4		59	63	2.46										
	5		64	68	2.98										
	6		64	68	3.37										
	7		60	64	2.23										MT02
	8		53	56	1.83										
	9		53	57	1.60										
	10		52	55	1.62										

Species Box Tally Area / Site Comments:

QA/QC By:

Date:

Species	Catch	Species	Catch
		Total #	

Aging Structures Legend:
Sc - Scales
Cl - Cleithrum
Pr - Pectoral Ray
Oto - Otoliths
Ds - Dorsal Spine
YOY - Young Of the Year
1+ - Older than "yoy"

WATER / SEDIMENT / BENTHIC SAMPLING FORM

SITE INFORMATION

wood.

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-04	—	19/10/21	0470330 / 5408330 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Omema 2002		Clear 16°	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-04	17:30	7	19/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C	DO	56.0	%	OTHER:
H2O Temperature	12.9	°C	DO	5.73	mg/L	
pH	6.83	pH	TDS	—	g/L	
Conductivity	129.4	µS/cm or ~~mS/cm~~	ORP	216.6	mV	
Turbidity	—	NTU	Depth	1	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-01		23/10/21	475441 5406413 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-01	12:15	7	23/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C	DO	59.7	%	OTHER:	
H2O Temperature	4.5	°C	DO	7.46	mg/L		
pH	6.79	pH	TDS	/	g/L		
Conductivity	35.4	(µS/cm) or mS/cm	ORP	187.2	mV		
Turbidity	/	NTU	Depth	0.5	m		

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-01-S	12:30		P. Ponar	(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)
1			
2			
3			
4			
5			
6			

12:30
13:00
13:30

Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)

1 475413 / 5406458 Depth 1m
2 475485 / 5406407 Depth 1m
3 475500 / 5406368 Depth 1m

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-01-B	12:30		P. Ponar	(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)
1			
2			
3			
4			
5			
6			

Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)

See above GPS

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NOR-S-01	NOR			OMem_2015	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr) / (cover)
MT x 19					
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)			

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophytes NC = no cover
LT = log/tree

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0° - 90°)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
MG + RD								
	22/10/14	16:30						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (°C)	Water Temp. [SITEM1] (°C)	Wave Height [XWAVEHT] (codes 1 - 5)
	23/10/14	14:30				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
Pearl dace						
B. Stickleback	5 + 5	+ 5 = 15				
Fathead minnow	1 + 2 = 3					
N. Redbelly	1					
Finescale	4					

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

DETAILED BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): MT x 19

wood.

Waterbody Name:	Start Date (DD MMM YYYY) / Time (24HR):	End Date (DD MMM YYYY) / Time (24HR):	Area Description (Habitat Type):
NOR-S-01	22/10/21	23/10/21	Pond

Sample ID:	Method #: (Traps/ Rods/ Dips)	Project Number:	UTM Coordinates (mN, mE, Zone, Acc.):	Samplers In:	Page: _____ of _____ see Net Form ☐
	MT x 19	Omeneca2022	See GPS		

Species	Fish #	Species Code	Length (mm)		Round Weight					Sex	Maturity	Aging Structures	Retained for Analysis	Age Class	Comments
			Fork	Total	Body (g /kg)	L. Tissue (g)	R. Tissue (g)	Liver (g)	Gonad (g)	(M/F)	(M/ IM / 9)	(Sc, Pr, Di, Oto)	(Y/N)	(YOY / 1+)	(Hg / Condition / etc.)
Pearl dace	1		99	103	9.75										Comp 1
	2		99	104	11.35										
1	3		106	110	13.59			Comp 1 = 53.99 g							1
	4		93	98	9.65										
P.D	5		93	98	9.84										Comp 1
PD	1		113	119	14.83										Comp 2
1	2		113	118	14.71			Comp 2 = 58.7g							
	3		104	109	13.17										1
PD	4		109	117	15.99										Comp 2
PD	1		108	115	15.35										Comp 3
	2		107	113	13.38										
1	3		99	106	10.3			Comp 3 = 59.64g							1
	~~4~~		~~98~~	~~103~~	~~9.74~~										
PD	4		120	125	20.58										Comp 3
					Aging										
PD	1		132	137	20.93										
	2		108	113	9.63										
	3		46	49	1.07										
	4		57	60	2.08										
	5		74	79	5.27										
	6		124	130	19.66										
	7		50	53	1.37										
	8		82	86	7.04										
	9		85	90	6.92										
	10		126	133	22.48										

Species Box Tally Area / Site Comments:

QA/QC By:

Date:

Species	Catch	Species	Catch
		Total #	

Aging Structures Legend:
Sc - Scales
Cl - Cleithrum
Pr - Pectoral Ray
Oto - Otoliths
Ds - Dorsal Spine
YOY - Young Of the Year
1+ - Older than "yoy"

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NDR-S-02	NDR			OMEA21W2	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr) / (cover)
Seine net					
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)			

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophytes NC = no cover
LT = log/tree

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
MG + RD								
	22/10/21	11:45						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)
	22/10/21	12:30				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
~~Emerald Shiner~~						
Golden Shiner		2				
Emerald YOY		13				
N. Pike YOY		1				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:
1 - 0472044/5408756
L 0472059/5408740
3 0472077/5408732

See Bio Sheet Data (Y / N)

QA/QC By:

Page: _____ of _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NAR-S-02	NAR				
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr) / (cover)
M.Trap x16					
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)			

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophytes NC = no cover
LT = log/tree

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
MF+RO								
	22/10/21	14:15						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)
	23/10/21	10:00				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
White Sucker		1				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

WATER / SEDIMENT / BENTHIC SAMPLING FORM

SITE INFORMATION

wood.

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-04		21/10/21	0470362 / 5412388
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
[illegible]		Overcast / Snow / -2c	

WATER QUALITY

Sampler Initials MG / KD

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-04	13:45	7	21/10/21	(☑ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	-2	°C	DO	80.9	%	OTHER:
H2O Temperature	7.0	°C	DO	9.49	mg/L	
pH	6.91	pH	TDS	/	g/L	
Conductivity	70.1	µS/cm or mS/cm	ORP	191.6	mV	
Turbidity	—	NTU	Depth	0.5	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-04-S1-3	14:45		P. Ponar	(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	left	1m		1. 0470383 / 5412395
2	Centre	1m		2. 0470378 / 5412402
3	Right	1m		3. 0470374 / 5412451
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-04-B1-3				(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	left	1m		See above GPS.
2	centre	1m		
3	Right	1m		
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NDR-S-04	NDR			Omenzecc	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm)	Coordinates (UTM NAD 83) [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	Site Type [SITP] (substr)	(cover)
Seine net		17U				
Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types [BOTTOM] (list all substrate types in area of net)				
	10 - 15 m	Cobble / clay / silt				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophyles NC = no cover
LT = log/tree

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
	21/10/21	13:45						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)
	21/10/21	14:35				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
Johny Darter		1				
Emerald Shiner		1				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments:
Pull 1 - 0470362 / 5412388
Pull 2 - 0470376 / 5412408
Pull 3 - 0470376 / 5412433

See Bio Sheet Data (Y / N)

QA/QC By:

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
NDZ-S-04				Onema2017	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
MT x 11						
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophytes NC = no cover
LT = log/tree

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
M+RD								
	21/10/21	16:00						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)
	22/10/21	09:00				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

Page: _____ of _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

SITE INFORMATION

wood.

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Trib01		19/10/2021	471526 5406900 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Omema2002		Sunny 18°c	

WATER QUALITY

Sampler Initials ML + RD

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Trib-01	13:20	7	19/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	18	°C	DO	64.7	%	OTHER:	
H2O Temperature	11.0	°C	DO	6.94	mg/L		
pH	6.87	pH	TDS	—	g/L		
Conductivity	90.~~89~~	µS/cm or mS/cm	ORP	199.0	mV		
Turbidity	—	NTU	Depth	1	m		

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Trib01-S	13:46/14:00/14:55	2	Petit Ponar	See below (☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1		1		clay and detritus
2		1		S1 0471529/5406900
3		1		S2 0471515/5406907
4				S3 0471536/5406925
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials ML + RD

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Trib01-D	13:30/14:00/14:55	1/	Petit Ponar	(☒ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1		1		
2		1		
3		1		
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

27 - NDR-P-03
16:00

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]		
NDR-TR5-01	✓			Omen 20L		
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
minnow trap x 11		See GPS				
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = sill
CL = clay MU = muck
DE = delritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophyles NC = no cover
LT = log/tree

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
11 minnow traps	19/10/21	13:15	✓	✓	✓	✓	✓	✓

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)
MB+RD	20/10/21	16:00				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)
0	0					

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]		
NDL-Tris-01						
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophytes NC = no cover
LT = log/tree

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
	20/10/21	16:00						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)
	21/10/21	16:00				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments
Brook Stickleback		1				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NOR-Tr.5-02		20/10/21	0471050 / 5409500 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMEMC 2012			

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NOR-Tr.5-02	16:45	7	20/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C	DO	50.1	%	OTHER:
H2O Temperature	7.5	°C	DO	5.81	mg/L	
pH	5.46	pH	TDS		g/L	
Conductivity	38.6	(µS/cm) or ~~mS/cm~~	ORP	183.1	mV	
Turbidity	—	NTU	Depth	.1	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) 17U
WBR-P-01		26/10/21	0475218 5412053
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
SMPM&C002		Overcast ~0°c	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-P-01	10:00	7	26/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	0	°C	DO	54.0	%	OTHER:
H2O Temperature	4.4	°C	DO	6.86	mg/L	
pH	6.14	pH	TDS	✓	g/L	
Conductivity	27.1	µS/cm or mS/cm	ORP		mV	
Turbidity	✓	NTU	Depth	0.5	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-P-01-S			P. Ponar	See below (☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				1 10:15 0475213 5412048
2				2 10:45 0475189 5412057
3				3 11:10 0475172 5412076
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-P-01-B			P. Ponar	See above (☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				See above
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

SITE INFORMATION

wood.

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-P-02		26/10/21	0475875 5412208 17J
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
GMEMC 2002		Overcast 2°C	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-P-02	12:30	7	26/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	20	°C	DO	33.3 %	OTHER:
H2O Temperature	5.2	°C	DO	4.12 mg/L	
pH	5.89	pH	TDS	~~0.34~~ g/L	
Conductivity	23.9	µS/cm or ~~mS/cm~~	ORP	156.1 mV	
Turbidity	✓	NTU	Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

SITE INFORMATION

wood.

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-01	Prosser Creek	25/10/21	0478692/5405841 17U
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMEM.2017			

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-01	15:45	8	25/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	4	°C	DO	87.0	%	OTHER:
H2O Temperature	5.4	°C	DO	10.75	mg/L	
pH	7.21	pH	TDS	✓	g/L	
Conductivity	68.3	µS/cm or ~~mS/cm~~	ORP	211.5	mV	
Turbidity	✓	NTU	Depth	0.25	m	

Comments (water colour, sheen, plankton/algal bloom):

Plus radium

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-02	WBR	25/10/21	0478573/5405897 17V
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Smeaton07		Overcast 4°C	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-02	14:00	7	25/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	4.1	°C	DO	93.4	%	OTHER:
H2O Temperature	4.9	°C	DO	11.68	mg/L	
pH	6.73	pH	TDS	—	g/L	
Conductivity	52.2	µS/cm or mS/cm	ORP	197.3	mV	
Turbidity	—	NTU	Depth	0.3	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT – S1, S2, S3 → 3 pulls each

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-02	14:10	3 jars	petit ponar	(☐ Same As Above)

	Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
S1	1	left, centre, right			1. 14:10 1. 0478576/5405893
S2	2	"			2. 14:40 2. 0478570/5405904
S3	3	"			3. 15:10 3. 0478584/5405883
	4				
	5				
	6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC B1, B2, B3 → 3 pulls each

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-02			P. Ponar	(☑ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	Same as sediment			See GPS above
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-03	WBR	24/10/21	
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
Orema2002		Partly cloudy 4°	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-03	16:40	7	24/10/21	(☒ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C	DO	98.4	%	OTHER:
H2O Temperature	5.3	°C	DO	11.17	mg/L	
pH	6 ~~6~~.68	pH	TDS	/	g/L	
Conductivity	35.1	µS/cm or mS/cm	ORP	195.7	mV	
Turbidity	—	NTU	Depth	0.2	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT - S1, S2, S3 → 3 pulls at each.

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-03		2 jars	P. Ponar	(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	left, right, centre			1. 0476687 / 5412335 11:00
2	left			2. 0476693 / 5412360 11:20
3	left, right			3. 0476689 / 5412370 11:45
4				bag at S1 also
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-03				See above (☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				See above
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Verification Undertaken By: _____ Date: _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
WBR-S-03	WBR			ONemp2007	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr) / (cover)
Seine net					
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)			
	3m				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
MG + RD								
	24/10/12	16:40						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)
MG RD						
	24/10/12	17:00				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

Comments: From Start 0476674/5412380
To! Finish: 0478680/
5412330

See Bio Sheet Data (Y / N)

QA/QC By:

Page: ____ of ____

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wood.

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-04	WBR	24/10/21	0476573 / 5412891 17J
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OneMac2017		Overcast 4°C	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-04	14:10	2	24/10/21	(☐ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature		°C	DO	89.7	%	OTHER:
H2O Temperature	5.1	°C	DO	11.13	mg/L	
pH	6.38	pH	TDS	/	g/L	
Conductivity	343	µS/cm or ~~mS/cm~~	ORP	210.5	mV	
Turbidity	—	NTU	Depth	0.7	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

S1, S2, S3 → 3 pulls for each

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-04	14:45		P. Ponar	See below (☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	left	0.6	14:45	1 - 2 jars, 1 bag. Gravel \ small wood debris, sand
2	left	0.4	15:25	2 2 jars, 1 bag " " " "
3	left		16:10	3 2 jars + dup
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

Dup-01-S → WBR-S-04-S3

BENTHIC

B1, B2, B3 → 3 pulls for each

Sampler Initials _____

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-04			P. Ponar	(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1			14:45	See GPS track
2				
3				
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

0476576 5412886 = B1/S1

0476566 5412898 = B2/S2

0476574 5412913 B3/S3

Verification Undertaken By: _____ Date: _____

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION

Sample ID [SAMID]	Waterbody Name [WBY_NM]			Project Code [PROJCD]	
WBR-S-04	W.B. River			Omenica20	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm)	**Coordinates (UTM NAD 83)** [UTM Zone]	[LAT] [Easting, 6 No.]	[LONG] [Northing, 7 No.]	**Site Type** [SITP] (substr)	(cover)
Seine						
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** [BOTTOM] (list all substrate types in area of net)				
	3m	clay, silt				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date [EFFDTO] (dd/mm/yy)	Set Time [EFFTMO] (24hh:mm)	Net Length [XLEADUSE] (1 - 60 m)	Dist. Off Shore [XDISTOFF] (0 - 40 m)	Angle to Shore [XANGLE] (0^o - 90^o)	Min Depth [GRDEPMIN]	Mid Depth [XGRDEPMID]	Max Depth [GRDEPMAX]
Matty								
	24/10/21	14:30						

LIFT DATA (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date [EFFDT1] (dd/mm/yy)	Lift Time [EFFTM1] (24hh:mm)	Effort Status [EFFST] (codes 1 - 3)	Air Temp. [AIRTEM1] (^{o}C)	Water Temp. [SITEM1] (^{o}C)	Wave Height [XWAVEHT] (codes 1 - 5)
	24/10/21	14:50				

Cloud Cover [CLOUD] (%)	Precipitation [PRECIP] (codes 00 - 95)	Direction & Speed of Wind [WIND] (N,S,E,W)	(knots : km/hr)	General Weather for Set Duration [XWEATHER] (duration precip)	(duration wave)	Duration [EFFDUR] (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY

Kk 3 Seine) See GPS below

Species	Species Code	Total Catch [CATCNT]	Length-tallied [SUBCNT]	Bio-sampled [BIOCNT]	Struct. Taken [STRUCT]	Comments

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of th
1+ - Older than "

WATER QUALITY READING

Date: _____ Time: _____

Temperature: (^{o}C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments: 1-2 0476570 / 5412904 71
2-3 0476571 / 5412878 72
3-4 0476583 / 5412846 74

See Bio Sheet Data (Y / N)

QA/QC By:

Page: _____ o

FISHERIES NET CATCH / EFFORT FORM

wood.

proj: OMEMA3003

SITE DESCRIPTION:

Sample ID	Waterbody Name	Project Code
JC-S-01	Jacko Creek	OMEMA3003

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) UTM Zone	(LAT)	(LONG)	Site Type (Control / Exposure)
GN	127 MM	17 W	5901502 N	0473310 E	Control

Total/Hoop Size (#)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of set)
		Gravel, Cobble, Boulder, Bedrock, Fine Substrate, Aquatic Vegetation, Undercut Bank, Overhanging Vegetation, Woody Debris

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mm/yyyy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
D. LeBlanc	28/09/22	1420				0.3		0.6

LIFT DATA: (recorded at time of lift) Note: a knot equals one "nautical mile" per hour or 1.8 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mm/yyyy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
	27/09/22	09:20	1		10.1	

Cloud Cover (%)	Precipitation (codes 00 - 90)	Direction & Speed of Wind (N,S,E,W)	General Weather for Set - Duration (knots / km/hr)	(duration precip)	(duration wave)	Duration (fishing hours)
75	00					19.0

Effort Status Codes: 1 = no problem; 2 = minor problem - fished open; 3 = major problem - effort not fished

Wave Height Codes: 1 = 0.0 m (1 ft); 2 = 0.3 - 0.9 m (1 - 3 ft); 3 = 1.0 - 1.5 m (3 - 5 ft); 4 = 1.6 - 2.0 m (5 - 6.5 ft); 5 = > 2 m (> 6.5 ft)

Precipitation Codes (ALAS): 00 = no precipitation at lift time; 10 = mist; 20 = fog; 31 = light drizzle; 32 = heavy drizzle; 41 = light rain; 42 = heavy rain; 71 = light snow; 72 = heavy snow; 80 = light rain shower; 84 = heavy rain shower; 85 = flurries snow

Duration Terminations Codes: 1 = no precipitation during set; 2 = < 4 hours of precipitation; 3 = > 4 hours of precipitation; 4 = constant precipitation

Duration Wave Codes (calm <0.3m): 1 = calm for entire set duration; 2 = mostly calm & some rough; 3 = mostly rough & some calm; 4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Wts-sampled	Struct. Taken	Comments
White sucker		17				
Northern redbelly dace		84				
Brook stickleback		25				
Brook trout		84				
White sucker		42				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments
Northern redbelly dace		129	TOTAL = 2			
Brook stickleback		125	TOTAL 254			

WATER QUALITY READING: Date: 28/09/2022 Time: 19:30

Temperature: (°C)	10.1	DO: (%)	80.9
Cond: (µs/cm) (Micro)	97.6	DO: (mg/L)	8.65
Turbidity: (NTU)		pH:	7.09
TDS: (g/L)	71	ORP:	183.3 mV
Salinity: (ppt)		Depth: (m)	0.3

Comments: spring flowers close to creek mouth; other flowers yellow; water field shade also

See Bio Sheet Data (Y/N)

QA/QC By:

Page: of

Age Structures Legend:
Sc – Scales
Pv – Pectoral Ray
Otp – Otolith
Dr – Dorsal Ray
YOY – Young Of the Year
1+ – Older than "one"

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wood. Diagnostic Indicators of Channel Stability

Mandatory Fields in Grey must be filled out for processing

Stream Name: Jacko Creek

Site: JC

Station: S

Reach: 01

Date: 2022-06-05

Left Bank: 720.

Right Bank: 720.

Total Distance: 740.

Time: 11:35

	Wetted Width (cm)	Bankfull Width (cm)	Max. Depth (cm)	Velocity (m/s)
Left Bank Channel	200.0	242		
Right Bank Channel	415.0	181		
Main Channel Depth	403.0	764		
Left Active Channel	215.0	556	406	
Right Active Channel	410.	764	606	

Transect #	Wetted Width (cm)	Bankfull Width (cm)	Max. Depth (cm)	Velocity (m/s)
01	55.0	247	0	
02	150.0	218	27	
03	200.0	242	78	
04	211.0	279	108	
05	219.0	562	407	
06	235.0	687	531	
07	265.0	663	521	
08	295.0	672	545	

Transect #	Wetted Width (cm)	Bankfull Width (cm)	Max. Depth (cm)	Velocity (m/s)
09	325.0	706	570	
10	355.0	725	589	
11	385.0	747	605	
12	410.0	764	606	
13	415.0	147	0	
14	430.0	90	0	
15	530.0	103	0	
16	585.0	138	0	
17	590.0	211	38	
18	620.0	182	7	
19	640.0	140	0	
20	650.0	165	0	

Comments: Flood plain/wetland with deep channels flowing throughout. LB Swollen standing water 1.43m back on wetland grass/moss

Crew Leader (First & Last Name): R. Bleile

Crew: DL, RD

Recorder: DL

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wood. proj: OMEMA3003

Rapid Assessment Methodology Field Form

Mandatory Fields in Grey Must be filled out for processing

Stream Code: TC

Site Code: S

Sample: 01

Date: 2022-06-05

Site Type: ☐ Calibration ☑ Survey

Stream Name: Jacko Creek

Crew Leader (First & Last Name): R. Bleile

Crew: D, RD

Recorder: DL

Channel Structure

Depth (mm)	Pools (Hydraulic Head > 0.0 mm) No Cover	Pools Cover Present	Glides (Hydraulic Head > 8.7 mm) No Cover	Glides Cover Present	Slow Riffles (Hydraulic Head > 8.17 mm) No Cover	Slow Riffles Cover Present	Fast Riffles (Hydraulic Head > 17 mm) No Cover	Fast Riffles Cover Present
0 - 100 mm								
101 - 600 mm		18		3				
601 - 1000 mm								
> 1000 mm								
Total # Points	19		3	0				

Note: Grey hatched areas are for tally marks

Instream Cover

Cover Types	Fish Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points				3		

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Most Particle	30			
Maximum Particle	30			

Bank Stability

Mean Stream Width (m): 2.8 Mean Depth at Crossover (mm): Maximum Particle Size (mm):

Eroding Bank		Angle > 45°, erodible soil, undercut or bank fall
Vulnerable Bank	17	Angle < 45°, erodible soil, no sign of recent erosion
Protected Bank	3	Angle < 45°, non-erodible material/soil
Deposition Zone		Angle < 45°, (gradual slope from river) Fine grained sediments

UTM Coordinates of Transects:

Zone 17u

	Easting	Northing	Acc. (m)
1	0473310	5901502	
2	0473305	5901502	
3	0473301	5901499	
4	0473297	5901497	
5	0473296	5901487	

Comments: Substrate assisted by boat

Entered Verified Corrected

OMEMA 2002

FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap

wood.

Waterbody Name: Jack Lake

Start Date (dd-mmm-yyyy) / Time (nearest): 2 June 2022 / 1612h

Start Date (dd-mmm-yyyy) / Time (nearest): 3 June 2022 1120

Area Description:

Sample ID: NDR-JackLK

Method #: (Traps / Rods / Dips / Area): 10

UTM Coordinates: 17U 471035 5404771

Samplers Initials: DL, RD

PG: 1 of 1

SPECIES / TLEN (mm)		
	Brook Stickleback	32+14+5+12+9 = 72
	Iowa darter	4+3 = 7
Yellow	Perch	1 = 3
	Phoxinus	1 = 9
Golden	Shiner	2
	Fathead minnow	= 9
	Brook stickleback	+10 = 16
	Northern Pike observed	

Air ~19°C surface

Water Quality 3 June – 1 Water sample set → 7 bottles

19.7 °C

113.4 DO%L

1035 DO mg/L

0332.1 SPC µS/cm

(3.8K TDS mg/L

7.64 pH

104.5 ORP mV

1:30

Fish Species	
Size Range	
Total # Indv.	
Bulk Wt. (g)	
Bag ID	
Comments	

Comments/Notes: TRAPS from 471022 5404835 to 471046 5404733

Phoxinus = northern redbelly, dace + finescale dace

OMEMA 2002

FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap

wood.

Waterbody Name: Martin Lake

Start Date (dd-mmm-yyyy) / Time (nearest): 29 May 2022 1540

Start Date (dd-mmm-yyyy) / Time (nearest): 30 May 2022 0935

Area Description: Lake

Sample ID: MAR-LK

Method #: (Traps / Rods / Dips / Area): 16 minnow traps

UTM Coordinates: 17U 470382 5406861

Samplers Initials: DL, RD

PG: 1 of 1

SPECIES / TLEN (mm)		
YLPR	= 13	Yellow Perch

Traps set around north end of lake, east + west of the culvert under the access road immediately north of the lake

Water samples taken – 7 bottles 30 May 2022

10.4°C

28.5 µS/cm SA

83.5% DO

9.25 mg/L DO

18.2 TDS mg/L

4.81 pH

176.2 ORP

@ 470336 5406867 near culvert crossing

Fish Species	
Size Range	
Total # Indv.	
Bulk Wt. (g)	
Bag ID	
Comments	

Comments/Notes: 3 tadpoles. Traps tied off from shore. North area of lake.

ONEMA 2002

FISH TALLY — Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap — wood.

Waterbody Name: Sherry Lake
Start Date (DD MMM YYYY) / Time (24HR): 2 JUN 2022 / 15:45 — 3 JUN / 11:30
Area Description:
Sample ID: NDR-Sherlk — Method #: (Traps / Rods / Dips / Area): 17 — UTM Coordinates: 17U 471085 5405364 — Samplers Init.: RD, DL — PG: 1 of 1

SPECIES / TLEN (mm)					
	Yellow Perch	16+27=43			

3 June Air ~ 19°C

Water Quality
19.3 °C
62.7 DO %
5.76 DO mg/L
200.1 SPC
130.0 TDS
7.46 pH
104.4 ORP

water Sample Collected
June 3, 2022
(Surface)
CNC-Dup-02 also collected here
10:30

Fish Species	
Size Range	
Total # Inds.	
Bulk Wt. (g)	
Bag ID	
Comments	

Comments/Notes:
South west bay close to "road" part of the lake. Traps spread out from 471126 5405502 to 471090 5405338

ONEMA 2002

FISH TALLY — Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap — wood.

Waterbody Name: Davis Lake
Start Date (DD MMM YYYY) / Time (24HR): 01 JUN 2022 / 14:10 — 2 JUN / 13:30
Area Description:
Sample ID: NDR-Davlk — Method #: (Traps / Rods / Dips / Area): 16 — UTM Coordinates: 17U 471724 5403770 — Samplers In.: RD, DL — PG: 1 of 1

SPECIES / TLEN (mm)					
	Golden Shiner - 6				
	Yellow Perch - 182				
	Phoxinus - 124				
	Lava Darter - 17				
	Fathead minnow 4				

Water Quality
18.2 °C
76.5 DO%
7.17 DO mg/L
2282 SPC µs/cm
148.2 TDS mg/L
7.57 pH
116.5 ORP mV

from ~ 471656 5403753
to ~ 471751 5403793

Water Collected @ Surface
3 June 2022 7 bottles
471689 5403765

Fish Species	
Size Range	
Total # Inds.	
Bulk Wt. (g)	
Bag ID	
Comments	

Comments/Notes:
Phoxinus = northern redbelly dace + Finescale dace

Mat-R-02 8 June 2022

17.4 °C 1900

89.0 DO%

8.49 DO mg/L Water Collected

84.1 SpC

54.60 TDS

6.62 pH

126.9 ORP.

Mat-R-01 8 June 2022

17.3 °C 1930

87.8 DO% 0463524

8.40 DO mg/L 5409188

54.60 TDS

83.8 SpC

6.70 pH

116.1 ORP

8 July 2022 Fish enchi BCC
OMEN 7 2022 FB 3.4 20.1
Sutherland YSI

	Surface	1m	2m	3m
°C	17.5	17.9	17.4	11.5
%DO	95.1	92.8	88.4	~~38.3~~
DO mg/L	8.88	8.99	8.44	~~5.08~~
SpCond µs/cm	191.2	190.7	190.7	209.7
Mg/L	124.15	124.05	124.15	195.0
pH	7.08	7.33	7.35	7.35
ORP mV	113.1	117.1	116.6	119.4
	5m	6m	7m	8m

4m
9.6
1
1

343.7
223.6
7.10

Rite in the Rain

WBR-P-01 7 June 2027

Set 945

ON SHEET 8 Traps

Phoxinus 49+73+17 Pull: 900

Flathead 2+7+2+3+15+13

Stickleback 2+4+5+5+7+1+6+3+12+12

Chub 2+1

White Sucker 1+

Phoxinus Cont - 5+74+47+48+25+66

142+

Stickleback cont -

Water Quality

14.4 °C

39.1 Do %

3.95 Do mg/L

46.3 TDS

61.8 SpE

5.79 pH

148.6 ORP

Rite in the Rain

VBR - S - 03 6 June 2022

Trout perch 7 Traps

Burbot: 15.3c

Water Quality

15.7 °C

85.0 DO%

8.47 DO mg/L

45.8 SPC

29.90 TDS

5.85 PH

120.7 ORP

OMEMA2007

FISH TALLY

wood.

Waterbody Name: North Drift wood River

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow traps

Start Date (DD MMM YYYY) / Time (24HR): 31MAY2022 20:19:00

Start Date (DD MMM YYYY) / Time (24HR): 01JUN2022 10:44

Area Description:

Sample ID: NDR-5-05

Method #: (Traps / Rods / Dips / Area): 10

UTM Coordinates:

Samplers Initials: AD, D

PG: ___ of ___

SPECIES / FISH (mm)	adults 5-06				
Pharyngus	⊠⊠⊠□	+44+6+20+58+67+67+4+124 = 424			
Brook Stickleback	⊠ = 11				
Fathead	□ = 8				
Lake Chub	: = 2				

Water Quality

21.4 °C

61.0 DO %L

5.34 DO mg/L

26.0 SPC mS/cm

4.64 pH

17.55 TDS

162.6 ORP mV

water Sample Collected (7 bottles)

* June 1, 2022

Air temp ~ 20°C

Fish Species	
Size Range	
Total # Indv.	
Bulk Wt. (g)	
Bag ID	
Comments	

Comments/Notes:

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION:

Sample ID	Waterbody Name			Project Code
JC 5-01	Jackie Creek			

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
minnow traps		17	54	147		

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)
		overnight accumulation

Site Type - Substrate Codes
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + OE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand
SI = silt
CL = clay
MU = muck
OE = detritus
MA = marl

Site Type - Cover Codes
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms
BO = boulders
MA = macrophytes
LT = logs/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
K Ashley								
D Lee	29/MAY/22	11:00				0.3		0.6

LIFT DATA: (recorded at time of lift) Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
same	29/MAY/22	09:20			13	

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)
75	00	—	—	—	—	19.0

Effort Status Codes
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
fathead minnow		⊠⊠ 17				
northern redbelly dace		⊠⊠⊠⊠				
pearl dace		⊠⊠				
Brook Stickleback		⊠⊠				
lake chub		⊠⊠				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments
Northern cNTS		174	TOTAL = 280			
Lake Chub cont'd		132	TOTAL = 254			

WATER QUALITY READING: Date: 29MAY2022 Time: 10:30

Temperature: (°C)	13.1	DO: (%)	50.4
Cond.: (µS/cm) or (Ms/cm)	47.6	DO: (mg/L)	5.65
Turbidity: (NTU)	~~21.2~~	pH:	7.79
TDS: (g/L)	31.2 mg/L	ORP:	183.3 mV
Salinity: (ppm)	—	Depth: (m)	0.2

Comments: spring peepers close in hidden corridor, water samples taken

See Bio Sheet Data (Y / N)

QA/QC By:

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

Page: ___ of ___

May 29, 2022

NDR-S-01

MT Lift @ 12:30

Brook Stickleback: 34+12+4+5+1+5+2 ☒☒☒ +12+21+18+10+1+13

Fathead Minnow: 1+2+4+2+1+1:

Northern Redbelly Dace 1 ☒ +21+~~2~~0 12+34+56+12 ☒☒☒

Lake chub ~~+~~ 4+5+16

Finescale: ☒ ~~+~~ +14+12+10 ::

Yellow Perch. =1

Tadpole = 2

14.7°C

60.8 % DO

6.15 DO mg/L

38.9 µS/cm SPC

25.35 TDS mg/L

4.88 pH

149.6 ORP mV

@ 17 U 0475391

5406435

water samples taken here

13:15

NDR-P-01 lift @ 13.53 +23+12 +31=24

Phoxinus Sp. = 3+10+16+105+137 = 271 +262+45 = 534 1,439

Brookstickleback = 12+8+6+4+1+3+3+1+3 = 41

Fathead = 25+11+3+7+17+11+2+4+6 +5+4+1 = 96

Lake chub = 2+2

Brook stickleback = 2+10+7 = 19

White Sucker = 1

Bluntnose minnow = 1

American toads calling in pond

Common shiner 1

13.0 °C

39.0 Spc uS/cm

25.35 TDS mg/L

4.68 PH

36.1 DO %

3.65 mg/L DO

158.6 ORP. mV.

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION:

Sample ID	Waterbody Name	Project Code
NDR-P-01		2MEM02001

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
minnow traps		17U				

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = logtree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
	29MAY22							

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
	29MAY22	13:55	1		13.0	

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)
	00					

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
Phoxinus sp.		534		Finescale Dace, Northern Redbelly Dace		
Brook stickleback		120				
Fathead minnow		96				
Lake Chub		4				
White sucker		1				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments
Bluntnose minnow		1				
Common shiner		1				

WATER QUALITY READING:

Date: 29May2022 Time: 14:00

Temperature: (°C)	13.0	DO: (%)	36.1
Cond.: (µS/cm) or (Ms/cm)	39.0	DO: (mg/L)	3.65
Turbidity: (NTU)	—	pH:	4.68
TDS: (g/L)	25.35 mg/L	ORP:	158.6 mV
Salinity: (ppm)	—	Depth: (m)	0.3

Comments:

See Bio Sheet Data (Y / N

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

OMEMA 2002

FISH TALLY

wood.

Waterbody Name:	North Driftwood River
Method Used: (Minnow Trap / Angling / Dip Net / Seine)	Minnow Trap
Start Date (DD MMM YYYY) / Time (24HR):	05JUN2022/15 / 18:40
Area Description:	creek/stream
Sample ID:	NDR-trib-01
Method #: (Traps / Rods / Dips / Area)	7
UTM Coordinate:	174
Samplers In:	RD, NL
PG: ___ of ___	

SPECIES / TLEN (mm)					
	brook stickleback	1			
	Water quality 17.0°C	6 June 8:50	surface water samples taken 7 bottles		
	65.7 DO%				
	6.35 DO mg/L				
	85.2 SPC				
	55.25 TDS mg/L				
	6.95 pH				
	130.3 ORP mV				
Fish Species					
Size Range					
Total # Indv.					
Bulk Wt. (g)					
Bag ID					
Comments					

Comments/Notes:

OMEMA 2002

FISH TALLY

wood.

Waterbody Name:	West River
Method Used: (Minnow Trap / Angling / Dip Net / Seine)	Minnow Trap
Start Date (DD MMM YYYY) / Time (24HR):	05JUN2022 / 12:15
Area Description:	river
Sample ID:	WDR-S02
Method #: (Traps / Rods / Dips / Area)	7
UTM Coordinate:	174
Samplers In:	RD, NL
PG: ___ of ___	

SPECIES / TLEN (mm)					
	Burbot	total			
	Sculpin	total			
	Brook stickleback	total			
	Trout perch	total			
	Water Quality 14.2°C	6 June 2022 12:28	surface water taken 7 bottles		
	87.4 DO%				
	8.92 DO mg/L				
	42.1 SPC µS/cm				
	27.30 TDS mg/L				
	5.89 pH				
	133.1 ORP mV				
Fish Species					
Size Range					
Total # Indv.					
Bulk Wt. (g)					
Bag ID					
Comments					

Comments/Notes:
Traps set for 2 days

© MEMA 2022

FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow trap

wood.

Waterbody Name:	Start Date (DD MMM YYYY) / Time (24hr):	Start Date (DD MMM YYYY) / Time (24hr):	Area Description:
North Driftwood River	04 JUN 2022	06 JUN / 13:50	river

Sample ID:	Method #: (Traps / Rods / Dips / Area)	UTM Coordinates:	Samplers in:	PG: ___ of ___
NDR-A-05	7	174	RAPL	

SPECIES / TLEN (mm)					
	Brook stickleback	17+16+14+	21+16+16 =	90	
	Phoxinus sp.	9+58+39+5	7+2+14 =	179	
	Fathead minnow	= 6 total			
	Lake Chub	= 1 total			
	Water quality 14:05		6 Tubes → surface water samples taken, 7 bottles		
	20.1 ℃				
	77.3% DO				
	7.01 DO mg/L				
	48.6 SPC µS/cm				
	31.85 TDS				
	5.65 pH				
	127.3 ORP mV				
Fish Species					
Size Range					
Total # Indv.					
Bulk Wt. (g)					
Bag ID					
Comments					

Comments/Notes:
Traps set for 2 days

FISH TALLY

Waterbody Name:

Method Used: (Minnow Trap / Angling / Dip Net / Seine) Minnow Trap

wood.

Sample ID: WBRS-04

Method #: (Traps / Rods / Dips / Area) 7

Start Date (DD MMM YYYY) / Time (24HR): 04JUN 2022

Start Date (DD MMM YYYY) / Time (24HR): 06JUN / 15:00

Area Description:

UTM Coordinate: 17U

Samplers In.

PG: ___ of ___

SPECIES / TLEN (mm)					
	Trout perch = 3 total				
	Mottled sculpin = 1 total				
	Water Quality 15:00		surface water samples taken - 7 bottles		
	15.9°C				
	85.9 DO%				
	8.45 DO mg/L				
	45.05 SPEC µS/cm				
	29.25 TDS mg/L				
	5.79 pH				
	125.3 ORP mV				
Fish Species					
Size Range					
Total # Indv.					
Bulk Wt. (g)					
Bag ID					
Comments					

Comments/Notes:
Traps set for 2 days

OMEMA2002

FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine) Minnow traps

wood.

Waterbody Name:

Start Date (DD MMM YYYY) / Time (24HR): 01JUN2022/12:48

Start Date (DD MMM YYYY) / Time (24HR): 02JUN / 11:05

Area Description:

Sample ID: NDR-P-03

Method #: (Traps / Rods / Dips / Area) 10 traps

UTM Coordinates:

Samplers Int. IRO, DL

PG: ___ of ___

SPECIES / TLEN (mm)					
	Fathead minnow	159+187+163	+94+77+130+86+161+	134+170+114+90+88	
	Pharyngo.	10+13+X+1	+13+27+27+	9+5+6	
	Brook st.	1			
	Fathead cont'd	224+115			

Water quality 2 June 2022 10:35

20.6 °C

98.0 DO%L

8.75 DO mg/L

69.9 SPC mS/cm

45.50 TDS mg/L

6.84 pH

114.6 ORP mV

17U 0469783 5409473

Surface water samples taken (7 bottles)

Water quality

22.6 °C

108.9 DO%L

9.32 DO mg/L

69.4 SPC mS/cm

17U → no sample

44.85 TDS mg/L

6.39 pH

120.0 ORP

Fish Species					
Size Range					
Total # Indv.					
Bulk Wt. (g)					
Eag ID					
Comments					

Comments/Notes:

MEMA 2002

FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap

wood.

Waterbody Name: Gerry Lake

Start Date (DD MMM YYYY) / Time (24HR): 2JUN2022/

Start Date (DD MMM YYYY) / Time (24HR): 3JUN/

Area Description:

Sample ID: NPR-Gerry-k

Method #: (Traps / Rods / Dips / Area): 19

UTM Coordinate: 7U

Samplers In: AD, DL

PG: ___ of ___

SPECIES / TLEN (mm)					
	Yellow Perch	16+27=43			
	3 June	Air ~ 19C			
	Water Quality		water Sample Collected @ June 3, 2022 (Surface)		
	19.3 °C				
	62.7 DO%		CNC-Dup-02 also collected here		
	5.76 DO mg/L				
	200.1 SPC				
	130.0 TDS				
	7.46 pH				
	104.4 ORP				
Fish Species					
Size Range					
Total # Indv.					
Bulk Wt. (g)					
Bag ID					
Comments					

Comments/Notes:

FISH TALLY

wood.

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap

Waterbody Name: Jack Lake

Start Date (dd-mmm-yyyy) / Time (pm): 2 June 2022 / 1612 h

Start Date (dd-mmm-yyyy) / Time (pm): 3 June 2022 / 1130

Area Description:

Sample ID: MMA-Jack1K

Method # (Traps / Rods / Dips / Area): 10

UTM Coordinate: 174

Samplers in: DLRA

PG: ___ of ___

SPECIES / FISH (mm)				
	Brook Stickleback	32 + 14 + 5 + 12 + 9 = 72		
	Iowa darter	4 + 3 = 7		
Yellow	Perch	1 = 3		
	Phoxinus	1 = 9		
Golden	Shiner	2		
	Fathead minnow	= 9		
	Brook	1 + 15 = 16		
	stickleback			
	Northern Pike observed			

OMEMA 2002

FISH TALLY

wood.

Waterbody Name: North Driftwood River	Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow trap		
Sample ID: NDR-P-04	Method #: (Traps / Rods / Dips / Area): 9 minnow traps	Start Date (DD MMM YYYY) / Time (HHMM): 30 MAY 2022 / 10:30	End Date (DD MMM YYYY) / Time (HHMM): 31 MAY / 15:00
UTM Coordinate: 17U	Samplers Initials: DL, RD	Area Description:	PG: 1 of ___

SPECIES / TLEN (mm)					
	No fish caught				

Water quality 10.50 cm, Air 16°C
16.6 °C
55.3 % DO
5.34 DO mg/L
120.3 SPC µs/cm
75.00 TDS mg/L
5.88 pH
146.2 MV ORP
water samples taken 30 May

Fish Species					
Size Range					
Total # Indv.					
Bulk Wt. (g)					
Bag ID					
Comments					

Comments/Notes:

OMEMA 2002

FISH TALLY

wood.

Waterbody Name: Marilyn Lake	Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap		
Sample ID:	Method #: (Traps / Rods / Dips / Area): 15 minnow traps	Start Date (DD MMM YYYY) / Time (HHMM): 29 May 2022 / 10:15	End Date (DD MMM YYYY) / Time (HHMM): 30 May 2022 / 15:00
UTM Coordinate: 17U	Samplers Initials:	Area Description: Lake	PG: ___ of ___

SPECIES / TLEN (mm)					
YLPR	BRK = 13	Yellow Perch			

Water samples taken - 7 bottles

Fish Species					
Size Range					
Total # Indv.					
Bulk Wt. (g)					
Bag ID					
Comments					

Comments/Notes:
3 tadpoles

FISH TALLY

weight

FISH TALLY

weight

OMEMA2022

FISH TALLY

wood.

Waterbody Name: North Driftwood River
Sample ID: NDR-S-06
Method #: (Traps / Rods / Dips / Area): 12
Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow traps
Start Date (DD MMM YYYY) / Time (24HR): 31 MAY 2022/19:15
Start Date (DD MMM YYYY) / Time (24HR): June 2 22/11:25
Area Description:
UTM Coordinates: 17U
Samplers Initials: KD, DL
PG: ___ of ___

SPECIES / TL/FL (mm)					
Phoxinus sp.	87	76	72	109	76
Brook Stickleback				157	3
Fathead minnow					23
	239	1	= 486		
	= 51				

Water Quality
22.4 °C
72.1 DO%L
6.21 DO mg/L
27.1 SPC µS/cm
4.74 pH
17.55 TDS
158.0 ORP mV

Water sample collected (7 bottles)
* June 1, 2022

Air temp ~ 20°C

Fish Species	
Size Range	
Total # Indv.	
Bulk Wt. (g)	
Bag ID	
Comments	

Comments/Notes:

OMEMA2022

FISH TALLY

wood.

Waterbody Name: North Driftwood River
Sample ID: NDR-R-07
Method #: (Traps / Rods / Dips / Area): 15
Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow traps
Start Date (DD MMM YYYY) / Time (24HR): 31 MAY 2022/15:30
Start Date (DD MMM YYYY) / Time (24HR): June 2 2022/10:45
Area Description: RDS
UTM Coordinates: 17U
Samplers Initials: KD, DL
PG: 1 of ___

SPECIES / TL/FL (mm)					
Phoxinus sp.	8	145	110	12	= 135
Brook stickleback	1	25	7	6	72 = 112
Lake chub	5	= 6			
Fathead	6				

Water Quality
11.8 °C
52.3 %DO
4.73 DO mg/L
27.9 SPC µS/cm
18.2 TDS
4.46 pH
174.9 ORP mV

Water sample taken (7 bottles)
* June 1, 2022
Air temp ~ 20°C

Fish Species	
Size Range	
Total # Indv.	
Bulk Wt. (g)	
Bag ID	
Comments	

Comments/Notes:
See habitat notes other side

OMEMA 2002

FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap

wood.

Waterbody Name: West Buskegau River River

Start Date (DD MMM YYYY) / Time (24HR): 04 JUN 2022 / 17:00

Start Date (DD MMM YYYY) / Time (24HR): 06 JUN / 12:25

Area Description: river

Sample ID: WBR-S01

Method #: (Traps / Rods / Dips / Area): 7

UTM Coordinate: 17U 478567 5405800

Samplers in: RA, AL

PG: ___ of ___

SPECIES / TLEN (mm)					
	Burbot	1 total			
	Mottled sculpin	1 total			
	Brook stickleback	1 total			
	Trout perch	1 total			

Water Quality
14.2°C
87.4 DO%
8.92 DO mg/L
42.1 SPC µs/cm
27.30 TDS mg/L
5.89 pH
133.1 ORP mV

6 June 2022 12:28
surface water taken 7 bottles
478572
5405884

Fish Species	
Size Range	
Total # Indv.	
Bulk Wt. (g)	
Bag ID	
Comments	

Comments/Notes:
traps sit for 2 days

wood.

Proj # OMEMA 2002 WBR-S-01, S-02 not sampled

Rapid Assessment Methodology Field Form

Mandatory Fields In Grey
Must be filled out for processing

Stream Code: WBR | Site Code: S | Sample: 01

Date: YY 2022 - MM 06 - DD 04

Site Type: ☐ Calibration ☑ Survey

Stream Name: West Buskegau River

Crew Leader (initial & last name): R DIBBLEY

Crew: DL, RD

Recorder: DL

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm								
101 - 600 mm	03		03					
601 - 1000 mm	07	02	05		10			
> 1000 mm								
Total # Points	10	02	08	1	10	1	1	1

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points			02			

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle				
Maximum Particle				

425 451 780 418 451
935 845 744 541 909
952 899 901 835 932
936 814 895 784 904
889 868 1030 658 868
690 769 725 535 781
water depths (mm) ↑

Bank Stability

Mean Stream Width (m) | Mean Depth at Crossover (mm) | Maximum Particle Size (mm)

could not measure due to water depth + colour

Eroding Bank		Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank		Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank		Angle > 45°, non-erodible material/soil
Deposition Zone		Angle < 45°, (gradual slope from river), fine grained sediments

UTM Coordinates of Transects:

Zone 17u

Easting	Northing	Acc.(m)
0478576	5405899	
0478568	5405904	
0478567	5465928	
0478559	5405936	
0478564	5405914	

Comments: Substrate assessed by foot, Cobble encountered was on the smaller size.

Ent/Scanned | Verified | Corrected

2021 locations

OMEMA 2002

Rapid Assessment Methodology Field Form

S not 5

Mandatory Fields In Grey
Must be filled out for processing

Stream Code: WBR | Site Code: S | Sample: 03

Date: YY 2022 - MM 06 - DD 02

Site Type: ☐ Calibration ☑ Survey

Stream Name: West Buskegau River

Crew Leader (initial & last name): R DIBBLEY

Crew: D. Lepage

Recorder: DL

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm								
101 - 600 mm								
601 - 1000 mm	1		01		02		02	
> 1000 mm								
Total # Points	01	1	01	1	02	1	02	1

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points	1	1	1	1	1	1

water depths
610 mm
740
910
950
675
820

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)	gavia feces
Point Particle	04	02			
Maximum Particle	01	04	01	1	1

Bank Stability

Mean Stream Width (m) | Mean Depth at Crossover (mm) | Maximum Particle Size (mm)

Eroding Bank	01	Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank	01	Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank	1	Angle > 45°, non-erodible material/soil
Deposition Zone	1	Angle < 45°, (gradual slope from river), fine grained sediments

Comments: Substrate assessed by foot, RD has slumped

Ent/Scanned | Verified | Corrected

Diagnostic Indicators of Channel Stability

Proj # OMBMA 2002

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 1 | Page No. 1 of 1

Stream Name: WEST BUSKEGAU RIVER

Date (yyyy-mm-dd): 2022-06-04

Stream Code: WBR

Site Code: S

Sample: 01

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (Check all applicable types).
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 09.8

Point Spacing (m): 01.06

Channel Profile

	Horiz. Loc. (cm)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	483.0	1347	
Left Active Chann.	50	0545	
Right Active Chann.	1035	0525	

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (cm)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	39.5	1106	0			.
02	50.0	147	0			.
03	69.0	559	50			.
04	100.0	727	227			.
05	200.0	1166	660			.
06	300.0	1329	921			.
07	400.0	1345	955			.
08	500.0	1328	955			.
09	600.0	1313	939			.
10	700.0	1335	933			.
11	800.0	1313	887			.
12	900.0	1234	745			.
13	1000.0	992	466			.
14	1035.0	325	0			.
15	1062.0	277	0			.
16	1098.0	191	0			.
17	.					.
18	.					.
19	.					.
20	.					.

Comments:
Undercut LB 45mm. Started at LB, LB = 54 cm back from first point
Vertical height 270mm, RB top of bank = 1.1m back from last
Point on, Vertical height 360 mm, RB Stake is close to high water mark

Crew Leader (init. & last name): R DIBBLEY

Crew	Recorder	Ent/Scanned	Verified	Corrected
D. LEDAGE	DL			

Done at different spot than 2021

Bankfull Profile and Transect Discharge

Mandatory Fields in Grey Must be filled out for processing

Transect No. 1 of 1 | Page No. 1 of 2

Stream Name: WEST BUSKEGAW RIVER | Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2022-06-02

Stream Code: WBR | Site Code: 5 | Sample: 03

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (Check all applicable types)
☒ None Present ☐ Armouring ☐ Trampled Banks ☐ Inlets ☐ Wood Deflectors ☐ Other ☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☒	☐
Bank Material	☒	☒
Top of Point Bar	☐	☐
Vegetation	☒	☒
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width.

Left Entrenchment Width (m) .
Right Entrenchment Width (m) .
Total Entrenchment Width (m) .

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 13.9 | Point Spacing (m):

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Channel Profile (Horiz. Loc. (cm) | Vert. Ht. (mm) | Ht. Represents Bankfull? ☐ Yes ☐ No)

	Horiz. Loc. (cm)	Vert. Ht. (mm)
Left BFD	.	
Right BFD	.	
Max. Chann. Depth	900.0	1342
Left Active Chann.	110.0	492
Right Active Chann.	1500.0	205

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

	Horiz. Loc. (cm)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Observ. 01	.					.
02	.					.
03	.					.
04	.					.
05	40.0	93	0			.
06	80.0	400	0			.
07	100.0	471	0			.
08	110.0	492	0			.
09	150.0	718	244			.
10	200.0	881	425			.
11	300.0	1083	650			.
12	400.0	1123	694			.
13	500.0	1100	750			.
14	600.0	1204	823			.
15	700.0	1245	896			.
16	800.0	1200	871			.
17	900.0	1342	999			.
18	1000.0	1152	838			.
19	1100.0	921	592			.
20	1200.0	1008	676			.
Σ	1500.0	205	0			

Comments: Start at Left upstream bank. Not done at same location as summer 2021. Water above bankfull

Crew Leader (init. & last name): R DEBLEY

Crew: R.B, D.L | Recorder: DL | Ent/Scanned | Verified | Corrected

235

See notes on back

Proj. # OMEMA2002

Bankfull Profile and Transect Discharge

Mandatory Fields in Grey Must be filled out for processing

Transect No. 1 of N | Page No. 2 of 2

Stream Name: West Buskegaw River | Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2022-06-02

Stream Code: WBR | Site Code: 5 | Sample: 03

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring ☐ Trampled Banks ☐ Inlets ☐ Wood Deflectors ☐ Other ☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m) .
Right Entrenchment Width (m) .
Total Entrenchment Width (m) .

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 13.9 | Point Spacing (m): 01.00

Record only on the 1st transect.
Site Length (m) .
Transect Spacing (m) .

Channel Profile (Horiz. Loc. (cm) | Vert. Ht. (mm) | Ht. Represents Bankfull? ☐ Yes ☐ No)

	Horiz. Loc. (cm)	Vert. Ht. (mm)
Left BFD	.	
Right BFD	.	
Max. Chann. Depth	900.0	1342
Left Active Chann.	110.0	0492
Right Active Chann.	1500.0	0205

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

	Horiz. Loc. (cm)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Observ. 21	1300.0	1151	823			.
22	1400.0	999	604			.
23	1483.0	809	390			.
24	1500.0	205	0			.
25	1520.0	10	0			.
26	.					.
27	.					.
28	.					.

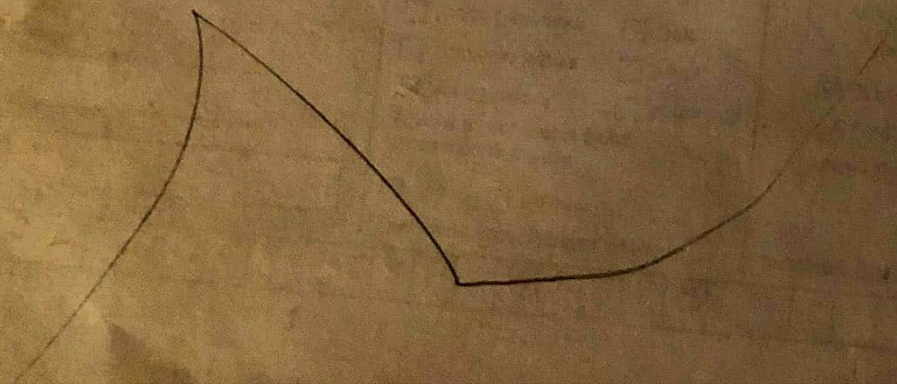
Comments:

Crew Leader (init. & last name): R DIBBLEY

Crew: D. LEPAGE | Recorder: DL | Ent/Scanned | Verified | Corrected

Right Top of bank = 630mm above RB assessment point
LD Approx 2m back from RB measurment.

Left Top of bank = approx 1m above LB assessment point
LD Approx 3 back from LB measurement.



Proj # OMEMA2002

wood.

Rapid Assessment Methodology Field Form

Mandatory Fields in Grey
Must be filled out for processing

Stream Code: WBR | Site Code: S | Sample: 03

Date (YY-MM-DD): 2022-06-04

Site Type: ☐ Calibration ☑ Survey

Stream Name: West Buskegau River

Crew Leader (initial & last name): RDibbley | Crew: DL, RD | Recorder: DL

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm								
101 - 600 mm	04	03	01		05		03	
601 - 1000 mm	01	01	03		02		05	01
> 1000 mm					01			
Total # Points	5	4	4		8		8	11

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points			05			

654 805 269 435 570
1040 842 417 641 361
1025 873 581 762 712
624 515 636 888 452
679 488 578 562 628
371 332 364 565 539
water depths (mm)

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle	23	17		
Maximum Particle	14	16		

Bank Stability

Mean Stream Width (m): | Mean Depth at Crossover (mm): | Maximum Particle Size (mm):

could not measure due to water depth & colour.

UTM Coordinates of Transects:
Zone 17U

Easting	Northing	Acc.(m)	
0476666	5412393		T5
0476676	5412383		T4
0476682	5412369		T3
0476690	5412353		T2
0476694	5412336		T1

Eroding Bank	5	Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank	5	Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank		Angle > 45°, non-erodible material/soil
Deposition Zone		Angle < 45°, (gradual slope from river), fine grained sediments

Comments: LB undercut additional 35cm, Substrate assessed by foot, Transects same as 2021
Slumping on Right bank, Line across Stream of logs that create a riffle (T1)

Ent/Scanned | Verified | Corrected

Proj # OMEMA2002

wood.

Rapid Assessment Methodology Field Form

Mandatory Fields in Grey
Must be filled out for processing

Stream Code: WBR | Site Code: S | Sample: 04

Date (YY-MM-DD): 2022-06-04

Site Type: ☐ Calibration ☑ Survey

Stream Name: West Buskegau River

Crew Leader (initial & last name): RDibbley | Crew: DL, RD | Recorder: DL

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm								
101 - 600 mm	07		03					
601 - 1000 mm			03		17			
> 1000 mm								
Total # Points	7		6		17			

Note: Grey hatched areas are for tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points						

464 359 418 491 341
830 791 831 849 566
922 905 933 995 726
841 916 960 955 936
742 834 835 863 977
298 535 486 637 400
water depths (mm)

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)
Point Particle	25	5		
Maximum Particle	5	18	7	

Bank Stability

Mean Stream Width (m): | Mean Depth at Crossover (mm): | Maximum Particle Size (mm): – see notes.

UTM Coordinates of Transects:
Zone 17U

Easting	Northing	Acc.(m)	
0476578	5412924		
0476576	5412906		
0476572	5412893		
0476575	5412875		
0476576	5412862		

Eroding Bank	10	Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank		Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank		Angle > 45°, non-erodible material/soil
Deposition Zone		Angle < 45°, (gradual slope from river), fine grained sediments

Comments: Substrate assessed by foot, Max Cobble Size Approx 100 - 200 mm

Ent/Scanned | Verified | Corrected

Diagnostic Indicators of Channel Stability

Proj # OMEMA2002

Mandatory Fields in Grey
Must be filled out for processing

Transect No. 1 of 1 | Page No. 1 of 2

Date (yyyy-mm-dd): 2022-06-04

Stream Name: WEST BUSKEGAW RIVER

Stream Code: WBR

Site Code: S

Sample: 04

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 10.3
Point Spacing (m): 1.00

Channel Profile (cm)

	Horiz. Loc. (cm)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	565.0	1110	
Left Active Chann.	69.0	306	
Right Active Chann.	1395.0	1306	

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (cm)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	40.0	1253	.	0		.
02	60.0	2663		0		.
03	69.0	3063		25		.
04	80.0	3833	102			.
05	100.0	3977	127			.
06	200.0	4033	157			.
07	300.0	8311	606			.
08	400.0	1003	800			.
09	500.0	1086	898			.
10	600.0	1108	951			.
11	700.0	1110	826			.
12	800.0	1099	914			.
13	900.0	1080	878			.
14	1000.0	1046	831			.
15	1100.0	1010	814			.
16	1200.0	961	716			.
17	1300.0	712	443			.
18	1330.0	659	380			.
19	1350.0	607	322			.
20	1372.0	474	183			.

Comments:
LB Top-60cm Back, 260mm above first LB point.
RB Top-1.5m Back, 1030mm above first RB point.
High water mark RB-800mm above first RB point.

Crew Leader (init. & last name): R DIBBLEY

Crew	Recorder	Ent/Scanned	Verified	Corrected
DL, RD	DL			

Proj # OMEMA2002

Mandatory Fields in Grey
Must be filled out for processing

Transect No. 1 of 1 | Page No. 2 of 2

Date (yyyy-mm-dd): 2022-06-04

Stream Name: WEST BUSKEGAW RIVER

Stream Code: WBR

Site Code: S

Sample: 04

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 10.3
Point Spacing (m): 1.00

Channel Profile

	Horiz. Loc. (cm)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	1345.0	300		2		.
22	1436.0	146		0		.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

Comments:

Crew Leader (init. & last name): R DIBBLEY

Crew	Recorder	Ent/Scanned	Verified	Corrected
D. LEPAGE	DL			

12:00

FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap

wood.

Waterbody Name:	Start Date (DD MMM YYYY) / Time (24HR):	Start Date (DD MMM YYYY) / Time (24HR):	Area Description:
West Buckegaw River	04JUN 2022 / 14:	06JUN / 15:00	

Sample ID:	Method # of (Traps) / Rods / Dips / Area)	UTM Coordinate:	Samplers In.	PG: 1 of 1
WBRS-04	7	17U 476567 5472897	DL KD	

SPECIES / TLEN (mm)					
	Trout perch = 3 total				
	Mottled sculpin = 1 total				
	Water Quality 15:80		surface water samples taken - 7 bottles		
	15.9°C				
	85.9 DO%				
	8.45 DO mg/L				
	45.05 SPC µS/cm				
	29.25 TDS mg/L				
	5.79 pH				
	125.3 ORP mV				
Fish Species					
Size Range					
Total # Indv.					
Bulk Wt. (g)					
Bag ID					
Comments					

Comments/Notes:
Traps set for 2 days
Habitat sheets also

Point of Work Risk Assessment

wood.

Project / activity	OMEMB2002
Work location	Timmins
Date	Aug 29

PoW RA is intended to facilitate and document a field-level risk assessment by all involved workers, to verify that the hazards identified, and controls specified in the Health and Safety Plan (HASP) and/or Activity Hazard Analysis (AHA) adequately address the hazards encountered at the site. If you have concerns regarding Health, Safety or Environment (HSE) hazards or controls, contact your supervisor / project manager, HSE Coordinator or HSE Manager.

Part 1 – Stop

Before you start (Discuss and agree with all involved workers. Tick appropriate box.)	Yes	No*	N/A
Is the task the same as briefed?	✓		
Are conditions or activities as expected and mitigated in the HASP / AHA?	✓		
Do you have the right documentation and authorization?	✓		
Does the team have the right training, competence and fit for duty?	✓		
Are all tools, equipment and required PPE in good working order?	✓		
Have all applicable work permits and/or site orientation been completed?	✓		

*** If you have answered 'No' to any of the above, report to the supervisor / project manager to verify the required actions.**

Part 2 – Look and Think

Hazard Assessment (If the hazard is present, tick the box.) **Life Saving Rules (LSR) indicated by icon***

Driving / Journey management	✓	Excavations (protection) / Utilities	
Traffic / motorist exposure	✓	Overhead powerlines / Electricity	
Towing and securing cargo		Work permits (site, other special, etc.)	
Moving and energized equipment		Toxic chemicals / hazardous materials	
Operating mobile equipment	✓	Confined space	
Uncertified / defective equipment		Isolation (electricity, process, etc.)	
Powered tool use		Dropped objects / Overhead work	
Line of fire from equipment failure		Work at height / Scaffolding	
Manual handling		Suspended load / Crane	
Temperature (high / low) / weather	✓	Heat / fire / explosion	
Lone / remote working	✓	Personal security / Harassment / Crime	
Fatigue / stress	✓	Work near or over open water	✓
Other hazard(s) – specify			

Circle any ticks for hazards that have not been identified in the AHA and that do not currently have appropriate controls and carry these forward to Part 3. Do not commence work until these have been assessed further.

***LSR: Contact the supervisor / project manager if LSR identified are not currently controlled.**



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Point of Work Risk Assessment

wood.

Part 3 – Assess, Control and Act

Risk Assessment (if more space is needed attach separate page.)

Hazard (circled from Part 2)	Additional control measures / precautions	Residual Risk* (E, H, M, L, VL)

*** If any Residual Risk is Extremely high (E) or High (H) following implementation of control measures / precautions, then activity must not proceed.**

Risk Assessment Code (RAC) Matrix (Refer to Risk Register)

Severity \ Probability	Almost certain	Likely	Possible	Unlikely	Rare
Catastrophic	E	E	E	H	M
Major	E	H	H	M	L
Serious	H	H	M	L	VL
Minor	M	M	L	L	VL
Negligible	L	VL	VL	VL	VL

1. **Review each "Hazard" to identify Probability and Severity considering controls applied.**
2. **Identify the RAC as E, H, Medium (M), Low (L) or Very Low (VL) for each "Hazard" after controls are applied.**

"Probability" is the likelihood to cause an incident:
Almost certain (more than 1per every month), Likely (at least 1per every 6 months), Possible (1per every 6 months - 2 years), Unlikely (1per every 2-10 years), Rare (less than 1per every 10 years).

"Severity" is the outcome/degree if an incident:
Catastrophic (>5 fatal), Major (1-4 fatal, severe health effect, long term disability), Serious (Lost time injury, significant health effect), Minor (Medical or Restricted injury, moderate health effect) or Negligible (First Aid or temporary health effect).

Part 4 – Review

Activity review	Yes	No
Are there any lessons for next time?		
Has the work created any new hazards?		
Midday activity review? (i.e. after breaks, lunch, or changed condition)		

If you have answered 'Yes' to either of these questions, inform the supervisor or project manager.

Name and signature(s) of person(s) completing POW:

Reviewer: _____ Date reviewed _____

Once complete, scan and send to the supervisor or project manager.

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Point of Work Risk Assessment

wood.

Project / activity	OMEMA2002
Work location	Timmins
Date	Aug 30

PoW RA is intended to facilitate and document a field-level risk assessment by all involved workers, to verify that the hazards identified, and controls specified in the Health and Safety Plan (HASP) and/or Activity Hazard Analysis (AHA) adequately address the hazards encountered at the site. If you have concerns regarding Health, Safety or Environment (HSE) hazards or controls, contact your supervisor / project manager, HSE Coordinator or HSE Manager.

Part 1 – Stop

Before you start (Discuss and agree with all involved workers. Tick appropriate box.)	Yes	No*	N/A
Is the task the same as briefed?	✓		
Are conditions or activities as expected and mitigated in the HASP / AHA?	✓		
Do you have the right documentation and authorization?	✓		
Does the team have the right training, competence and fit for duty?	✓		
Are all tools, equipment and required PPE in good working order?	✓		
Have all applicable work permits and/or site orientation been completed?	✓		

*** If you have answered 'No' to any of the above, report to the supervisor / project manager to verify the required actions.**

Part 2 – Look and Think

Hazard Assessment (If the hazard is present, tick the box.) **Life Saving Rules (LSR) indicated by Icon***

Driving / Journey management	✓	Excavations (protection) / Utilities	
Traffic / motorist exposure		Overhead powerlines / Electricity	
Towing and securing cargo		Work permits (site, other special, etc.)	
Moving and energized equipment		Toxic chemicals / hazardous materials	
Operating mobile equipment	✓	Confined space	
Uncertified / defective equipment		Isolation (electricity, process, etc.)	
Powered tool use		Dropped objects / Overhead work	
Line of fire from equipment failure		Work at height / Scaffolding	
Manual handling		Suspended load / Crane	
Temperature (high / low) / weather	✓	Heat / fire / explosion	
Lone / remote working	✓	Personal security / Harassment / Crime	
Fatigue / stress	✓	Work near or over open water	✓

Other hazard(s) – specify

Circle any ticks for hazards that have not been identified in the AHA and that do not currently have appropriate controls and carry these forward to Part 3. Do not commence work until these have been assessed further.

***LSR: Contact the supervisor / project manager if LSR identified are not currently controlled.**



Powered by CamScanner

Point of Work Risk Assessment

wood.

Part 3 – Assess, Control and Act

Risk Assessment (if more space is needed attach separate page.)

Hazard (circled from Part 2)	Additional control measures / precautions	Residual Risk* (E, H, M, L, VL)

*** If any Residual Risk is Extremely high (E) or High (H) following implementation of control measures / precautions, then activity must not proceed.**

Risk Assessment Code (RAC) Matrix (Refer to Risk Register)

Severity \ Probability	Almost certain	Likely	Possible	Unlikely	Rare
Catastrophic	E	E	E	H	M
Major	E	H	H	M	L
Serious	H	H	M	L	VL
Minor	M	M	L	L	VL
Negligible	L	VL	VL	VL	VL

1. **Review each "Hazard" to identify Probability and Severity considering controls applied.**
2. **Identify the RAC as E, H, Medium (M), Low (L) or Very Low (VL) for each "Hazard" after controls are applied.**

"Probability" is the likelihood to cause an incident:
Almost certain (more than 1per every month), Likely (at least 1per every 6 months), Possible (1per every 6 months - 2 years), Unlikely (1per every 2-10 years), Rare (less than 1per every 10 years).

"Severity" is the outcome/degree if an incident:
Catastrophic (>5 fatal), Major (1-4 fatal, severe health effect, long term disability), Serious (Lost time injury, significant health effect), Minor (Medical or Restricted injury, moderate health effect) or Negligible (First Aid or temporary health effect).

Part 4 – Review

Activity review	Yes	No
Are there any lessons for next time?		
Has the work created any new hazards?		
Midday activity review? (i.e. after breaks, lunch, or changed condition)		

If you have answered 'Yes' to either of these questions, inform the supervisor or project manager.

Name and signature(s) of person(s) completing POW:

Reviewer: _____ Date reviewed _____

Once complete, scan and send to the supervisor or project manager.

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CRAWFORD

AHA DAILY RENEWAL

Date: Aug 31	Weather: overcast, 7°C, cloudy
Changes noted: —	

Site Supervisor (Print & Sign):		
Name(s):		

Date: Sept 1	Weather: Sunny, 19°C
Changes noted: —	

Site Supervisor (Print & Sign):		
Name(s):		

Date: Sept 2	Weather: Sunny, 30°
Changes noted: MAT R.	

Site Supervisor (Print & Sign):		
Name(s):		

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Project Name: OMEMA2002		
Document Title	**Daily Inspection / Maintenance Log – Pickup Truck / ATV / UTV / Snowmobile / ARGO (circle one)** Project No: OMEMA2002	wood.

Week Ending: Sept 2 *(Friday)*

Equip No. / Lic.Plate _____

Must be completed by first user daily. Any problems to be reported to immediate supervisor. Keep inspection form with the equipment.

Inspected by:			SS	SS	[illegible]	SS		
Date:	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	COMMENTS (note any deficiencies/actions):
Safety Devices			29	30	31	1	2	
Check Flashing Beacon Operating			✓	✓	✓	✓		
Check Buggy Whip (Flag)			✓	✓	✓	✓		
Check Horn Operation			✓	✓	✓	✓		
Seat Belts Working and in Good Condition			✓	✓	✓	✓		
Fire Extinguisher Fully Charged			✓	✓	✓	✓		
First Aid Kit			✓	✓	✓	✓		
Spill Kit			✓	✓	✓	✓		
Fluid Levels (check & add as required)								
Fuel Level (F, ¾, ½, etc.)			F	1/2	1/4	F		
Engine Oil Level			✓			✓		
Radiator Coolant Level			✓	✓	✓	✓		
Windshield Washer Fluid			✓	✓	✓	✓		
External Inspection								
Tires – Condition & Pressure (visual)			✓	✓	✓	✓		
Brake and Parking Brake Operation			✓	✓	✓	✓		
Lights – Condition & Functioning			✓	✓	✓	✓		
Windshield (cracks or damage)			✓	✓	✓	✓		
Panel damage (Dents, Scratches)			✓	✓	✓	✓		
Tracks – Condition & Tension (4-6" Slack)			T	T	T	T		
Twist Grip Throttle Operation								
Side Safety Nets								
Drain Plugs (in place)								
Winch Operation								
Tow Rope / Winch Slings								
Slow Moving Vehicle Sign								
Idler Chains – Condition / Lubricate								
Grease Nipples Weekly								
Maintenance								
Remove debris from front grill area, intake/exhaust			✓	✓	✓	✓		
Cleaning of Cab / Rear Seating Area / Box			✓	✓	✓	✓		
Equipment Hours or Odometer (km):			2467	2621	2849	2958		**Due for Service:**
Checked by Supervisor/Security (Initials):			SS	SS	[illegible]	SS		

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wood.

SITE DESCRIPTION:

Sample ID	Waterbody Name	Project Code
NDR-P-03	North Driftwood R.	OMEMA002

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
GN.						

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophytes NC = no cover
LT = log/tree

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
SS MG	30/Aug/22	17:05						

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
SS MG	30/Aug/22	20:05				

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
NRPD	28	3				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING: Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

Page: _____ of _____

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ELECTROFISHING FORM

Project Name / Number: OMEMA2002.

wood.

Waterbody: JSO1	Date: (DD/MMM/YYYY) 30/Aug/2022	Water Temp:	Shocking Method:	Pg: 1 of 1 Run: ___ of ___
UTM Start: UTM End: Zone / Acc.:	Start Time / Stop Time (24 hrs):	Netters: MG/SS.		Site Area (Length X Width):
Sample ID:	Elapsed Time: (hours)	Effort (seconds):	Voltage:	Frequency: / Pulse:

Sample ID	Fish #	Species	Species Code	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Aging Structures (Sc, Pr, Dr, Oto)	Retained (Y/N)	Comments (Hg / Released / etc.)
	EF	1006 seconds.							
Pass	#1	@ 13:45							
WHSC		5							
NRPD		17							
FTMN		2							
BRST		12.							
Pass	#2	@ 14:05							
NRPD		27							
FTMN		1							
WHSC		1							
BRST		7							
Pass	#3	@ 14:15							
BRST		6							
FNSC		7							
NRPD		10							
		See Renese for Hab.							

Species Box Tally Area / Site Comments:

Aging Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"

QA/QC By:
Date:

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Habitat

Open marshland, boggy mounds of grasses, 500m of open field before spruce forest on west side and HW4 655 on E.

Transect #1

LB = 60cm
Mid = 54cm
RB = 73cm
width = 182cm.

Transect #2

LB = 79cm
mid = 85cm
RB = 82cm
width = 192cm

Transect #3

LB = 59cm
mid = 60cm.
RB = 70cm
width = 160cm

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5 mm FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Seine

wood.

Waterbody Name: North Driftwood River

Start Date (DD MMM YYYY) / Time (24HR): 29/Aug/22 12:40

Start Date (DD MMM YYYY) / Time (24HR): —

Area Description: Stream

Sample ID: NDR-S-04

Method #: (Traps / Rods / Dips / Area): 30m Seine x4

UTM Coordinate: Sum

Samplers In: SS/MG

PG: 1 of 1

SPECIES / TLEN (mm)	CMSH	YLPR	LGPR	BRST						
0	19	1	1	1						
5										
10	* crayfish present									
15	* toads present									
20										
25	Seine # 2 x 30m @					12:50				
30										
35	WHSC	CMSH	BRST	LGPR	JHDR	BNSH				
40	1	61	9	3	1	22				
45										
50										
55	Seine #3 x30m @ 13:15									
60										
65	CMSH	BRST	NRDC	BNSH	WHSC	GLSH	JHDR	BLMN		
70	131	1	14	25	1	6	2	1		
75										
80		See Release For Hab.								
85										
90										
95										
100										
105										
110										
115										
120										
125										
130										
135										
140										
145										
150										
Fish Species										
Size Range										
Total # Indv.										
Bulk Wt. (g)										
Bag ID										
Comments										

Comments/Notes:

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Habitat Assessment

29/Aug/22.

NDR-S-04

Joe pyeweed, horsetail, arrowhead, poison hemlock, tape grass, alder, spruce.

Transect #1 DS

35 ft wide, depths: LB = 23 in
mid = 25 in
RB = 16.5 in CB/SI

Transect #2 Mid

27.3 ft wide, D: LB = 15 in
mid = 17.5 in
RB = 13.5 raf/BO/CB

Transect #3 US

17.5 ft wide, D: LB = 19.25 in
mid = 23 in
RB = ≥ 19.5 in CL/WD BO/CB.

FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION:

Sample ID		Waterbody Name			Project Code	
NDR-S-04		North Driftwood River			OMEM2022	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
GN	Var.					
Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
SS MG	29/Aug/22	13:45						

LIFT DATA: (recorded at time of lift) Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
SS MG	29/Aug/22	18:00.				

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
GN/11" @ DS			GN 4"	@ US		
↳ YLPR		1		no catch.		
↳ CMSH		2				
GN 1.5" @ mid						
No Catch						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING: Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

Comments:

See Bio Sheet Data (Y / N

QA/QC By:

Page: _____ of _____

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Ministry of Transportation

Ontario

PONDS AND LAKES FIELD COLLECTION FORM

GENERAL INFORMATION

Project #	Project Description:	Date:
OMEMA2002	Baseline	sept. 12022

Collectors:	Time Started:	Time Finished:
AS / SS	8:00 am	9:00 am

Weather Conditions:	Air Temp (°C):
Sunny.	9°

Surface Conditions:

Calm	Rippled	Wavy	Rough
O	✓	O	O

Photos Numbers and Descriptions:

Sam's phone

LOCATION

Name of Waterbody:	Station #:	Location of Station:
Mar LK		
GPS Coordinates:	MTO Chainage:	
Township:	MNRF District:	

LAND USE AND POLLUTION

Surrounding Land Use / Terrain:	Sources of Pollution:
Forrest	~~AAA~~, dirt Road, rec. trails

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WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ⊘	Pond ○	Reservoir ○	Dug-out ○	Wetland ○
Intermittent ○	Run-off ○	Spring-Fed ○	In-stream ○	Bypass ○	Not connected ○

Waterbody Dimensions:	
Length (m) google Earth.	Mean Width (m)

WATER CHEMISTRY			
Water Colour:			
Colourless ○	Yellow / Brown ○	Blue / Green ⊘	Other (Describe): ○
Secchi Depth (m):		pH (as required):	
Conductivity (µS/cm):			
Surface:		Bottom:	

DISSOLVED OXYGEN / TEMPERATURE PROFILE							
Depth (m)	**0.0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
Water Temp (°C)							
Dissolved Oxygen (mg/L)							
Depth (m)	**3.5**	**4.0**	**4.5**	**5.0**	**5.5**	**6.0**	**6.5**
Water Temp (°C)							
Dissolved Oxygen (mg/L)							
Depth (m)	**7.0**	**7.5**	**8.0**	**8.5**	**9.0**	**9.5**	**10.0**
Water Temp (°C)							
Dissolved Oxygen (mg/L)							

Max Depth (m):			Bottom Substrate:					
Bedrock (Br)	***Boulder (Bo)***	***Cobble (Co)***	***Gravel (Gr)***	***Sand (Sa)***	***Silt (Si)***	***Clay (Cl)***	***Muck (Mu)***	***Detritus (D)***

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BANK HABITAT						
Bank Cover (% surface area):						
Undercut banks	Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	None
					100	0
Near Shore Slope (%): 0-45%						

Shoreline Substrate (%):									
Bedrock	Boulder	Cobble	Gravel	Sand	Silt	Clay	Muck	Marl	Detritus
							100		

Shore Cover (% shaded):				
100-90% O	89-60% O	59-30% ✓	29-1% O	None O

IN-WATER HABITAT					
Underwater Cover (% surface area):					
Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
				30%	

Vegetation Type:				
Vegetation Type (%)	Submerged 25	Floating 25	Emergent 25	None O
Predominant Species:	Milfoil, grasses, Potamogetan			

MIGRATORY OBSTRUCTIONS		
None	Seasonal	Permanent

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POTENTIAL CRITICAL HABITAT

POTENTIAL ENHANCEMENT OPPORTUNITIES

ADDITIONAL COMMENTS

Southwest Bay: 2m deep, pond lilies, sedges, quickly turns to dense forest with black spruce. Lots of dead heads and fallen trees in bay. Mucky bottom, eroding banks.

Cattails on shore.

South shore: outflow with cattails, grasses, milfoil, 75% submerged, 15% floating veg, 10% emerged veg. Horsetail, mucky bottom, creek meeting grn. LK. Marsh area dominated by horsetail on southeast.

Additional Notes Appended? O No O Yes Number of Pages _____

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PONDS AND LAKES FIELD COLLECTION FORM

GENERAL INFORMATION

Project #	Project Description:	Date:
OMEMA2002	Baseline	Sept. 1/2022

Collectors:	Time Started:	Time Finished:
AS/SS	12:30	13:30

Weather Conditions:	Air Temp (°C):
Sunny, calm	15°C

Surface Conditions:

Calm	Rippled	Wavy	Rough
O	①	O	O

Photos Numbers and Descriptions:

Sam's phone.

LOCATION

Name of Waterbody:	Station #:	Location of Station:
GERR LK		

GPS Coordinates:	MTO Chainage:

Township:	MNRF District:

LAND USE AND POLLUTION

Surrounding Land Use / Terrain:	Sources of Pollution:
Forest	Dirt Road, recreational trails.

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WATERBODY TYPE AND MORPHOLOGY					
Large Lake ○	Small Lake ✓	Pond ○	Reservoir ○	Dug-out ○	Wetland ○
Intermittent ○	Run-off ○	Spring-Fed ○	In-stream ○	Bypass ○	Not connected ○

Waterbody Dimensions:	
Length (m)	Mean Width (m)

WATER CHEMISTRY			
Water Colour:			
Colourless ○	Yellow / Brown ○	Blue / Green ✓	Other (Describe): ○
Secchi Depth (m):		pH (as required):	

Conductivity (µS/cm):	
Surface:	Bottom:

DISSOLVED OXYGEN / TEMPERATURE PROFILE							
Depth (m)	**0.0**	**0.5**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**
Water Temp (°C)							
Dissolved Oxygen (mg/L)							
Depth (m)	**3.5**	**4.0**	**4.5**	**5.0**	**5.5**	**6.0**	**6.5**
Water Temp (°C)							
Dissolved Oxygen (mg/L)							
Depth (m)	**7.0**	**7.5**	**8.0**	**8.5**	**9.0**	**9.5**	**10.0**
Water Temp (°C)							
Dissolved Oxygen (mg/L)							

Max Depth (m):	Bottom Substrate:							
Bedrock (Br)	***Boulder (Bo)***	***Cobble (Co)***	***Gravel (Gr)***	***Sand (Sa)***	***Silt (Si)***	***Clay (Cl)***	***Muck (Mu)***	***Detritus (D)***

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BANK HABITAT

Bank Cover (% surface area):

Undercut banks	Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	None
					100.	0

Near Shore Slope (%):

0-45%

Shoreline Substrate (%):

Bedrock	Boulder	Cobble	Gravel	Sand	Silt	Clay	Muck	Marl	Detritus
			5				95		

Shore Cover (% shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	✓	O	O

IN-WATER HABITAT

Underwater Cover (% surface area):

Boulders	Cobbles	Woody Debris	Organic Debris	Vascular Macrophytes	Other
				30%	

Vegetation Type:

Vegetation Type (%)	Submerged	Floating	Emergent	None
	25	25	25	O
Predominant Species:	horsetail milfoil	Pond lilies	grasses	

MIGRATORY OBSTRUCTIONS

None	Seasonal	Permanent

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POTENTIAL CRITICAL HABITAT

POTENTIAL ENHANCEMENT OPPORTUNITIES

ADDITIONAL COMMENTS

5-20m deep in basin, shores lined with sedges, cattails and surrounding by dense forest predominantly black spruce. Fallen trees along ~~AHS~~ shoreline. Mucky bottom, stable banks.

Additional Notes Appended? O No O Yes Number of Pages _____

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BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): GN

Project Site / Project Number: OMEMA2002

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
North Driftwood River	30/Aug/22 11:45	30/Aug/22 / 15:15	Pond

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1
NDR-P-06	3	See GPS	AS/DL	See Net Form: (Y) N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Pearl dace	1		7.2	7.7						
Fathead	2		5.8	6.2						
Pearl dace	3		7.0	7.4						
White Sucker	4		252	26.9						
"	5		17.6	18.7						
"	6		17.0	18.6						
"	7		18.3	19.8						Dead.
	~~8~~									
	9									
	~~10~~									
	~~RST HHT~~									
	~~TOTAL 11 452~~									

Species Box Tally Area / Site Comments:
FinnScale -:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

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BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) MT.

Project No: OMEMA2002 wood.

Waterbody Name: North Driftwood R

Start Date (DD MMM YYYY) / Time (24HR): 29/Aug/22 17:10

End Date (DD MMM YYYY) / Time (24HR): 30/Aug/22 13:30.

Area Description: Pond.

Sample ID: NDR-P-06.

Method #: (Traps / Rods / Dips) ~~30~~ 26

UTM Coordinates (mN, mE, Zone, Acc.):

Samplers In. AS/DL

Page: 1 of 1

see Net Form ☑

Sample ID	Fish #	Species	Species Code	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Aging Structures (Sc, Pr, Dr, Oto)	Pres. for Analysis (Y/N)	Presumed age class (YOY / 1+)	Comments (Hg / Released / etc.)
BRST	1			~~4~~	49					
"	2			–	42					
FNDC	3			50	56					
BRST	4			–	53					
FNDC	5			74	76					
BRST	6			–	49					
FNDC	7			55	57					
"	8			78	83					
"	9			80	85					
"	10			79	84					
"	11			79	84					
BRST	12			–	46					
FNDC	13			73	77					
"	14			67	71					
"	15			54	57					
FTMN	16			58	61					
BRST	17			–	39					
BRST	18			–	41					
BRST	19			–	42					
		+FNDC		56+1+1						
BRST	20			–	50					
		+ BRST = 6								
		+ FNDC = 154								

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch
		Total #	

QA/QC By:

Date:

Aging Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"

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Ministry of Transportation

Ontario

WATERCOURSE FIELD COLLECTION FORM

GENERAL INFORMATION		
Project #: OMEMA2022	Project Description: Baseline	Date: 30 Aug. 2022

Is Stream Realignment required for this section:

O Yes O No O Unknown

Collectors:	Time Started:	Time Finished:
ASI DL	15:40	

Weather Conditions: Cloudy, rain, 15°C.

Air Temp (°C):	Water Temp (°C):	Conductivity (µS/cm):	Velocity (m/s):
15°C	20°C		

Photos Numbers And Descriptions:

Dustin's Phone

LOCATION			
Name of Waterbody: ~~Northwood~~ Driftwood River.	Drainage System:	Crossing #: /	Station #: NDR-P-06

Location Of Crossing:

GPS Coordinates:	MTO Chainage:
Township: Timmins	MNRF District:

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NDR-P-06

Vascular Macrophytes:	Woody Debris:
Instream:	Instream:
Overhanging:	Overhanging:

Shore Cover (% stream shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	O	O

Vegetation Type:

Vegetation Type (%)	Submergent 59-30%	Floating:	Emergent:	None O
Predominant Species:				

MIGRATORY OBSTRUCTIONS

Permanent	Seasonal	None

POTENTIAL SIGNIFICANT HABITAT

Spawning	Groundwater	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES

ADDITIONAL COMMENTS

Arrowhead
Cattails,
rushes, reeds, alders | dogwood.
Soft muddy bottom, >1m deep, channel flowing out.
some deadheads. 3m wide.

Additional Notes Appended? O No O Yes Number of Pages _____

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BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): GN

Project Site / Project Number: OMEMA2002

wood.

Waterbody or Watercourse Name: NDR-P-07

Start Date: (DD/MMM/YY) / Time (24HR): 29/Aug/22 15:15

End Date: (DD / MMM / YY) / Time (24HR): 30 Aug 22 10:00

Area Description: (Habitat Type / Site Features): Pond

Sample ID: North Driftwood B.

Method Effort: (Traps/Rods/Dips) 50m x4

UTM Coordinates: (mN, mE, Zone, Acc.)

Samplers In: DL/AS

Page 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Lake Chub	1		10.9	11.4						Dead.
White Sucker	2		16.6	17.1						
"	3		11.7	12.4						Dead
Finescale	4		5.3	5.6						
"	5		5.6	6.0						
Finescale	6		5.2	5.6						
Finescale	7		6.2	6.6						
White Sucker	8		19.2	20.1						Dead
White Sucker	9		17.7	20.6						Dead
Finescale	10		8.5	9.0						Dead
lake Chub	11		7.7	8.1						Dead
lake chub	12		7.2	7.6						Dead
lake chub	13		7.0	7.3						Dead
White Sucker	14		20.3	21.0						
"	15		26.4	27.9						Dead
"	16		25.0	26.6						Dead
"	17		14.8	15.6						"
"	18		16.0	17.3						"
"	19		18.8	20.0						"
Lake Chub	20		8.0	8.3						"
Pearl Dace	21		8.4	8.8						"
lake chub	22		9.5	10.1						"
Finescale	23		[illegible]	82						
RedBelly	24		56	61						
Lake chub	25		65	68						
Finescale	26		61	65						
Lake Chub	27		63	66						
Finescale	28		57	61						
Finescale	29		66	70						
Finescale	30		59	62						

Species Box Tally Area / Site Comments:

WS 4
FD 1
LC 1

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

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BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): MT.

Project Site / Project Number: GM ENA2002 2

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
Northwood Drift	29/Aug/22 16:55	30/Aug/22 13:50	Pond

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1
NDR.S-05	30		AS/DL	See Net Form: Y (N)

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BRST	1		—	61						
BRST	2		—	50						
BRST	3		—	43						
FNDC	4		64	67						
11	5		49	52						
BRST	6		—	46						
BRST	7		—	49						
BRST	8		—	45						
FNDC	9		68	74						
FNDC	10		58	61						
BRST	11		—	44						
FNDC	12		53	56						
BRST	13		—	45						
FNDC	14		62	66						
BRST	15		—	56						
11	16		—	42						
BRST	17		—	44						

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

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FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION:

Sample ID		Waterbody Name			Project Code	
NDR-S-05		North Driftwood R.			UMEM22	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
GN	var				4	1
Trap/Hoop Size (m)	**Net/Leader length (m)**	**Substrate Composition and Cover Types (list all substrate types in area of net)**				
x2 GN	5m					

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophytes NC = no cover
LT = log/tree

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
AS DL	30/Aug/22	12:00	5m	var	var	1m		>1m

LIFT DATA: (recorded at time of lift) Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
AS DL	30/Aug/22	15:00	1	20	20	1

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)
90	00	NE	2	00	1	3.5

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
		See Biosampling.				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING: **Date:** _____ **Time:** _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

Comments:

See Bio Sheet Data (Y / N

QA/QC By:

Page: _____ of _____

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FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION:

Sample ID		Waterbody Name			Project Code	
NPR-P-06		Northwood Drift.			OMEM22002	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
GN	var.				4	1
Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)				
x3 GN	5m.					

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
AS DL.	30Aug22	11:45	5.	var	var	~0.25		1.5m

LIFT DATA: (recorded at time of lift) Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
AS DL	30Aug22	15:05	1	20	20	1

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)
90	00.	NE	2	00	1	3.5

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
		See Biosampling				

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING: **Date:** _____ **Time:** _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

Comments:

See Bio Sheet Data (Y / N

QA/QC By:

Page: _____ of _____

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FISHERIES NET CATCH / EFFORT FORM

wood.

SITE DESCRIPTION:

Sample ID	Waterbody Name	Project Code
NDR-P-07	North Drift woodriver	OMEMA2022

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
GN	var	Dustin			4	2

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)
—	5m	MU, DE

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
AS DL	29/Aug/22	15:15	25	10.	90.	0.5	1m.	1m.

LIFT DATA: (recorded at time of lift) Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
AS DL.	30/Aug/22	10:00	1	19.	20.	1

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)
95	95.	SE	10.	2	2.	18.45.

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
RIN						
See Biosampling.						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

WATER QUALITY READING: Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

Comments:

See Bio Sheet Data (Y) / N

QA/QC By:

Page: _____ of _____

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APPENDIX C1: WATERCOURSE FIELD COLLECTION FORM

GENERAL INFORMATION		
Project # OMEMA2002	Project Description: Baseline	Date: 30 Aug. 22
Is Stream Realignment required for this section: O Yes O No O Unknown		
Collectors: AS / DL	Time Started: 15:50	Time Finished: 16:00
Weather Conditions: Rain, Clouds, 15°C		
Air Temp (°C):	Water Temp (°C): 20°C	Conductivity (µS/cm):
Velocity (m/s):		
Photos Numbers and Descriptions: Dustin's Phone		

LOCATION			
Name of Waterbody: Northwood Drift R.	Drainage System: —	Crossing #: —	Station #: NDR-S-05
Location of Crossing:			
GPS Coordinates:		MTO Chainage:	
Township:		MNRF District:	

LAND USE AND POLLUTION	
Surrounding Land Use: Recreational trails	Sources of Pollution: Trails

EXISTING STRUCTURE TYPE				
Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O
Other O (Describe)		Size: (w x h) m^2		

SECTION TYPE AND MORPHOLOGY

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Section (Reach) Identifier:				Section Location: (Include on Habitat Map)	
Associated Wetland					
Stream/River ✓	Channelized O	Permanent O	Intermittent O	Ephemeral O	
Total Section (Reach) Length (m):					

Sub-Sections:	Run O	Pool O	Riffle O	Flats O	Culvert O	Other O
Percentage of Area:						
Mean wetted depth (m)						
Mean wetted width (m)						
Mean bankfull depth (m)						
Mean bankfull width (m)						
Substrate (type & %)						

Bedrock (Br)	***Boulder (Bo)***	***Cobble (Co)***	***Gravel (Gr)***	***Sand (Sa)***	***Silt (Si)***	***Clay (Cl)***	***Muck (Mu)***	***Detritus (D)***

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Bank	✓	O	O	O
Right Bank	✓	O	O	O

	Deposition Zone	Protected Bank	Vulnerable Bank	Eroding Bank
Left Bank	O	✓	O	O
Right Bank	O	✓	O	O

HABITAT

In-Stream Cover (% surface area):

Undercut banks:	Boulders:	Cobbles:	Organic Debris:	None ✓

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LAND USE AND POLLUTION	
Surrounding Land Use: Recreational trails	Sources of Pollution: Gas from offroad vehicles.

EXISTING STRUCTURE TYPE				
Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O
Other O (Describe)		Size: (w x h) m^2		

SECTION TYPE AND MORPHOLOGY	
Section (Reach) Identifier:	Section Location: (Include On Habitat Map)
Associated Wetland	

Stream / River	Channelized	Permanent	Intermittent	Ephemeral
O	✓	O	O	O

Total Section (Reach) Length (m):

Sub-Sections:	Run O	Pool O	Riffle O	Flats O	Culvert O	Other O
Percentage of Area:						
Mean wetted depth (m)						
Mean wetted width (m)						
Mean bankfull depth (m)						
Mean bankfull width (m)						
Substrate (type & %)						

Bedrock (Br)	*Boulder (Bo)*	*Cobble (Co)*	*Gravel (Gr)*	*Sand (Sa)*	*Silt (Si)*	*Clay (Cl)*	*Muck (Mu)*	*Detritus (D)*

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MIGRATORY OBSTRUCTIONS

Permanent	Seasonal	None
		✓

POTENTIAL CRITICAL HABITAT

Spawning	Groundwater	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES

ADDITIONAL COMMENTS

Depth: >1m. channel off the road, dries to 0.3m.
Water is brown/yellow.
Marshy wetland surrounding. Emergent wood stumps. Shrubs/grasses. bog cotton. channel flowing in on S side. Detritus/muck.
Cattails/rushes/pickerel/alders.

Additional Notes Appended? O No O Yes Number of Pages _____

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BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): GN

Project Site / Project Number: OMFMA2052 — wood.

Waterbody or Watercourse Name: North Driftwood R.

Start Date: (DD/MMM/YY) / **Time:** (24HR): 30/Aug/22 12:00

End Date: (DD / MMM / YY) / **Time** (24HR): 30/Aug/22 15:00

Area Description: (Habitat Type / Site Features): B Stream

Sample ID: NDR-S-05

Method Effort: (Traps/Rods/Dips): 2

UTM Coordinates: (mN, mE, Zone, Acc.)

Samplers In.: AS / DL

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Lake Chub	1		5.5	5.8						
"	2		5.5	5.9						
Finescale	3		5.8	6.2						

Species Box Tally Area / Site Comments:

BSB - •

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

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5 mm FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine): Minnow Trap

wood.

Waterbody Name: NDR

Start Date (DD MMM YYYY) / Time (24HR): 24/Aug/22 16:10

Start Date (DD MMM YYYY) / Time (24HR): 30/Aug/22 12:30

Area Description: Pond

Sample ID: NDR-P-07

Method #: (Traps / Rods / Dips / Area): 30 traps

UTM Coordinate:

Samplers In: AR/DL

PG: 1 of ___

SPECIES / TLEN (mm)	LKCB	BRST	PRDC	AMRO	FINE	WHSCB				
0	~~IIII~~	~~IIII~~	~~IIII~~	II	~~IIII~~	1				
5	~~IIII~~	~~IIII~~			~~IIII~~					
10	~~IIII~~	TL: 56mm								
15	III	TL: 50mm								
20		TL: 49mm		TL/FL 54/61						
25		TL: 45mm								
30		TL: 55mm								
35		TL: 49mm								
40		TL: 47mm								
45		TL: 46mm								
50		TL: 49mm								
55		TL: 54mm								
60	+	~~IIII~~								
65		II								
70										
75										
80										
85										
90										
95										
100										
105										
110										
115										
120										
125										
130										
135										
140										
145										
150										
Fish Species										
Size Range										
Total # Indv.										
Bulk Wt. (g)										
Bag ID										
Comments										

Comments/Notes:

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SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
MAR CK			
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
~~EFA~~ CK	18:00				(□ Same as above)	
Air Temperature:		°C	DO:		%	
H2O Temperature:		°C	DO:		mg/L	
pH:			TDS:		g/L	
Conductivity:		µS/cm or mS/cm	ORP:		mV	
Sample Depth:		m	Duplicate Taken:			
Comments:						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
					(□ Same as above)	
Air Temperature:		°C	DO:		%	
H2O Temperature:		°C	DO:		mg/L	
pH:			TDS:		g/L	
Conductivity:		µS/cm or mS/cm	ORP:		mV	
Sample Depth:		m	Duplicate Taken:			
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L	SPC.	pH/ORP	Depth (m)	SW Temp (deg C)	DO %	DO mg/L	SPC	pH	ORP
0	18.6	73.1	6.60	0.122	76	-52.3	15	5.4	0.8	0.07	0.253	7.02	-300	4
1	18.5	73.7	6.65	0.122	7.80	-50.5	16	5.4	0.8	0.10	0.253	7.04	-26	1.6
32	18.5	72.4	6.50	0.122	751	-47.3								
43	15.5	9.9	0.93	0.137	7.09	-87.5								
54	8.9	2.8	0.29	0.226	7.06	-149	7							
5	6.4	1.9	0.21	0.238	6.80	-187								
6	5.9	1.8	0.16	0.240	6.77	-214								
	5.2	1.2	0.15	0.251	6.78	-236	8.3							
8	5.4	1.0	0.15	0.252	6.78	-250								
9	5.4	1.1	0.12	0.252	6.82	-250	9							
10	5.4	1.0	0.12	0.253	6.85	-19	6.8							
11	5.4	0.9	0.10	0.253	6.90	-193	9							
12	5.4	0.9	0.10	0.253	6.93	-214	6							
13	5.4	0.9	0.09	0.253	6.96	-241	5							
14	5.4	0.9	0.10	0.253	6.98	-279	2							

Comments: Secchi Down: 1.5m, up-1.25m

Epilimnion upper, lighter water layer
Thermocline middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID	MAR	Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	16 m	Total Water Depth	m	Total Water Depth	m
No. Tows Required	1	No. Tows Required		No. Tows Required	
Sample Date	31 Aug	Sample Date		Sample Date	
Sample Time	1900	Sample Time		Sample Time	
Vertical Tow Length	15 m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers	1	No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	.5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

wood

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SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID GERR	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
MARB-LK	Gerry	31 Aug 22	
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
OMEMA 2002			

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
	15:00		SSAS			(□ Same as above)
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)	
						(□ Same as above)
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L	ms/cm SPC	pH	ORP
0	16.9	84.5	7.52	0.206	8.04	183.3
1	18.9	84.5	7.54	0.206	8.06	183.0
2	18.9	84.1	7.52	0.206	8.08	181.7
3	14.2	88.2	6.72	0.344	7.20	194.6
4	12.1	2.7	0.25	0.360	7.16	178.1
5	8.1	1.3	0.16	0.390	7.12	182.4
6	6.3	1.3	0.14	0.391	7.07	183.3
7	5.4	1.1	0.16	0.398	7.05	133.2
8	5.1	1.0	0.13	409	7.02	37.5
9	4.5	1.0	0.130	421	7.01	5.4
10	4.2	1.0	0.11	0.442	7.04	-23.4
11	4.2	0.9	0.11	0.441	7.01	-39.7
	*DO needs to be calibrated					

Depth (m)	SW Temp (deg C)	DO %	DO mg/L	SPC	pH	ORP
12	4.1	0.9	0.12	448	7.10	-48.6
13	4.0	0.8	0.10	46.2	7.12	-60.8
14	bottom					
thermocline						
25	16.7	48.1	3.81	0.357	7.45	189.7
35	15.6	12.2	1.11	363	7.28	194.2

Comments:

Epilimnion upper, lighter water layer
Thermocline middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID	GERR-LK	Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	14.6 m	Total Water Depth	m	Total Water Depth	m
No. Tows Required	1	No. Tows Required		No. Tows Required	
Sample Date	31 Aug	Sample Date		Sample Date	
Sample Time	15:00	Sample Time		Sample Time	
Vertical Tow Length	13 m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers	1	No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

Fishingon back

wood

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ON x3 31 Aug @ 13:00

.5" 1", 4", 1.5"

NRPK 1

	FL	TL
1	26	23

1"

YLPR 1111 (9)

	FL	TL
1	101	106
2	99	103
3	109	113
4	102	106

4" NO CATCH

MT 30 pulled @ 17:30

YLPR.

16+6 ~~###~~

5	54	56
6	82	85
7	74	76
8	105	109
9	82	84
10	107	111

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MAR - LK

GN x 3 set @ 13:00 31 Aug

GER - LK

GN x 3 set @ 13:30 31 Aug

3", 4.5", 3"

~~4", 4", 4"~~

NO CATCH

30 MT pulled 31 Aug @ 14:36

YLPR	FL	TL
1	85	89
2	88	92
3	53	56
4	81	84
5	93	99
6	81	84
7	85	89
8	60	62
9	80	84
10	91	96
JWDR		
1		44

YLPR 3+10+1+3+2+1+1+2+1+1+3 (28)

JWDR (1)

5 mm FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine): MT @ 30

wood.

Waterbody Name: NDR

Start Date (DD MMM YYYY) / Time (24HR): 29/Aug/22

Start Date (DD MMM YYYY) / Time (24HR): 31/Aug/22

Area Description:

Sample ID: NDR-P03

Method #: (Traps) Rods / Dips / Area): 30

UTM Coordinate: Sam's phone

Samplers In.

PG: 1 of 1

SPECIES / TLEN (mm)											
	30/Aug	6 traps pulled @ 10:16 MT * CD MNRR pulled 24 traps									
0	BRST	1+	1+1+	3+2	+2	+1	+3	+1	effort 105 + *		
5									30 traps set originally 29/Aug		
10	NRDC	1	+32	+1+1	+35						
15											
20		set 24 traps @ 30/Aug/22							10:48		
25		retrieved @ 31/Ag 22							9:39		
30	~~NDR-P03~~										
35	FreSalO	~~[illegible]~~								:: ~~[illegible]~~ 47	+73
40	BSB										+11
45	Perl	~~[illegible]~~ in 4									
50	FatHead							+20		23	+79
55	Johnny	dater									
60											
65											
70		B10 * scale dead need new batteries									
75	FTMN	WFL	TL (cm)		FTMN	WFL	TL (cm)				
80	1	4.4	6.5	5		4.6		9	4.7	4.9	
85	2	4.2	4.4	6		4.5		10	6.0	6.1	
90	3	5.0	5.1	7		4.6		Johnny			
95	4	5.8	5.7	8		4.0		1	4.5	4.6	
100	5	6.4	6.5	9		4.4		NPDC			
105	6	4.4	4.5	10		5.6		1	6.4	6.5	
110	7	5.7	5.9	FNDC				2	5.5	5.6	
115	8	5.3	5.4	1	6.1	6.2		3	4.8	4.9	
120	9	6.4	6.4	2	5.4	5.5		4	4.6	4.7	
125	10	4.3	4.5	3	5.7	5.9		5			
130	BRST			4	7.0	7.1		6			
135	1		4.3	5	4.9	5.0		7			
140	2		4.7	6	6.1	6.2		9			
145	3		5.2	7	5.8	5.9		9			
150	4		4.4	8	4.9	5.0		10			
Fish Species											
Size Range											
Total # Indv.											
Bulk Wt. (g)											
Bag ID											
Comments											

Comments/Notes:

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4/2

Project No: OMEMP 2002 Project Name: Crawford

Date: 30 Aug 22 Personnel: SS/MG

Weather Conditions: (current) PRECIP. Weather Conditions (prev. 24-hrs) TEMP (°C) PRECIP.

Sample ID.	Date (yyyy/mm/dd)	Time	GPS Coordinates Zone	Easting	Northing	Total Water Depth (m)	Sample Depth (m)	Air Temp. (°C)	Water Temp. (°C)	D.O. (mg/L)	D.O. (%)	pH	ORP (mV)	Conductivity ~~(µS/cm)~~ µS/cm/mS/cm	Turbidity (NTU)	DUP Y/N	Comments water? yes/no
NDR-P03	30/Aug	1030					0.5	18.15	20.55	7.85	87.9	7.45	7.0	70	—	Y	Y
NDRSD4	30 Aug	1200					0.5		12.27	4.10	44.5	6.93	-11	107/0.120	—	N	Y
JKS-01	30 Aug	14:34					0.5		16.73	85.7	55.0	5.35	61.9	58/0070	—	N	Y

PAGE ____ OF ____

Print Name & Initial: _____ (field notes author)

Quality Control: This form is complete ☐ & legible ☐

Print Name & Initial: _____ (field notes QA/QC personnel)

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5 mm FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine) MT

wood.

Waterbody Name: NDR	Start Date (DD MMM YYYY) / Time (24HR):	Start Date (DD MMM YYYY) / Time (24HR):	Area Description:
Sample ID: NDRS04	Method #: (Traps / Rods / Dips / Area) 30	UTM Coordinate: Arenza	Samplers In. SSMG

PG: 1 of 1

SPECIES / TLEN (mm)										
0		fit	29	Aug	22 @	Chuck	55 phone			
5		pull	30	away	@	1200				
10										
15		Frogs, leech, crayfish								
20		BRST	1							
25		CMSH	2							
30										
35										
40										
45										
50										
55										
60										
65										
70										
75										
80										
85										
90										
95										
100										
105										
110										
115										
120										
125										
130										
135										
140										
145										
150										
Fish Species										
Size Range										
Total # Indv.										
Bulk Wt. (g)										
Bag ID										
Comments										

Comments/Notes:

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BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA 2002

WSP

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / Time: (24HR): 23/Oct 22 16:30

End Date: (DD / MMM / YY) / Time (24HR): 24Oct22 12:00

Area Description: (Habitat Type / Site Features): Pond

Sample ID: WBR-P04

Method Effort: (Traps/Rods/Clips): 20

UTM Coordinates: (mN. mE, Zone, Acc.): DK GPS

Samplers In: CH, DK

Page: 2 of 2

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FSD	46		63	68	3.27	TISS	-	WB		Comp 5
↓	47		67	70	3.47	↓	↓	↓		↓
BSTS	48			48	0.76					Comp 1
	49			46	0.84					
	50			52	1.05					
	51			55	1.29					
	52			54	1.38					
	53			57	1.22					
	54			49	0.90					
	55			50	0.86					
	56			49	0.90					
	57			50	0.90					
	58			51	1.30					
	59			48	0.57					
	60			49	0.82					
	61			59	1.37					
	62			47	0.75					
	63			56	1.33					
	64			50	0.82					
	65			52	1.01					
	66			57	1.27					
	67			52	1.15					
	68			52	0.81					
	69			53	0.97					COMP 1 - TW - 21.68g
BSB	70			62	1.80					
	71			59	1.74					
	72			63	1.52					
	73			63	1.87					
	74			43	0.64					Comp 2 - TW - 7.51g

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA2002

WSP

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / Time: (24HR): 23/oct/22 16:30

End Date: (DD / MMM / YY) / Time (24HR): 24/oct/22 12:00

Area Description: (Habitat Type / Site Features): Pond

Sample ID: WBR-P-04-MT1

Method Effort: (Min/Rods/Dips): 20

UTM Coordinates: (mN, mE, Zone, Acc.): See DL GPS

Samplers In.: DL CM

Page: 1 of 2

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FSD	1		62	66	2.97	TISS	-	WB		Comp1 23g
	2		63	68	2.86					
	3		63	67	2.77					
	4		67	71	3.68					
	5		70	74	4.06					
	6		62	67	2.41					
	7		58	62	2.17					
	8		61	65	2.74					
	9		94	101	9.75					Comp2 20.1g
	10		95	101	10.48					
	11		70	75	4.19					Comp3 25.5g
	12		65	70	3.28					
	13		64	67	3.08					
	14		64	68	3.03					
	15		72	77	4.52					
	16		63	67	3.26					
	17		73	78	4.35					
	18		48	52	1.09					Comp4 27.8g
	19		52	55	1.31					
	20		54	57	1.43					
	21		47	51	1.12					
	22		53	57	1.67					
	23		47	50	1.2					
	24		51	53	1.06					
	25		52	55	1.27					
	26		48	51	1.08					
	27		53	57	1.61					
	28		48	52	1.21					
	29		48	51	1.08					
	30		53	59	1.78					
	31		45	49	0.78					
	32		49	52	1.06					
	33		48	53	1.25					
	34		52	55	1.44					
	35		49	53	1.16					
	36		53	57	1.48					
	37		47	51	1.23					
	38		53	56	1.30					
	39		50	53	1.3					Comp5 24.3g
	40		63	66	2.41					
	41		65	69	2.94					
	42		64	68	2.82					
	43		67	71	3.46					
	44		64	68	3.08					
	45		65	69	3.05					

Species Box Tally Area / Site Comments:

FSD 80 BSB 25

NRD 60 FHM 10

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA2022

WSP

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / Time: (24HR): 23/Oct/22 15:45

End Date: (DD / MMM / YY) / Time (24HR): 24/Oct/22 15:15

Area Description: (Habitat Type / Site Features): Pond

Sample ID: WBR-P02-MT1

Method Effort: (Traps/Rods/Clips)

UTM Coordinates: (mN, mE, Zone, Acc.): See DL GPS

Samplers In:

Page: 3 of 3

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Brook stickleback	91			49	0.66	Tiss	—	WB		
	92			43	0.55					
	93			47	0.61					
	94			45	0.58					
	95			52	0.98					
	96			55	1.19					
	97			52	0.90					
	98			62	1.69					
										Comp2 TH1 - 12.68g

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Minnow Traps

Project Site / Project Number: OMEMA 2022 — WSP

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / Time: (24HR) 23 Oct 22 / 15:45

End Date: (DD / MMM / YY) / Time (24HR) 24 Oct 22 / 15:15

Area Description: (Habitat Type / Site Features) Pond

Sample ID: WBR-P03

Method Effort: (Traps/Seine/Dips) 23

UTM Coordinates: (mN, mE, Zone, Acc.) DL GPS

Samplers In:

Page: 2 of 3

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FSD	46		43	47	1.03	TISS	—	WB		Comp 4
	47		49	54	1.21					
	48		50	54	1.46					
	49		50	54	1.63					
	50		53	57	1.84					
	51		53	56	1.44					
BSB	52		48	48	0.68					
	53			50	0.75					
	54			46	0.54					
	55			43	0.52					
	56			54	0.98					
	57			50	0.68					
	58			50	0.78					
	59			50	0.66					
	60			54	1.06					
	61			53	0.92					
	62			49	0.83					
	63			51	0.75					
	64			54	1.00					
	65			48	0.70					
	66			46	0.82					
	67			50	0.73					
	68			50	0.74					
	69			48	0.79					
	70			49	0.65					
	71			48	0.71					
	72			49	0.72					
	73			46	0.61					
	74			49	0.74					
	75			55	1.04					
	76			49	0.85					
	77			50	1.06					
	78			50	0.91					
	79			48	0.70					
	80			47	0.72					
	81			47	0.69					
	82			47	0.79					
	83			51	0.86					
	84			52	0.95					
	85			49	0.88					Comp 1 - TWL - 25.8g
	86			53	1.05					
	87			54	1.16					
	88			50	0.72					
	89			57	1.05					
	90			48	0.78					

Species Box Tally Area / Site Comments:

40 BSB 4 NPD
20 FHM 40 NRD
60 FSD

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): minnow Trap

Project Site / Project Number: OMEMA2002

WSP

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / Time: (24HR): 23/oct/22 15:45

End Date: (DD / MMM / YY) / Time (24HR): 24/oct/22 15:15

Area Description: (Habitat Type / Site Features): Pond

Sample ID: WDR-P-03-MT1

Method Effort: (Traps/Rods/Dips): 23

UTM Coordinates: (mN, mE, Zone, Acc): see DL GPS

Samplers In:

Page: 1 of 3

See Net Form: Y/N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FSD	1		73	76	3.28	Tiss	-	WB		COMP 1 24.75g
	2		68	74	3.45					
	3		57	60	2.07					
	4		57	61	2.06					
	5		59	64	2.14					
	6		65	69	2.84					
	7		67	72	3.42					
	8		68	73	3.21					
	9		64	68	2.66					
	10		57	62	2.48					COMP 2 24.26g
	11		53	57	1.87					
	12		51	54	1.31					
	13		49	53	1.19					
	14		47	50	1.27					
	15		51	49	1.17					
	16		50	53	1.23					
	17		47	50	1.04					
	18		53	56	1.82					
	19		47	50	0.98					
	20		47	49	0.88					
	21		46	48	0.99					
	22		52	55	1.06					
	23		50	53	1.33					
	24		45	47	0.90					
	25		45	48	1.03					
	26		45	47	0.98					
	27		40	44	0.74					
	28		45	49	1.04					
	29		50	54	1.37					
	30		43	47	0.86					
	31		68	71	3.49					COMP 3 23.23g
	32		65	70	2.96					
	33		71	76	2.71					
	34		76	81	5.0					
	35		66	70	2.93					
	36		65	69	2.76					
	37		63	68	2.52					
	38		56	60	1.66					COMP 4 17.9g
	39		55	59	1.5					
	40		46	50	1.08					
	41		45	47	0.9					
	42		48	52	1.28					
	43		48	51	1.1					
	44		50	54	1.22					
	45		50	54	1.35					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
FIIL - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Traps

Project Site / Project Number: OMeMa2002 — WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR)	Area Description: (Habitat Type / Site Features)
Northdrift mud	12/oct/22 / 13:45	13/oct/22 / 900	River, upstream of beaver dam

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1	See Net Form: Y/N
NDR-S-04-MT1	10	See DL GPS	DLCM		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Northern Redbelly	01		59	63	1.99					
Common Shiner	02		85	92	6.46					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: omema2022

WSP

Waterbody or Watercourse Name: North driftwood

Start Date: (DD/MMM/YY) / Time: (24HR): 12/oct/22 / 15:45

End Date: (DD / MMM / YY) / Time (24HR): 12/oct/22 / 10:45

Area Description: (Habitat Type / Site Features): old beaver pond.

Sample ID: NDR-P-04-MT1

Method Effort: (Traps/Rods/Ops): 10

UTM Coordinates: (mN, mE, Zone, Acc.): See DL, GPS.

Samplers In.: DL, Ca

Page: 1 of 1

See Net Form: Y (N)

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Minnow Trap

Project Site / Project Number: OMeMa2ew2.

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
North Driftwood	12/oct/22/ 1640	13/oct/22 /1115	man made pond.

Sample ID:	Method Effort (Cards/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1	See Net Form: Y / N
NDR-P-02-MT1	10	see DL GPS.	DL Em.		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Minnow Trap

Project Site / Project Number: OMEMA2002 WSP

Waterbody or Watercourse Name: North Drift River

Start Date: (DD/MMM/YY) / Time: (24HR) 30ct 22 / 1445

End Date: (DD / MMM / YY) / Time (24HR): 4Oct 22 / 1130

Area Description: (Habitat Type / Site Features) Pond

Sample ID: NDR-P03-MT1

Method Effort: (Traps/Rods/Dips) 25

UTM Coordinates: (mN, mE, Zone, Acc.) DL GPS

Samplers In: DL CM

Page: 3 of 3

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FHM	91		60	64	2.48	TISS	-	WB		Cmp1 31.01g
	92		65	69	3.02					
	93		65	68	3.66					
	94		54	58	2.16					
	95		73	78	4.33					
	96		61	65	2.81					
	97		62	68	2.99					
	98		61	65	2.86					
	99		64	68	3.51					
	100		65	70	3.35					
FHM	101		56	61	2.34					Cmp2 21.48g
	102		68	73	3.65					
	103		55	60	2.12					
	104		70	74	4.06					
	105		62	67	2.88					
	106		55	58	2.18					
	107		55	59	2.46					
	108		50	54	1.81					

62

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA 2002

WSP

Waterbody or Watercourse Name: North Drift Wood River

Start Date: (DD/MMM/YY) / Time: (24HR): 13Oct 22 / 14:45

End Date: (DD / MMM / YY) / Time (24HR): 14Oct/22 / 11:30

Area Description: (Habitat Type / Site Features): pond

Sample ID: NDR-P-03-MT1

Method Effort: (Traps/Nets/Dips): 25

UTM Coordinates: (mN, mE, Zone, Acc.): DL GPS

Samplers In.: DL, EM

Page: 2 of 3

See Net Form: Y / N

Species	Fish #	Species Code (MMR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained (Aging / Tiss. / Both)	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / FIL)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NRD	46		48	50	1.2	TISS	-	WB		comp 3 26.65g
	47		48	50	1.06					
	48		51	55	1.58					
	49		45	49	1.12					
	50		48	51	1.18					
	C1		53	56	1.63					
	52		51	55	1.43					
	53		53	56	1.31					
	54		52	55	1.56					
	55		49	52	1.33					
	56		54	56	1.84					
	57		49	52	1.32					
	58		55	58	1.93					
	59		50	54	1.63					
	60		55	59	2.04					
NRD	61		53	56	1.48					comp 4 32.12g
	C2		50	54	1.47					
	63		54	57	1.79					
	64		56	59	1.92					
	65		56	59	1.91					
	66		50	53	1.23					
	67		48	52	1.31					
	68		55	58	1.93					
	69		55	58	1.79					
	70		55	59	1.86					
	71		57	60	2.21					
	72		58	62	2.08					
	73		55	59	2.07					
	74		58	61	1.79					
	75		48	51	1.28					
	76		48	51	1.28					
	77		51	54	1.6					
	78		48	50	1.17					
	79		46	50	1.08					
	80		48	51	1.38					
NRD	81		65	68	2.75					comp 5 25.04g
	82		58	62	2.32					
	83		63	67	2.91					
	84		57	60	2.35					
	85		59	63	2.33					
	86		58	63	2.05					
	87		60	65	2.56					
	88		60	63	2.70					
	89		62	66	2.86					
	90		58	62	2.36					

Species Box Tally Area / Site Comments:

marlo NRD = 31+47+13+16+20

BSB = 6+4+18+13+7+4+19

Pearl Dace = 142

Iowa Darter = 2+1+1

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

wood.

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Minnow Traps

Project Site / Project Number: CMEMA2-22

Area Description: (Habitat Type / Site Features) Pond

Waterbody or Watercourse Name: North drift and River

Start Date: (DD/MMM/YY) / Time: (24HR) 13/Oct/22/14:45

End Date: (DD / MMM / YY) / Time (24HR) 4/Oct/22 / 11:30

Samplers In. DL CM

Page: 1 of 3

See Net Form: Y / N

Sample ID: NDR-P-03-MT1

Method Effort: (Cages/Nodes/Clips) 25

UTM Coordinates: (mN, mE, Zone, Acc.) See DL GPS.

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NRD	1		52	56	1.63	TISS	—	WB		comp1 24.34g
	2		44	46	1.06					
	3		55	59	1.99					
	4		48	50	1.29					
	5		46	48	1.22					
	6		49	53	1.40					
	7		46	50	1.38					
	8		47	51	1.30					
	9		47	50	1.26					
	10		45	49	1.03					
	11		46	50	1.04					
	12		46	49	1.30					
	13		45	49	1.11					
	14		45	48	1.03					
	15		46	50	1.15					
	16		47	51	1.15					
	17		48	51	1.23					
	18		46	50	1.09					
	19		45	50	1.16					
	20		47	50	1.15					comp2 22.95g
NRD	21		44	47	0.99					
	22		48	51	1.21					
	23		46	50	1.11					
	24		47	50	1.17					
	25		46	49	1.17					
	26		47	50	1.16					
	27		46	50	1.08					
	28		51	54	1.44					
	29		47	50	1.2					
	30		49	52	1.24					
	31		50	53	1.35					
	32		45	48	1.18					
	33		49	51	1.24					
	34		48	52	1.17					
	35		48	51	1.24					
	36		47	50	1.12					
	37		46	50	1.13					
	38		44	48	1.02					
	39		45	48	1.16					
	40		46	50	1.15					comp3
NRD	41		48	51	1.22					
	42		51	54	1.53					
	43		47	49	1.16					
	44		46	49	1.12					
	45		50	53	1.21					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Traps / Angling / Dip Net / Gillnet / Seine): Minnow Traps

Project Site / Project Number: OMEMA2002

wood.

Waterbody or Mesocosm Name: Mud Driftwood River

Start Date: (DD/MM/YY) / Time: (24HR): 13/oct/22 / 1625

End Date: (DD/MM/YY) / Time: (24HR): 14/oct/22 / 1500

Area Description: (Habitat Type / Site Features): Pond alongside Road

Sample ID: MDR-Pol-MT1

Habitat Effort: 25

UTM Coordinates: (mN, mE, Zone, Accr.): See DL GPS

Samplers In: AK, CM

Page: 1 of 2

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained (Aging / Tiss. / Both)	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / FillL)	Presumed age class (YOY / 1+)	Comments (Release, Analysis (Hg), Disease, malformation, etc.)
FSD	1		57	60	1.96	TISS	—	WB		Comp1 20.42g
	2		55	59	1.91					
	3		59	63	2.28					
	4		52	55	1.64					
	5		55	60	1.89					
	6		59	64	2.16					
	7		60	64	2.38					
	8		54	56	1.57					
	9		50	54	1.34					
	10		56	60	1.89					
	11		57	60	1.73					
FSD	12		72	98	10.27					comp2 42.66g
	13		93	96	8.38					
	14		92	98	8.37					
	15		80	86	7.28					
	16		90	96	8.57					
FSD	17		63	67	2.67					comp 3 36.33g
	18		66	70	3.05					
	19		70	73	3.71					
	20		73	76	3.78					
	21		66	71	3.13					
	22		72	77	4.25					
	23		62	67	2.82					
	24		69	74	3.65					
	25		62	66	3.12					
	26		65	70	3.32					
	27		62	66	3.14					
FSD	28		50	53	1.33					comp4 31.27g
	29		57	60	1.77					
	30		59	63	2.11					
	31		50	53	1.20					
	32		51	54	1.56					
	33		57	62	2.24					
	34		50	53	1.37					
	35		56	60	1.65					
	36		54	58	1.86					
	37		55	59	1.760					
	38		55	58	1.6					
	39		50	54	1.34					
	40		51	54	1.3					
	41		57	60	1.87					
	42		53	56	1.65					
	43		54	57	1.58					
	44		54	58	1.82					
	45		58	62	1.73					

Species Box Tally Area / Site Comments:

FSD - 50
Fathead - 25

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
WB - Whole Body
FillL - Fillet or Dorsal Epaxial

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) | Project Site / Project Number: | wsp

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMFM12002 | wsp

Waterbody or Watercourse Name: North Driftwood.

Start Date: (DD/MMM/YY) / Time: (24HR): 13 Oct 22 / 1625

End Date: (DD / MMM / YY) / Time (24HR): 14 Oct 22 / 1500

Area Description: (Habitat Type / Site Features): pond

Sample ID: NDR P01-MT1

Method Effort: (Time/Rods/Clips): 25

UTM Coordinates: (mN, mE, Zone, Acc.): DL GPS

Samplers Initials: [illegible]

Page: 2 of 2

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FSD	46		86	91	7.24	TSS	-	WB		Comp 5 3466g
	47		90	95	8.28					
	48		84	89	6.41					
	49		82	87	6.62					
	50		80	85	6.24					
FSD	51		83	88	6.45	Aging		-		
	52		85	89	6.34					
	53		71	75	4.29					
	54		71	75	3.79					
	55		63	67	3					
	56		70	75	3.71					
	57		70	74	3.89					
	58		61	65	2.18					
	59		64	69	2.80					
	60		49	43	1.34					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEM2022

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
	14 Oct 22 / 1800	15 Oct 22 / 16:30	

Sample ID:	Method Effort: (Trips/Rods/Days)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In:	Page: 2 of 2	See Net Form: Y / N
NDR-P-06-MT1	25	DL GPS	DL, CM		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fillet)	Presumed age class (YOY / 1+)	Comments (Metals Analysis [Hg], disease, malformation, etc.)
FSD	46		58	61	2.03	Aging				
↓	47		57	60	2.35	↓				
	48		40	43	0.73					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Traps

Project Site / Project Number: OME-MA2002

WSP

Waterbody or Watercourse Name: NDR-P-06

Start Date: (DD/MMM/YY) / Time: (24HR): 14/Oct/22 / 800

End Date: (DD / MMM / YY) / Time (24HR): 15/Oct/22 / 1630

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-P-06-MT1

Method Effort: (Seine Pulls/Dips): 25

UTM Coordinates: (mN, mE, Zone, Acc.): See DL GPS

Samplers Initials: DL CM

Page: 1 of 2

See Net Form: Y / N

Species	Fish #	Species Code (BBNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FSD	1		52	55	1.35	TISS	-	WB		COMP 1 24.69g
	2		54	58	1.77					black spot
	3		59	63	1.94					
	4		50	53	1.27					
	5		54	58	1.48					
	6		55	59	1.93					
	7		52	56	1.48					
	8		60	63	1.97					
	9		51	55	1.34					
	10		51	54	1.34					
	11		57	61	1.82					
	12		56	60	1.6					
	13		53	57	1.6					
	14		55	59	1.55					
	15		58	63	2.47					
FSD	16		69	74	3.43					COMP 2 23.61g
	17		65	70	3.23					
	18		66	70	3					
	19		68	74	3.27					
	20		73	76	4.04					
	21		70	74	3.52					
	22		67	70	3.18					
FSD	23		83	88	6.21					COMP. 3 35.19
	24		87	92	7.28					
	25		94	99	8.58					
	26		92	95	7.52					
	27		82	80	5.62					
FSD	28		80	84	5.70					COMP 4 23.16g
	29		69	72	3.56					
	30		74	78	4.02					
	31		74	78	4.181					
	32		68	73	3.36					
	33		67	71	3.41					
FSD	34		72	75	4.40					COMP 5 22.17g
	35		74	78	4.21					
	36		73	78	3.86					
	37		76	80	4.49					
	38		77	80	5.27					
FSD	39		77	82	4.54	Aging				
	40		91	95	6.91					
	41		66	70	3.26					
	42		60	64	2.4					
	43		50	53	1.31					
	44		55	60	1.99					
	45		48	50	1.12					

Species Box Tally Area / Site Comments:

FMM 18
NRD 2
BSB 1

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

H2O Temperature | 7.4

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA 2022

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MM/YY) / Time: (24HR)	End Date: (DD / MM / YY) Time (24HR)	Area Description: (Habitat Type / Site Features)
	14/04/22 / 17:45	15/04/22 / 16:00	

Sample ID:	Method Effort: (sec/Pools/Dist)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In:	Page: 2 of 2	See Net Form: Y / N
NDR-S-05-MTI	25	DGPS	PM		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained (Aging / Tiss. / Both)	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / FIll.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FSD	46		69	74	3.78	TISS	-	WB		comp2 24.78g
	47		69	74	3.61					
	48		52	56	1.4					
	49		54	57	1.67					
	50		57	60	1.79					
	51		69	73	3.56					
	52		66	70	3.21					
	53		72	77	4.11					
NRD	54		71	77	3.71					comp1 26.84g
	55		72	76	3.93					
	56		72	76	3.74					
	57		71	75	3.79					
	58		68	71	3.23					
	59		76	83	5.05					
	60		68	73	3.46					
NRD	61		59	63	2.11					comp2 28.61g
	62		62	66	2.54					
	63		65	70	2.7					
	64		68	73	2.94					
	65		65	70	2.95					
	66		67	71	3.13					
	67		67	72	2.91					
	68		66	70	2.87					
	69		69	73	3.58					
	70		70	74	3.28					
	75									
	80									
	85									
	90									

Species Box Tally Area / Site Comments:

NRD 12

FHM 10+3+1

FSD ~~11+11+7~~ 43+4

BSB 45+1

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Minnow Trap

Project Site / Project Number: OMEMA2002

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR)	Area Description: (Habitat Type / Site Features)
NDR-S-05	14-Oct/22 17:45	15/Oct/22 / 16:00	

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 2	See Net Form: Y/N
NDR-S-05-MT1	25	See DL GPS	DL CM		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BSB	1		—	50	0.83	TISS	-	WB		COMP1 21.1g
	2			49	0.90					
	3			50	1.03					
	4			47	0.97					
	5			50	0.98					
	6			54	1.2					
	7			48	0.85					
	8			47	0.67					
	9			52	1.19					
	10			50	0.84					
	11			53	1.15					
	12			53	1.11					
	13			53	1.19					
	14			50	1.02					
	15			43	0.59					
	16			53	1.24					
	17			50	1.08					
	18			52	1.16					
	19			53	1.17					
	20			52	1.03					
	21			52	1.30					
	22			54	1.22					
BSB	23			55	1.24					COMP2 23.34g
	24			57	1.58					
	25			62	1.90					
	26			58	1.28					
	27			50	1.09					
	28			59	1.88					
	29			54	1.1					
	30			65	2.02					
	31			58	1.65					
	32			60	1.76					
	33			51	1.13					
	34			51	1.21					
	35			58	1.57					
	36			57	1.44					
	37			56	1.44					
	38			56	1.45					
	39			50	0.97					
FSD	40		88	92	9.01	TISS	-	WB		COMP1 35.73g
	41		86	90	7.01					
	42		88	92	7.85					
	43		79	84	5.6					
	44		89	95	7.45					
FSD	45		57	61	1.79					COMP2

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA2002

WSP

Waterbody or Watercourse Name: North Driftwood Stream

Start Date: (DD/MMM/YY) / Time: (24HR): 16/Oct/22 / 17:45

End Date: (DD / MMM / YY) / Time (24HR): 17/Oct/22 / 15:45

Area Description: (Habitat Type / Site Features): Stream appx 1m width

Sample ID: NDR-S-02-MT1

Method Effort: (Traps/Rods/Ops): 10

UTM Coordinates: (mN, mE, Zone, Acc.): See DL GPS

Samplers In: DL EM

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals analysis (Hg), disease, malformation, etc.)

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Minnow Trap

Project Site / Project Number: CAMEMA2002

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR)	Area Description: (Habitat Type / Site Features)
NDR-P-07	14/Oct/22 / 1700	15/Oct/22 13:15	Pond

Sample ID:	Method Effort: (Time/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1	See Net Form: Y / N
NDR-P-07-MT1	10	See DL GPS	DL EM		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA2002

WSP

Waterbody or Watercourse Name: North Driftwood Tribs

Start Date: (DD/MMM/YY) / Time: (24HR): 16/Oct/22 17:00

End Date: (DD / MMM / YY) / Time (24HR): 17/Oct/22 / 12:00

Area Description: (Habitat Type / Site Features): Narrow Trib.

Sample ID: NDR-Trib-02-MT

Method Effort: (Trap#/Rode/Dips): 25

UTM Coordinates: (mN, mE, Zone, Acc.): see DL GPS

Samplers In: DL CM

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / FIL)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BSB	1		-	55	1.04	TISS	-	WB		COMP 1 21.5g
	2			52	0.94					
	3			47	0.79					
	4			55	1.05					
	5			56	1.27					
	6			47	0.68					
	7			55	1.06					
	8			50	1.17					
	9			56	1.41					
	10			52	0.92					
	11			54	1.12					
	12			57	1.29					
	13			52	1.01					
	14			54	1.09					
	15			58	1.25					
	16			56	1.15					
	17			50	0.85					
	18			53	0.94					
	19			50	0.81					
	20			54	1.1					
	21			50	0.91					COMP 1 40.83g
NPD	22		106	110	11.7					
	23		90	97	7.52					
	24		89	96	6.48					
	25		85	91	6.19					
	26		99	106	9.04					

Species Box Tally Area / Site Comments: BSB 3+1 NPD 5 FSD 2+1

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Traps

Project Site / Project Number: OMFMA2002

WSP

Waterbody or Watercourse Name: North Drift Lake River

Start Date: (DD/MMM/YY) / Time: (24HR): 18/Oct/22 10:45

End Date: (DD / MMM / YY) / Time (24HR): 19Oct22 / 9:00

Area Description: (Habitat Type / Site Features): Tributary DS of Beaver Dam

Sample ID: NDR-Trib-01-MT1

Method Effort: (Gillnet Soak/Dips): 10

UTM Coordinates: (mN, mE, Zone, Acc.): See DL GPS

Samplers In: CA DL

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (4M/F)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Minnow Trap

Project Site / Project Number: OMEMA2002

WSP

Waterbody or Watercourse Name: Jocko Creek

Start Date: (DD/MMM/YY) / Time: (24HR) 18 Oct 22 / 15:30

End Date: (DD / MMM / YY) / Time (24HR) 19 Oct 22 / 9:45

Area Description: (Habitat Type / Site Features) Small Stream.

Sample ID: JC-S-01-MT1

Method Effort: (Traps/Rods/Dips) 25

UTM Coordinates: (mN. mE, Zone. Acc.) DL GPS

Samplers In: DC CM

Page: 2 of 2

See Net Form: Y/N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BSB	46		—	50	0.9	TISS	—	WB		compl 22.22g
	47			56	1.35					
	48			53	1					
	49			53	1.04					
	50			52	1.16					
	51			56	1.26					
	52			53	0.97					
	53			57	1.32					
	54			50	0.88					
	55			56	1.21					
	56			53	1.15					
	57			56	1.20					
	58			56	1.5	"	"	"		
BSB	59			54	0.97					comp 2 21.07g
	60			56	1.22					
	61			64	1.97					
	62			59	1.58					
	63			54	1.08					
	64			55	1.08					
	65			60	1.45					
	66			55	1.67					
	67			60	1.62					
	68			56	1.24					
	69			60	1.98					
	70			55	1.29					
	71			57	1.54					
	72			58	1.33					
	73			56	1.29	"	"	"		

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA2022

WSP

Waterbody or Watercourse Name: Jacko Creek

Start Date: (DD/MMM/YY) / Time: (24HR): 18/Oct/22 15:30

End Date: (DD / MMM / YY) / Time (24HR): 19 Oct 22 / 9:45

Area Description: (Habitat Type / Site Features): Small stream

Sample ID: JC-S-01-MT1

Method Effort: (Time/Nets/Dips): 25

UTM Coordinates: (mN, mE, Zone, Acc.): See DL GPS

Samplers In: DL ZM

Page: 1 of 2

See Net Form: Y/N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Lake Chub	1		62	66	2.3	TISS	–	WB		comp1 23.11g
	2		68	72	2.93					
	3		72	78	3.61					
	4		70	75	3.67					
	5	5	70	75	3.26					
	6		67	72	3.5					
	7		73	78	4.01					
Lake Chub	8	8	69	74	2.96					comp2 24.78g
	9		70	73	3.29					
	10	10	70	75	3.44					
	11		69	74	3.55					
	12		74	80	4.28					
	13		68	74	4.01					
	14		70	75	3.45					
Lake Chub	15	15	75	81	4.82					comp3 30.43g
	16		81	86	6.28					
	17		81	86	5.6					
	18		83	88	6.68					
	19		90	95	7.26					
Lake Chub	20		94	100	8.92					comp4 41.08g
	21		96	102	9.84					
	22		92	99	8.04					
	23		88	93	7.52					
	24		87	91	6.93					
Lake Chub	25		75	80	4.36					comp5 24.61g
	26		79	84	5.5					
	27		78	83	4.5					
	28		78	83	5					
	29		81	86	5.34					
Lake Chub	30		73	77	4.36	Aging				
	31		64	68	2.18					
	32		81	86	5.35					
	33		85	91	6.46					
	34		71	76	3.94					
	35		69	73	3.51					
	36		77	82	4.46					
	37		86	90	5.95					
	38		96	102	9.89					
	39		66	70	2.75					
BSB	40		–	56	1.48	TISS	–	WB		comp1
	41			55	1.06					
	42			55	1.37					
	43			50	1.1					tumors
	44			55	1.29					
	45			54	1.19					

Species Box Tally Area / Site Comments:

Lake Chub - 131+70+7

NRD 4

FSD 12

BSB 2

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Traps

Project Site / Project Number: OMEMA2022 | WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR)	Area Description: (Habitat Type / Site Features)
Gerry Lake	19/Oct/22 / 11:30	20/Oct/22 / 12:45	Lake.

Sample ID:	Method Effort: (Traps/Rods/Ops)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In:	Page: 1 of 1	See Net Form: Y/N
NDRYGerLK-MT1	25	see DL GPS	EM		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
		- NO								
		Catch								

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA2002

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR)	Area Description: (Habitat Type / Site Features)
Martin Lake	19/oct/22 / 14:15	20/oct/22 / 15:45	Lake

Sample ID:	Method Effort: (Time/Pools/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1
NDR-Mark-MT1	24 hr	see DL GPS.	CM	See Net Form: Y/N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
N. Pike	1		248	265	0.090	Both	Sc, Cl	Fill		Gillnet 14:87 female tissue weight

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMFMA2002

WSP

Waterbody or Watercourse Name: Sutherland Lake

Start Date: (DD/MMM/YY) / Time: (24HR): 20/oct/22 · 1800

End Date: (DD / MMM / YY) / Time (24HR): 21/oct/22 / 16.50

Area Description: (Habitat Type / Site Features): LAKE

Sample ID: NDR-SutLk

Method Effort: (Traps/Rods/Dips): 25

UTM Coordinates: (mN, mE, Zone, Acc.): SecDL GPS

Samplers In: DL Em

Page: 1 of 1

See Net Form: Y / N

Gillnet / normT

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight lb (kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
N. Pike	1		501	552	1.050	Both	Sc, Cl	Fill		47.16 = left tissue F
	2		625	672	1.710					25.49 = right tissue
										right tissue = 60.33g
										left tissue = 72.83g F

Species Box Tally Area / Site Comments:

NRD-1

Tower Dexter - 1 > MT

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Traps

Project Site / Project Number: OMEMA2002

wsp

Waterbody or Watercourse Name: Jack Lake

Start Date: (DD/MMM/YY) / Time: (24HR): 21/Oct/22 / 1545

End Date: (DD / MMM / YY) / Time (24HR): 22/Oct/22 15:45

Area Description: (Habitat Type / Site Features): Lake

Sample ID: NDR-JackLk

Method Effort: (Traps/Rods/Dips): 23

UTM Coordinates: (mN. mE. Zone, Acc.): see DL GPS.

Samplers Initials: DL, EM

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fillet)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
GN N. Pike	1		596	639	1.140	Both	Sc, Cl	Fillet		right tissue = 58.44g
	2									LEFT tissue = 64.47g F
	3									
	4									
MT BSB	1		–	50	0.82	TISS	–	WB		Comp 1 12.23g
	2			46	0.76					
	3			57	1.36					
	4			55	1.07					
	5			54	1.14					
	6			49	0.67					
	7			47	0.68					
	8			51	0.90					
	9			47	0.72					
	10			56	1.14					
	11			38	0.69					
	12			57	1.360					tail missing
	13			51	0.83					

Species Box Tally Area / Site Comments:

Common Shiner – 4
Blacknose – 1
Perch – 1

NRD-1 > MT released

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fillet - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow Trap

Project Site / Project Number: OMEMA2022

WSP

Waterbody or Watercourse Name: North Driftwood River

Start Date: (DD/MMM/YY) / Time: (24HR): 20/oct/22 1800

End Date: (DD / MMM / YY) / Time (24HR): 23/oct/22 13:00

Area Description: (Habitat Type / Site Features): Pond

Sample ID: NDR-S-01

Method Effort: (Traps/Rods/Dips): 25

UTM Coordinates: (mN, mE, Zone, Acc.): See DL GPS.

Samplers In: DL CM

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / FIL)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BSB	1		—	47	0.81	TISS	-	WB		Comp 1 20.89g
	2			45	0.69					
	3			42	0.57					
	4			45	0.63					
	5			48	0.90					
	6			53	1.03					
	7			52	1.01					
	8			55	1.02					
	9			49	0.98					
	10			55	1.28					
	11			52	1.02					
	12			55	1.19					
	13			47	0.73					
	14			57	1.34					
	15			50	0.92					
	16			53	0.99					
	17			52	1.08					
	18			49	0.88					
	19			55	1.04					
	20			48	0.74					
	21			58	1.36					
	22			48	0.75					
	23			50	0.91					

Species Box Tally Area / Site Comments:

FSD - 1

Pearl Dace - 1

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
FIL - Fillet or Dorsal Epaxial

FISHERIES NET CATCH / EFFORT FORM

WSP

SITE DESCRIPTION:

Sample ID	Waterbody Name	Project Code
NDR-GenLk-GN1/0N2	Cherry Lake	ONEMa20-02

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83)			Site Type	
		(UTM Zone)	(LAT)	(LONG)	(substr)	(cover)
Gillnet	2"/1"					

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus -
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
	20/Oct/22	11:00	25m	5-10m	45	.9	1.5m	

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
	20/Oct/22	12:30	1	3	6.5°	1

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)
	71					

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
No Catch						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING: Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments: See QL GPS for Locations

See Bio Sheet Data (Y / N)

QA/QC By:

FISHERIES NET CATCH / EFFORT FORM

WSP

SITE DESCRIPTION:

Sample ID	Waterbody Name			Project Code
NDR-JackLk	Jack Lake			OMEMA 2022

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
Gillnet	2"/3.5"/4.5"/3"					

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
D.LePage C.Martino	22/Oct/22	11:30	15-25m	5m	90°	.5	1.0	2.0

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
D.LePage C.Martino	22/Oct/22	15:30	1			

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
Northern Pike	131	1	Yes	Yes	Sc, Cl	

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING: Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments: See DL GPS for Location

See Bio Sheet Data (Y) / N

QA/QC By:

Page: _____ of _____

FISHERIES NET CATCH / EFFORT FORM

WSP

SITE DESCRIPTION:

Sample ID	Waterbody Name	Project Code
NDR-SutLk-GN/12/3/4	Sutherland lake	OMEMA202

Gear Type (Gillnet, Trapnet, Fyke Trap Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
Gillnet						

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders OT = other
MA = macrophytes NC = no cover
LT = log/tree

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
DLePage C Martino	21/oct/22	10:15	25m	0	90°	1m		3m

LIFT DATA: (recorded at time of lift)

Note a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
DLePage C Martino	21/oct/22	13:00	1			

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
Northern Pike		2	Y	Y	Sc, Cl	
			Y	Y	Sc, Cl	

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING: Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments: See DL GPS for Locations

See Bio Sheet Data (Y) N

QA/QC By:

FISHERIES NET CATCH / EFFORT FORM

WSP

SITE DESCRIPTION:

Sample ID	Waterbody Name			Project Code
NDR-MarLE-GN1/GN2	Martin Lake			CMENA2022

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT)	(LONG)	Site Type (substr)	(cover)
Gillnet	1½"					

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = mould
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
D. Lelage, C. Martino	24/oct/22	13.00	25	5m	90	.5		

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
D. Lelage, C. martino	24/oct/22	16 00				

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
Northern Pike		1	Y	Y	Sc, Cl	

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year
1+ - Older than "yoy"

WATER QUALITY READING:

Date: _____ Time: _____

Temperature: (°C)		DO: (%)	
Cond.: (µS/cm) or (Ms/cm)		DO: (mg/L)	
Turbidity: (NTU)		pH:	
TDS: (g / L)		ORP:	
Salinity: (ppm)		Depth: (m)	

Comments: See DL Gaps

See Bio Sheet Data (Y) / N

QA/QC By:

Page: 1 of 1

Location NDR-S-04 Date Oct 12, 2022

Project / Client OMcMa2002. → D Crawford.

Sed Quality
- Sand, Gravel, Cobble - Substrate.
- not many depositional zones
- hard bottom
- Road used to travel over river.
- Large Rocks along banks.

* no sed collected *

- D/S Right bank possible deposition zone not enough for 3 samples.

fish Habitat.
- Gravel/Cobble bottom.
- Beaver dam d/s → Beaver activity.
- Alders, low shrubs, Grasses along Shoreline
  Some erosion visible
  old Road Crossing.
- Summer veg dead.
- large rocks, slow flow,
- water level appox same as Spring

Rite in the Rain

28 Location NDR-P-04 Date 12-oct-22

Project / Client OMEMA2022 - Crawford

Habitat observations.

- floating macrophytes, submergent veg.
- Pond lilys, Grasses cat tails, Alders,
- Tamarack, Black Spruce, Sweet gale.
- Deep pond, floating bog mat
- Spagnum moss.
- not likley fish hab.
- old beaver pond.
- canopy cover = low
- instream cover = low-moderate
- water tea stained.

ND

Location NDR-PO2 Date 12-Oct-22

Project / Client OMEMA2002 - Crawford

Habitat Observations:

- vegetation: cattails, horsetail, grasses, tamarack, dogwood
- instream cover = low-moderate
- canopy cover = low
- substrate = floc
- water = very clear
- Man made Pond.
- relatively shallow.

36

Location NDR-R07 Date 15-oct-22

Project / Client OMEMA2002

0467537 5411207

Water Quality 15:00

6.5 °C

68% DO

8.34 DO mg/L

0.031 Spc $\frac{mS}{cm}$

20.3 C $\frac{uS}{cm}$

5.27 pH

227.9 ORP

-1.34 NTU

Habitat

- Pond along trail
- huge trees in Pond
- Grasses, low Shrubs
- Fen Patches
- Submergent / Emergent Veg
- Coontail
- Trail along pond edge.

Location NDR-P-06 Date 16-Oct-22

Project / Client OMFNA2022

Location a468 556 5410412

Water Quality

6.4 °C

58.5 DO%

7.21 DOmg/L

0.030 SPC mS/cm

19.2 C. µS/cm

5.45 pH

18.8.5

- 0.89 NTU

0.1m Depth

fish habitat

- Pond along trail
- Old Stumps in Centre of Pond
- fen mats on far side of pond
- Cattails, grasses, wild Cotton, Dogwood, Alders
- Tamarak and Spruce trees.
- Deep Channel off Road -> Shallow Back Bay -> Floodplain like.
- Horsetail,
-

Time: 1200

- water taken from shoreline.

Rite in the Rain

Location NDR-S-05 Date 16-Oct-22

Project / Client OMEMA2022

Habitat observations

- narrow trib along road
- "T" intersection water flowing out
- Beaver activity
- Dogwood, grasses, horsetail, cattails, Alders
- Tamarack, spruces
- width of trib appox 3m – 13m
- fen floodplain
- Soft organic bottom.

Rite in the Rain

42 Location NDR-Trib-02 Date 16-Oct-22

Project / Client OMEMA2002

0471054 5409502 Time 1610

6.3°C

58.3 DO%

7.26 DO mg/L

0.030 SpC

19.2 C

5.53 pH

258.6 ORP

-1.24 NTu

Depth 1m.

Habitat

- Narrow Trib over 1m deep Approx 2m wide
- Flood plain Shoreline
- Grasses, Horsetail
- Alders, Tamarack, Spruces.
- Flooded over edge about 30cm water to treeline.

MT Set @ 1700

Location NDR-S-02 Date 16-Oct-22

Project / Client OMFMar2002

0472031 5408775 Time: 13:30

6.5 pc

46.6 Do %

5.74 Do mg/L

0.081 Spc.

52.6 C

6.56 pH

176.0 ORP mV

0.39 NTU

Depth - 2.0m

Habitat

- Slow/Lar flow
- exposed banks
- water level lower
- Alders, grasses,
- Small trib flowing in
- Flood plain like habitat
- Spruce, tamarack
- Dark Tea Color water

mT Set @ 17:45

Water Depths Across Channel

~~4.80~~ 4.80

868

1085

1192

1120

705

615

413

150

Rite in the Rain

Location NDR-Trib-01 Date 18 Oct 22

Project / Client OMEMA2002

047158 54069C8

Water Sample Time: 12:15

6.1 C
43.08 DO
5.33 DO mg/L
0.105 Spc
6.69 C
6.81 pH
189.2 ORPMV
0.60 NTU.

Habitat

- Approx 13m wide
- Meandering trib
- Tamarack, Spruces for treeline
- Grasses, Alders,
- Flood plain like Shoreline
- Beaver activity present
- Beaver Dam Dug out increasing flow upstream

Pull Traps 9:00

1 Shiner 1 BSB.

Rite in the Rain

52 Location NDR-JC-S-01 Date 18/oct/22

Project / Client OMEMA2002

0473298 5401485 Time: 1415

water Sample

6°C Depth, 3m

44.9 DO%

5.58 DO mg/L

0.073 SPC

46.5 C

5.32 pH

257.1 ORP

-1.28 NTu

Habitat

- floodplain
- water over Bankfull
- grasses
- Deep narrow Channel
- Below Power line
- Spruce/Tamarack on edge of floodplain
- Highway 100m away from site
- high flow

62 Location NDR-GerLk Date 20/oct/22

Project / Client

Habitat

- Lake
- fallen trees on shoreline
- some grasses
- Connected to Matin Lake
- long stretch various bays throughout the lake
- in flow on far end
- out flow mid lake
- Tamarack, spruce forest surrounding
- Tea / dark colour water

Location NDR-MarLK. Date 20/04/22 03

Project / Client

Habitat

- Lake
- Spruce treeline
- grasses along shoreline
- reeds, aquatic veg → Submergent/emergent
- fallen trees on shoreline
- out flow going into trib-01
- inflow near truck parking.
- Connected to Gerry lake
- Tea/dark colour water
- more shallow than Gerry
- multiple bays around the lakes
- signs of logging adjacent to lake.

Rite in the Rain

Location NDR-SutLk Date 21/Oct/22 67

Project / Client OMEMA2002

Habitat.

- 2 large bays connected through narrow channel
- Spruce Tamarack Shoreline.
- Pondweed,
- inflow from mel' lake. on far side
- outflow near Jack Lake
- Grasses, Downed trees on Shore
- Shallow Shore line -> 1.4m in centre.
- Some fen mats throughout the lake

Rite in the Rain

Location NDR-JackLk Date 22-oct-22

Project / Client OMEMA2002

Habitat

- Small Lake - D Side Bay
- mostly Spruce Treeline along Shore
- flows into Gerry Lake
- Shallow Back Bay on far end
- fallen trees on Shoreline
- Some Grasses / cattails
-

Location NDR-S-01 Date 23/oct/22 75

Project / Client OMEMA2002

04754424 5406463. Time: 1145

Water Quality

5.5 °C

27.1 % Do

3.42 Do mg/L

0.040 SpC

25.4 C.

5.84 pH

166.5 ORP

Depth = .2cm

-1.0 NTU

Habitat observations.

- Beaver activity more of a beaver pond
- flows into Stream
- floating fen mats
- Trees/twigs in water/along shoreline
- cattails, rushes, reeds, Alders
- flood plain shoreline.
- Tree line Tamarack/ Spruces approx loom back from main wetted pond.
- relatively Shallow .6-1.3m
- Small trib flowing in.

Rite in the Rain

76 Location WBR-P-04 Date 23/oct/22

Project / Client OMEMA 2022

Habitat observations

- Beaver Pond
- Deep along dam
- Pondweed, watershield, Lilly pads
- Fen Shore line
- flows into WBR-S-05
- Spruce Tamarack
- Grasses, reeds, cattails.
- woody debris in Pond.
- floating mats
- Shallow bays away from Dam
- Black Tea Stain water Color.
- Partially flooded
- water lower then Summer Sample.

Water Quality oct 24, 2022 Time: 11:15

8.2 °C Depth - .15m

21.2 Do % 0474594 5412296

2.50 Do mg/L

0.031 Spc

20.9 C

4.9 pH

221.9 ORP

0.30 NTU

Location WBR-P-03 Date 24/oct/22 83

Project / Client CMEMA2002.

Habitat observations:
- Beaver pond.
- D/S of WBR-S-05
- Clay bottom / Soft.
- water level higher than Summer Sampling
- Spruce, Pine, Tamarak treeline, alders.
- Grasses along Shore
- aquatic Grasses
- wild mint.
- Beaver Dam at East end of pond
- no sign of recent beaver activity.
- Relativity - Shallow.

Water Quality Time: 15:00
10.0 °C 0474910 5412159
20.4 Do%
2.30 Do mg/L
0.031 SpC
22.3 C
5.33 pH
237.5 ORP
0.99 NTU

Depth .2m

Rite in the Rain

84 Location WBR-S-05 Date 24/oct/22

Project / Client OMEMA 2022

Habitat observations

- Grasses, rushes, small alder Shoreline
- narrow Stream Approx 3.2m wide.
- algae
- Beaver dam upstream
- Beaverpond downstream
- wood debris
- low flow
- low Canopy Cover
- Pine Spruce Treeline
- large logs in stream
- flows over trail and down into Stream and WBR-P-03.
- black/tea Stain water
- flood plain

Location MatR - uPStream Date 25/oct/22

Project / Client OMEMA2002

0463418 5410086 Time: 14:30

Water Quality

6.8 °C
21.0 Do %
2.55 Do mg/L
0.078 Spc
51.0 C
7.15 pH
182.3 ORP
2.69 NTu.

Depth = 0.2 m

- Couldnt make it to far site for Sediment/water → running short on time.
- collected w/s

86

Location MatR-02 Date 25/Oct-22

Project / Client OMEMA2002

0462846 5412371 Time: 15.15

Water Quality Depth = 0.3 m

6.7 °C

19.4 Do%

2.36 Do mg/L

0.078 Spc

50.7 c

7.28 pH

194.1 oRP

2.68 NTu.

- Only water Collected Family Short on Daylight.

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wsp

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-SQ4	North Driftwood River	12/oct/22	047036 2 5412388
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMema2002		Cloudy, windy.	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	°C	DO	%	OTHER:
H2O Temperature	°C	DO	mg/L	
pH	pH	TDS	g/L	
Conductivity	µS/cm or mS/cm	ORP	mV	
Turbidity	NTU	Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials DL/CM

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Sed-01	12:00	1 / 3/4	p ponar	(☑ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	Left	.50	40	lots of coarse-fine Sand, some larger rocks
2	Centre	.70	30	
3	Right	.45	25	
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):
mayflies. leech.

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wsp

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-04	North Drift wood River	12/oct/22	0410352 5412381
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):	
OMEMa2002		Cloudy windy	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	°C	DO	%	OTHER:
H2O Temperature	°C	DO	mg/L	
pH	pH	TDS	g/L	
Conductivity	µS/cm or mS/cm	ORP	mV	
Turbidity	NTU	Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials DL/CM

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-04-2	1345	1 / 3/4	Ponar	(☐ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	Left	.5	30	gravel 60% / cobble 10 / fines 30%
2	Centre	.7	40	
3	Right	.5	40	
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):
- Mayflies
- Scuds

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wsp

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-04	North Driftwood River	12/Oct/22	0470342 5412377
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):	
0MeMa2002-		cloudy. windy	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	°C	DO	%	OTHER:
H2O Temperature	°C	DO	mg/L	
pH	pH	TDS	g/L	
Conductivity	µS/cm or mS/cm	ORP	mV	
Turbidity	NTU	Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials _____

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1				
2				
3				
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials DL/CM

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-S-04-3	13:30	2 / 1/2	Ponar	(☑ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	Left	.5	20	Some Sed present, mostly gravel, cobble, Sands
2	Centre	.7	20	
3	Right	.6	20	
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):
- mussle
- earthworms
- mayfly

WATER / SEDIMENT / BENTHIC SAMPLING FORM

WSP

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-03-03	North Driftwood River Pond	14/Oct/22	0469790 5469426
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):	
OMEMA2002	DL Photos	Sunny Cloudy.	

Sampler Initials _____

WATER QUALITY

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (☐ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	°C	DO	%	OTHER:
H2O Temperature	°C	DO	mg/L	
pH	pH	TDS	g/L	
Conductivity	µS/cm or mS/cm	ORP	mV	
Turbidity	NTU	Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

Sampler Initials DL/CM

SEDIMENT

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.) (☑ Same As Above)
NDR-P03-03	10:30	2 Jars ~~Bag~~ / full	Ponar	

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	Pond	3.5	100	Silt, clays.
2	Pond	3.5	100	
3	Pond	3.5	100	
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):
1 bag Submitted for grain size.
- slimy texture

Sampler Initials DL/CM

BENTHIC

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.) (☑ Same As Above)
NDR-P03-03	10:30		Ponar	

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / silt / clay)
1	Left	3.5	100	Silts, clays;
2	Right	3.5	100	
3	Centre	3.5	100	
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):
Slimy texture

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wsp

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P03-02	North Drift and River Pond	14/Oct/22	0469[illegible]2 5409364
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):	
OMEMA2002		Sunny / Cloudy	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (☐ Same As Above)

Comments (bottles field filtered, sample odour):

				OTHER:
Air Temperature	°C	DO	%	
H2O Temperature	°C	DO	mg/L	
pH	pH	TDS	g/L	
Conductivity	µS/cm or mS/cm	ORP	mV	
Turbidity	NTU	Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials DL/CM

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.) (☑ Same As Above)
NDR-P03-02	1000	2 Jars / 1 bag.	Ponar	✓

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	Pond	2.5	100	Organics, silt, fines.
2	Pond	2.5	100	
3	Pond	2.5	100	
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):
2 Jars 1 Bag.

BENTHIC

Sampler Initials DL/CM

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.) (☑ Same As Above)
NDR-P03-02	10:00	2 / 708, 308	Ponar	✓

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	Left	2.0	100	
2	Right	2.3	100	
3	Centre.	2.2	100	
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

WATER / SEDIMENT / BENTHIC SAMPLING FORM

wsp

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P03	North Drifting River Pond 3	14/Oct/22	0469826 5409537
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMEMA2002	See DL GPS.	Sunny / Cloudy	

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Comments (bottles field filtered, sample odour):

Air Temperature	°C	DO	%	OTHER:
H2O Temperature	°C	DO	mg/L	
pH	pH	TDS	g/L	
Conductivity	µS/cm or mS/cm	ORP	mV	
Turbidity	NTU	Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

SEDIMENT

Sampler Initials DL, CM

Sample ID	Time (24hrs)	Bags/Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P03-01	9:15	2 jars / 1 bag	Ponar	(☑ Same As Above)

Pull (#)	Location (in stream/river)	Depth (m)	Sampler Qty. (%)	Sediment Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	Pond	2	90	Organics, fines
2	Pond	2	95	
3	Pond	2	90	
4				
5				
6				

Comments (colour, steaking/mottling, odour, macrophytes):

BENTHIC

Sampler Initials DL/CM

Sample ID	Time (24hrs)	Jars (# / vol.)	Sample Gear	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P03-01	9:15	1 / 75%	Ponar	(☑ Same As Above)

Pull (#)	Location (Left / Centre / Right)	Depth (m)	Ponar Quantity (%)	Benthic Composition (Describe % cobble / coarse-fine sand / silt / clay)
1	Left	2	95	Organics, fines, silts
2	Right	2	95	
3	Centre	2	95	
4				
5				
6				

Comments (colour, coarse organics/detritus, visible animals):

Project / Client OMEMO

Sediment / Benthics

Sample ID NOR-P-01 Time: 13:00

Pull	Location	Depth	Quantity
1	Left	1.5 m	80 %
2	Centre	2.0 m	80 %
3	Right	2.5 m	80 %

- 2 Jars
- 1 Bag (Garch size)

Benthics NOR-P-01-06

Pull	Location	Depth	Quantity
1	Left	.75m	90 g
2	Right	.75m	90 g
3	Centre	to 3m	90 g

- 4 Jars 80% full

Sample Gear: Ponar

observations
- organics, silt, woody debris, roots
- Brown in colour
- ~~# of Jars~~ Gastropod.

Location 0473246 5406620

SS Location NDR-P-01-02 Date 14-Oct-22

Project / Client OMEMA 2022

Location: 0473198 5406521 Time: 13:45

Sediment NDR-P-01-02

Pull	Location	Depth	Quantity
1	Left	.70 m	100
2	Right	.80 m	100
3	Centre	2.00 m	100

Benthics NDR-P-01-02

Pull	Location	Depth	Quantity
1	Left	.70	90
2	Right	1.0	90
3	Centre	2.0	90

Observations. Sample Gear: Ponar

- Organics, woody debris, fine sands, silty
- Brown in Colour.
- Sediment = 2 Jars 1 bag grain size
- Benthic = 6 Containers 70% full

Rite in the Rain

32 Location NDR-P-01-03 Date 14 oct 22

Project / Client ONEMA2022

Location: 0473135 5406527 Time: 14:30

Pull	Location	Depth	Quantity
1	Left	1.m	80
2	Right	1.m	80
3	Centre	2.m	80

Benthics

Pull	Location	Depth	Quantity
1	Left	1 m	80
2	Right	1 m	80
3	Centre	2 m	80

Observations

Sample Gear: Ponar

- Brown in Colour Sediment
- organics, grasses, Silts,
- no odour

Scd = 2 Jars 1 bag (grainsize)

Benthos = 4 Jars.

Location NDR-P-07-01 Date 15-Oct-22

Project / Client OMEMA2002

Location 5046747 7541257 Time: 1230

Sediment — Ponar

Pull	Location	Depth	Quantity
1	Pond	1.5	90
2	Pond	1.2	70
3	Pond	1.0	70

Benthics — Ponar

Pull	Location	Depth	Quantity
1	Left	.80	95
2	Right	.90	95
3	Centre	1.3	95

Observations.

- Sed Jars = 2 Jars 1 bag.
- Benthos = 4 Jars.
- Brown in Colour
- Organics silt, woody debris
- No Benthics Observed.

Rite in the Rain

34

Location NDR-R-07-02 Date 15 Oct 22

Project / Client OMEMA 2002

Location: 0467529 5411225 Time: 1395

Sediment Pull	Location	Ponar Depth	Ponar Quantity
1	Pond	2.0	75
2	Pond	1.5	90
3	Pond	1.0	75

Benthics Pull	Location	Ponar Depth	Ponar Quantity
1	Left	1.2	85
2	Right	1.1	95
3	Centre	2.0	85

Observations

Sed = 2 Jars 1 bag

Benthos =

- Potential Hydrocarbons
- Brown in Colour
- Silty, Small grains
- Mayflies, Midges

Location NDR-P-07-03 Date 15-Oct-22

Project / Client OMEMA2002

Location: 0467591 5411185 Time: 14:30

Sediment

Pull	Location	Depth	Quantity
		Ponar	
1	Pond	0.9	90
2	Pond	1.0	90
3	Pond	1.2	90

Benthos

Pull	Location	Depth	Quantity
		Ponar	
1	Left	1.2	90
2	Right	1.0	90
3	Centre	1.2	90

Observations

Sed = 2 Jars 1 bag.

Benthos = 3 Jars.

- Organics, detritus, Silty
- Brown colour
- no odour
- Some Sand and Gravel present in Benthic Sample.

Rite in the Rain

38

Location NDR-S-05-01 Date 16-oct-22

Project / Client OMEMA2002

Location: 0468614, 5410394 Time: 12:30

Sediment Sample Gear = Ponar

Pull	Location	Depth	Quantity
1	Stream	1.0	80
2	Stream	2.0	80
3	Stream	1.2	80

- 2 Jars 1 bag.
- light Brown in colour
- Silty, organics, Clay, Sand

Benthics Sample Gear = Ponar

Pull	Location	Depth	Quantity
1	Left	1.0	80
2	Right	0.7	60
3	Centre.	2.2	80

- 3 Jars
- No Benthics observed
- woody debris.

Location NDR-S-05-02 Date 16-oct-22

Project / Client OMEMA2002

Location: 0468602 5410425 Time: 1300

Sediment — Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Stream	1.1	85
2	Stream	1.8	100
3	Stream	0.9	100

- 2 Jars, 1 Bag.
- Light Brown in Colour
- Small grain particles

Benthics — Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Left	0.9	80
2	Right	1.3	75
3	Centre	1.8	100

- Jars
- no benthics observed
- Grasses, woody debris.

Rite in the Rain

40

Location NDR-S-05-03 Date 16-oct-22

Project / Client GMEMA2002

Location: 0468562 5410432 Time 1345

Sediment — Sample gear - Ponar

Pull	Location	Depth	Quantity
1	Stream	.75	60
2	Stream	.75	60
3	Stream	.75	60

- 2 Jars - 1 bag
- lots of organics, woody debris.

Benthics — Sample gear - Ponar

Pull	Location	Depth	Quantity
1	Left	.75	70
2	Right	.75	70
3	Centre	.75	70

- Jars
- organics, grasses, woody debris.

Location NDR-S-02-01 Date 17-Oct-22

Project / Client OMEMA2022

Location: 0472022 5408783 Time: 14:00

Sed Samplegear Ponar

Pull	Location	Depth	Quantity
1	Stream	.80	60
2	Stream	1m	60
3	Stream	.70	70

- 2 Jars 1 bag
- Sandy substrate
- no odour

Benthics Sample Gear Ponar

Pull	Location	Depth	Quantity
1	Left	.8	70
2	Centre	1.0	65
3	Right	.5	90

- Mayflies
- Sandy
- 1 Jar of Sample

Rite in the Rain

46

Location NDR-S-02-02 Date 17-Oct-22

Project / Client OMEMA 2002

Location: 0472030 5408775 Time: 1430

Sediment Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Stream	.9	40
2	"	1m	60
3	"	.9	40
4	"	.9	70

- 2 Jars 1 bag
- Sandy, Clay

- hard bottom.
- woody debris.

Benthics Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Left	.8 m	60
2	Centre	1.0m	50
3	Right	.5	60

- Mayflies, Dragonflies, Caddisfly
- 1 Jars.

Location NDR-S-02-03 Date 12 Oct-22

Project / Client CMEMA 2002

Location: 0472035 5408768 Time: 1500

Sediment Pull.	Location	Sample Gear - Piner Depth	Quantity
1	Stream	.8	80
2	Stream	1.0m	70
3	Stream	1.2	65

- 2 Jars 1 bag
- lrgt grain size, Sand, Clay

Benthics Pull	Location	Sample Gear - Piner Depth	Quantity
1	Left	.8	80
2	Centre	1.0	70
3	Right	1.2	40

1 Jar
- mayfish, Caddisfly,

Rite in the Rain

48

Location NDR-TNb-01-01 Date 18/oct/22

Project / Client OMEMA 2002

0471570 5406914 Time: 1100

Sediment — Sample Grear Ponar

Pull	Location	Depth	Quantity
1	Stream	.5 m	80
2	"	1.2 m	80
3	"	.6 m	70

- 2 Jars 1 bag
- Dark Brown
- Small Granules: Silty Sand
- organics

Benthics — Sample Greer.-Ponar

Pull	Location	Depth	Quantity
1	Left	0.5	60
2	Centre	1.2	60
3	Right	0.6	60

- 1 Jar
- Leeches, Snails

Location NDR-Trib-01-02 Date 18/Oct/22

Project / Client OMEMA2002

0471549 5406917 Time: 11:30

Sediment — Sample Gear: Ponar

Pull	Location	Depth	Quantity
1	Stream	.5	40
2	"	1.0	55
3	"	.6	40

- 2 Jars 1 bag
- light. Brown in color
- Small granules present.

Benthics — Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Left	.7	60
2	Centre	1.2	55
3	Right	.5	40

- 2 Jars
- Mayfly

Rite in the Rain

50

Location NDR-Trib-01-03 Date 18/oct/22

Project / Client OMEMA 2002

0471518 5406908 Time: 12:00

Sediment

Pull	Location	Sample gear - Ponar Depth	Quantity
1	Stream	.6	60
2	"	.9	75
3	"	.4	50

- 2 Jars 1 bag
- light brown.
- Small grains present.
- Silty, Clay

Benthics

Pull	Location	Sample Gear Depth	Ponar Quantity
1	Left	.5	45
2	centre	.9	60
3	Right	.4	40

- Jars

Location NDR-JC-S-01-01 Date 18/oct/22

Project / Client OMEMA 2002

0473306 5401503 Time: 14:30

Sediment Pull	Location	Sample Gear - Ponar Depth	Quantity
1			
2			
3			

- No good Sediment
- hard Bottom.

Benthics Pull	Location	Sample Gear - Ponar Depth	Quantity
1	Left	.6	40
2	Right	.6	40
3	Centre	.6	40

- No Benthics observed
- Sandy, Organics, Grasses
- 2 Jars

Rite in the Rain

54

Location NDR-JC-Sv01-02 Date 18/oct/22

Project / Client OMFMA2cv2

0473297 5401493 Time: 1445

Sediment Pull	Location	Sample gear Depth	Ponar Quantity
1			
2			
3			

- no good Sediment hard Bottom

Benthics Pull	Location	Sample Gear - Depth	Ponar - Quantity
1	Left	.7	40
2	Right	.8	40
3	Centre	.7	40

- Sandy / organics
- grasses
- 2 Jacks.

Location NDR-JC-Sed-03 Date 18/Oct/22

Project / Client OMEMA 2002

0473258 5401475 Time: 1500

Sediment — Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	X		
2			
3			

Hard Bottom no good. Sed

Benthics — Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Left	.6	40
2	Right	.6	40
3	Centre	.6	40

-no benthics observed

-grasses, Organics, Sandy.

Pull Trips 19-Dec-22

9:45

Rite in the Rain

56

Location NDR-GeoLK-01 Date 19/Oct-22

Project / Client OMEMA2002

0471232 5405376 Time: 12:30

Sediment Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Lake	9.9m	100
2	"	9.9m	100
3	"	9.9m	100

2 Jars 1 bag

Streaking in sediment

Clay / Silt

Black organics Approx 1-2cm layer

Benthics

Sample Gear - Ponar

Pull	Location	Depth	Quantity
1			
2	Lake	9.9 m	100
3	Lake	9.9 m	100
	Lake	9.9 m	100

- 1 Jar
- No benthics observed
- ~~Sand~~ / Clay / Silt.
- Very little material

Location NDR-GerLK-02 Date 19-Oct-22

Project / Client OMEMA 2002

0471358 5405667 Time: 13:00

Sediment — Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Lake	4.3m	100
2	Lake	4.3m	100
3	Lake	4.3m	100

-2 Jars 1 bag
- Black/brown.
- Silty / Clay.

Benthics — Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Lake	4.3m	100
2	Lake	4.3m	100
3	Lake	4.3m	100

1 Jar
midges
some organics.
very little material

Rite in the Rain

58 Location NDR-GerLK-03 Date 19/oct/22

Project / Client OMEMA2002:

6471278 6405993 Time: 1330

Sediment Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Lake	16.9 m	100
2	Lake	16.9 m	100
3	Lake	16.9 m	100

- 2 Jars 1 bag
- Dark Brown
- Silty, clay.

Benthics Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Lake	16.9 m	100
2	Lake	16.9 m	100
3	Lake	16.9 m	100

- 1 Jar
- Midges.
- not a lot of material in Sample

Location NDR-MarLk-01 Date 19/Oct/22

Project / Client OMEMA2022

0476994 5406297 Time: 16:00

Sediment

Pull	Location
1	Lake
2	Lake
3	Lake

- 2 Jars 1 bag
- Brown in colour
- Silty, clay

Sample Gear - Ponar	
Depth	Quantity
2.0m	50
2.0m	50
2.0m	50

Benthics

Pull	Location
1	Lake
2	Lake
3	Lake

- 1 Jar
- no benthics observed

Depth	Quantity
2.0m	50
2.0m	50
2.0m	50

Rite in the Rain

60 Location NDR-MarLk-02 Date 19/Oct/22

Project / Client OMEMA2002

0470800 5406674 Time: 1630

Sediment Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Lake	8.5 m	100
2	"	8.5 m	100
3	"	8.5m	100

-2 Jars 1 bag
- Dark Brown
- Silty Clay, Sand.

Benthics Sample Gear Ponar

Pull	Location	Depth	Quantity
1	Lake	8.5 m	100
2	"	8.5 m	100
3	"	8.5m	100

-1 Jar
- not alot of organic material
- midges observed, mayflies

Location NDR-MacLK-03 Date 19/Oct/22

Project / Client OMEMA 2002

0477514 5406854 TIME: 1200

Sediment

Pull	Location	Sample Gear - Ponar Depth	Quantity
1	Lake	2.0 m	100
2	Lake	2.0 m	100
3	Lake	2.0 m	100

- 2 Jars 1 bag
- Brown in Colour
- Silty, Clay,
- no odour

Benthics

Pull	Location	Sample Gear - Ponar Depth	Quantity
1	Lake	2.0 m	100
2	"	2.0 m	100
3	"	2.0 m	100

- 1 Jar
- Not alot of organic Material
- midges,

Rite in the Rain

64 Location NDR-SutLk-01 Date 21/oct/22

Project / Client OMEMA 2002

0471333 5964355 Time: 11:00

Sediment Sample Gear Ponar

Pull	Location	Depth	Quantity
1	Lake	5.2m	100
2	Lake	5.2m	100
3	Lake	5.2m	100

- Loose kind of material w/ some organics
- Brown in Colour
- Slight odour.
- 2 Jars 1 bag Collected.

Benthics Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Lake	5.2m	100
2	Lake	5.2m	100
3	Lake	5.2m	100

- 1 Jars
- No benthics observed - Small Shells
- Some algae in Sample
- little material in Sample

Location NDR-SutLk-02 Date 21/oct/22

Project / Client OMEMA2002

0471208 5404484 Time: 11:30

Sediment Sample - Ponar

Pull	Location	Depth	Quantity
1	Lake	7.0m	100
2	Lake	7.0m	100
3	Lake	7.0m	100

- 2 Jars 1 bag
- Slight odour
- loose material
- Brown in Colour.

Benthics Sample Gear Ponar

Pull	Location	Depth	Quantity
1	Lake	7.0 m	100
2	Lake	7.0 m	100
3	Lake	7.0m	100

- 1 Jar
- midges
- very little material in Sample
- Some organics

Rite in the Rain

66 Location NDR-SutLk-03 Date 21/oct/22

Project / Client OMEMA2002

0470965 5404714 Time: 12:00

Sediment — Sample gear - Ponar

Pull	Location	Depth	Quantity
1	Lake	4.16m	100
2	Lake	4.10m	100
3	Lake	4.10m	100

- 2 Jars 1 bag
- Slight odour
- loose flocklike material
- light brown in colour.

Benthics — Sample Gear - Ponar

Pull	Location	Depth	Quantity
1	Lake	4.10 m	100
2	Lake	4.10 m	100
3	Lake	4.10 m	100

- 1 Jar
- mussle shell
- little organic material in Sample.

68 Location NDR-JackK-01 Date 22/oct/22

Project / Client OMEMA2002

0471159 5404798 Time: 12:15

Sediment — Sample Gear + Ponar

Pull	Location	Depth	Quantity
1	Lake	3.9 m	100
2	Lake	3.9 m	100
3	Lake	3.9 m	100

- 2 Jars 1 bag
- Loose Sediment
- Slight odour
- Brown in Colour

Benthics

Pull	Location	Ponar Depth	Ponar quantity
1	Lake	3.9 m	100
2	Lake	3.9 m	100
3	Lake	3.9 m	100

- 1 Jar
- midges observed
- small traces of algae

Location NDR-JacLIC-02 Date 22/Oct/22 69

Project / Client OMEMA2002

647063 5404861 Time: 12:45

Sediment

Ponar

Pull	Location	Depth	Quantity
1	Lake	11.3 m	100
2	Lake	11.3 m	100
3	Lake	11.3 m	100

- 2 Jars 1 Bag
- loose Sediment
- Dark Brown / Some black Streaking
- No odor.

Benthics

Ponar

Pull	Location	Depth	quantity
1	Lake	11.3m	100
2	Lake	11.3m	100
3	Lake	11.3M	100

- 1 Jar
- midges Present
- not alot of material in Benthic Sample

Rite in the Rain

70 Location NDR-JacLk-03 Date 22/oct/22

Project / Client OMEMA2002

0470991 5404908 Time: 13:15

Sediment — Ponar

Pull	Location	Depth	Quantity
1	Lake	3.5m	30
2	Lake	3.5m	30
3	Lake	3.5m	30

-2 Jars 1 bag.
- Black / Light Grey
- Clay material / Sandy traces

Benthics — Ponar

Pull	Location	Depth	Quantity
1	Lake	3.5	30
2	Lake	3.5	30
3	Lake	3.5	30

- Clam, midges
- Organics material in Sample

72 Location NDR-S-01-01 Date 23/oct/22

Project / Client OMEMA2002

~~0475499 5406346~~ Time: 945

Sediment — Ponar

Pull	Location	Depth	Quantity
1	Pond	.6	30
2	Pond	.6	30
3	Pond	.6	30

- 2 Jars / bag
- Dark Brown in Colour
- lots of organics
- Loose flock like material

Benthics

Pull	Location	Depth	Quantity
1	Pond	.6	30
2	Pond	.6	30
3	Pond	.6	30

- 3 Jars
- no benthics observed
- Woody debris, organics, Grasses in Sample

0475472 5406456

Location NDR-Sol-02 Date 23/oct/22

Project / Client OMEMA2002

0475427 5406496 Time: 10:30

Sediment — Ponar

Pull	Location	Depth	Quantity
1	Pond	1.3	60
2	Pond	1.3	100
3	Pond	1.3	100

- 2 Jars 1 bag
- Dark brown
- Silty, Sand
- no organics/very little

Benthics — Ponar

Pull	Location	Depth	Quantity
1	Pond	1.3	100
2	Pond	1.3	100
3	Pond	1.3	100

- Jars.
- Leeches,
- Some Organics
-

Rite in the Rain

74 Location NDR-S21-03 Date 23/oct/22

Project / Client OMEMA 2022

0475408 5406443 Time: 11:15

Benthics — Ponar

Pull	Location	Depth	Quantity
1	Pond	1.2m	90
2	Pond	1.2m	80
3	Pond	1.2m	75

- 2 Jars 1 bag
- Dark Brown in Colour
- Some Sand, Silty

Benthics — Ponar

Pull	Location	Depth	Quantity
1	Pond	1.2m	70
2	Pond	1.2m	70
3	Pond	1.2m	70

- 1 Jars
- Some organics/woody debris.
- no benthics observed

Location WBR-P-04-01 Date 24/Oct/22 77

Project / Client OMEMA2002

0474611 5412309 Time: 9:45

Sediment — Ponar

Pull	Location	Depth	Quantity
1	Pond	1.2m	50
2	Pond	1.2m	50
3	Pond	1.2m	50

- 2 Jars 1 bag
- lots of organics / wood debris
- Black in Colour

Benthics — Ponar

Pull	Location	Depth	Quantity
1	Pond	1.2m	50
2	Pond	1.2m	50
3	Pond	1.2m	50

- 3 Jars
- Snails observed
- woody debris / organics

Rite in the Rain

78 Location WBR-P04-02 Date 24/oct/22

Project / Client OMEMA 2002

0474555 5412264 Time: 10:15

Sediment.

Pull	Location	Depth	Ponar Quantity
1	Pond	1.1 m	100
2	Pond	1.1 m	60
3	Pond	1.1 m	50

- 2 Jars 1 bag
- Clay Sub Strate
- light Brown in Colour.

Benthics

Pull	Location	Depth	Ponar Quantity
1	Pond	1.1 m	50
2	Pond.	1.1 m	50
3	Pond	1.1 m	50

- 1 Jar.
- no benthics observed.

Location WBR-P-04-03 Date 24/oct/22 79

Project / Client OMEMA 2002

0474-531 5/4/2207 Time: 1045

Sediment

Pull	Location	Ponar Depth	Quantity
1	Pond	1.1m	60
2	Pond	1.1m	70
3	Pond	1.1m	90

- 2 Jars 1 bag
- organics / woody debris
- Silty
- Dark Brown

Benthics

Pull	Location	Ponar Depth	Quantity
1	Pond	1.1m	90
2	Pond	1.1m	70
3	Pond	1.1m	100

- 2 Jars.
- organics / wood debris
- 00 benthics observed.

Rite in the Rain

80 Location WBR-P-03-01 Date 24/oct/22

Project / Client OMEMA 2002

0474915 5412132 Time: 13.30

Sediment

Pull	Location	Depth	Ponar Quantity
1	Pond	0.75m	40
2	Pond	0.75m	40
3	Pond	0.75m	40

- 2 Jars 1 bag
- Clay, Silt Substrate
- no odour.

Benthics

Pull	Location	Depth	Ponar Quantity
1	Pond	0.75m	60
2	Pond	0.75m	60
3	Pond	0.75m	60

- 1 Jar
- Dragon fly larva observed
- Organics / Grasses

Location WBR-P-03-02 Date 24/oct/22

Project / Client OMEMA 2002

0474930 5412146. Time: 14.00

Sediment

Pull	Location	Ponar Depth	Quantity
1	Pond	1.1 m	40
2	Pond	1.1 m	80
3	Pond	1.1 m	80

- 2 Jars 1 bag.
- Brown in colour
- Silty, Clay, Small Grain Size particles
- no odour

Benthics

Pull	Location	Ponar Depth	Quantity
1	Pond	1.1 m	60
2	Pond	1.1 m	60
3	Pond.	1.1 m	60

- 2 Jars
- no benthics observed

Rite in the Rain

82 Location WBR-P-03-03 Date 24/oct/22

Project / Client OMEMA 2022

0474933 5412160 Time: 14:30

Sediment

Pull	Location	Ponar Depth	Quantity
1	Pond	0.7m	50
2	Pond	0.7m	50
3	Pond	0.7m	60

- 2 Jars 1 bag
- Brown in colour
- Silty, clay, muck.
- No odour.

Benthics

Pull	Location	Ponar Depth	Quantity
1	Pond	0.7m	40
2	Pond	0.7m	40
3	Pond	0.7m	40

- 1 Jar.

Snails, Clams in Sample

Dragon fly larva observed

WATER PROFILE & SAMPLING FORM

SITE INFORMATION

Site ID	Watercourse / Waterbody	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WQR-Marlk	Martin Lake	2010Oct22	0470385 5906521
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):	
OMCMA2010	see DL Photos	Sun cloud / Snowing	

SURFACE WATER QUALITY

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	14:45	7	KM	2010Oct22	(☑ Same As Above)

Air Temperature:		°C	DO:	%
H2O Temperature:		°C	DO:	mg/L
pH:			TDS:	g/L
Conductivity:		µS/cm or mS/cm	ORP:	mV
Depth:		m	Duplicate Taken:	Y / (N)

Water Sampling / Quality Comments:

DISCRETE WATER PROFILE SAMPLING

Interval (m)	Depths (m)	SW Temp (deg C)	pH	Cond. (µS mS/cm)	Turbidity (NTU)	DO %	DO mg/L	TDS	ORP	Comments (Sample ID, time, layer Sample ID)
	0	6.6	7.26	0.104	-0.07	36.0	4.42		139.5	
1	1	6.3	7.24	0.104	-0.10	40.7	5.02		114.1	
.5	1.5	6.2	7.22	0.103	-0.08	42.1	5.21		117.0	

Water Profile / Site Access / Other Comments:

- Shallow Point of Lake 1.8m deep.
- only Surface Collected.

Secchi disk to up .75m, Down .9m

Epilimnion upper, lighter water layer
Thermocline middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion lower, heavy, cool water layer

Zooplankton Collected

WATER PROFILE & SAMPLING FORM

WSP

SITE INFORMATION

Site ID	Watercourse / Waterbody	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR_Jack	Jack Lake	28Oct22	0491067 5404827
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):	
OMEMA2022	See DL Photos	Sunny	

SURFACE WATER QUALITY

Sample ID	Time (24hrs)	Bottles (#)	Sampler (Initials)	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (" Same As Above)
NDR_Jack	14:00	7	CM	28Oct22	

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Depth:		m	Duplicate Taken:		Y / N -

Water Sampling / Quality Comments:

DISCRETE WATER PROFILE SAMPLING

Interval (m)	Depths (m)	SW Temp (deg C)	pH	Cond. (µS mS/cm)	Turbidity (NTU)	DO %	DO mg/L	TDS	ORP	Comments (Sample ID, time, layer Sample ID)
1	0	7.3	7.99	0.244	-0.89	27.9	3.35		123.6	
1	1	7.2	7.89	0.244	-0.89	32.6	3.93		134.4	
1	2	7.1	7.85	0.244	-0.93	36.7	4.44		137.8	
1	3	7.1	7.84	0.244	-0.87	40.2	4.86		141.8	
1	4	7.1	7.85	0.244	-0.92	43.7	5.29		144.3	
1	5	7.1	7.84	0.244	-0.79	46.7	5.65		147.4	
1	6	7.0	7.83	0.245	-0.94	49.0	5.95		149.7	
1	7	7.0	7.82	0.245	-0.94	49.5	6.00		152.4	
1	8	7.0	7.81	0.245	-0.85	51.1	6.20		155.6	
1	9	7.0	7.78	0.246	-0.91	52.4	6.36		158.3	
1	10	7.0	7.77	0.246	-0.89	53.4	6.49		159.6	
1	11	6.9	7.74	0.248	-0.52	56.1	6.83		97.9	
1	12	6.8	7.69	0.261	-0.45	57.7	7.04		110.0	
1	13	6.0	7.10	0.318	3.95	54.4	7.40		-31.3	
1	14	5.4	7.04	0.334	-0.50	60.6	7.65		-77.1	
1	15	5.3	7.01	0.336	-0.53	61.6	7.80		-85.1	

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

Water Profile / Site Access / Other Comments:

Zooplankton Collected.

Secchi - Up 5.0m Down 5.3m

WATER PROFILE & SAMPLING FORM

WSI

SITE INFORMATION

Site ID	Watercourse / Waterbody	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Sut6K	Sutherland Lake	2/Oct/22	0471205 5404376
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover)	
SMEMA 2002			

SURFACE WATER QUALITY

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-Sut6K	13:30	7	CM	2/Oct/22	(= Same As Above)

Air Temperature:	°C	DO:		%
H2O Temperature:	°C	DO:		mg/L
pH:		TDS:		g/L
Conductivity:	µS/cm or mS/cm	ORP:		mV
Depth:	m		Duplicate Taken:	Y / N -

Water Sampling / Quality Comments:

DISCRETE WATER PROFILE SAMPLING

Interval (m)	Depths (m)	SW Temp (deg C)	pH	Cond. (µS mS/cm)	Turbidity (NTU)	DO %	DO mg/L	TDS	ORP	Comments (Sample ID, time, layer Sample ID)
	0	6.7	7.80	0.224	-0.74	34.8	3.64		109.1	
1	1	6.7	7.65	0.224	-0.71	36.6	4.46		126.3	
1	2	6.7	7.66	0.224	-0.79	40.2	4.93		129.8	
1	3	6.7	7.68	0.224	-0.76	42.6	5.21		139.2	
1	4	6.6	7.67	0.225	-0.75	45.1	5.53		142.2	
1	5	6.6	7.65	0.225	-0.80	46.7	5.73		146.1	
1	6	6.6	7.65	0.225	-0.80	48.9	6.00		148.6	
1	7	6.5	7.64	0.225	-0.73	50.8	6.23		151.1	
1	8	6.3	7.42	0.238	-0.57	52.1	6.41		155.7	
.5	8.5	5.6	7.13	0.277	0.21	53.2	6.67		120.7	
.5	9	4.8	7.01	0.294	0.30	54.7	7.02		53.1	
1	10	4.3	6.93	0.297	0.39	55.8	7.24		5.2	
1	11	4.1	6.92	0.302	-0.04	56.9	7.42		-71.3	
1	12	4.0	6.92	0.305	-0.01	57.8	7.56		-101.9	
1	13	3.9	6.97	0.310	0.34	59.0	7.76		-112.6	
1	14	3.9	6.91	0.311	0.20	60.0	7.89		-120.9	

Water Profile / Site Access / Other Comments:

Secchi disk up @ 2.1m down @ 2.45m.

Zooplankton Collected @ 1 Tow

Epilimnion upper, lighter water layer
Thermocline middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion lower, heavy, cool water layer

WATER PROFILE & SAMPLING FORM

SITE INFORMATION

Site ID	Watercourse / Waterbody	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-P-03	North Diffused River Pond 3	13/Oct/22	0469841 5409830
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):	
OMEMG2022	See DL Photos	Cloudy, Cool.	

SURFACE WATER QUALITY

Sample ID	Time (24hrs)	Bottles (#)	Sampler (Initials)	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (= Same As Above)
NDR-P03		7	DL/CM	13/Oct/22	

Air Temperature:		°C	DO:	96.4	%
H2O Temperature:	9.5	°C	DO:	11.00	mg/L
pH:	7.19		TDS:		g/L
Conductivity:	0.78	µS/cm or mS/cm	ORP:	101.6	mV
Depth:	Surface.	m	Duplicate Taken:		Y / N

Water Sampling / Quality Comments:

DISCRETE WATER PROFILE SAMPLING

Interval (m)	Depths (m)	SW Temp (deg C)	pH	SPC Cond. (µS mS/cm)	Turbidity (NTU)	DO %	DO mg/L	TDS	ORP	Comments (Sample ID, time, layer Sample ID)
0	0	9.6	7.28	0.78	.46	96.0	10.94		203	
1m.	1 ft	9.6	7.14	0.78	.09	99.3	11.33		212.0	
1m	2 ft	9.5	7.11	0.78	.11	101.5	11.61		213.8	
1m	3 ft	9.5	7.15	0.78	.08	104.0	11.87		213.0	
1m	4 ft	9.4	7.07	0.78	.03	105.9	12.13		216.3	
1m	5 ft	9.2	7.05	0.78	-.02	107.6	12.39		219.1	
1m.	6 ft	9.3	7.01	0.78	.43	100.9	12.60		222.8	
1m.	7 ft	9.2	7.03	0.78	.46	113.4	13.05		224.9	
1m.	8 ft	9.2	7.02	0.78	.12	116.1	13.38		226.8	
1m	9									
0	0	9.5	7.19	0.78	0.04	96.4	11.00		118.2	
1m.	1	9.3	7.16	0.78	0.09	102.1	11.73		155.4	
1m	2	9.2	7.18	0.78	-.04	110.4	12.72		163.6	
1m.	3	9.0	6.52	0.78	1922	114.5	13.78		101.6	hit bottom

Water Profile / Site Access / Other Comments:

- Profile Done in feet not Meters.
- 8.4ft = Bottom.

Secci - up → 0.85m Down → 1.1m.

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

WATER PROFILE & SAMPLING FORM

WSI

SITE INFORMATION

Site ID	Watercourse / Waterbody	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-BeckLK	Becky Lake	20/Oct/22	047 334 6053953
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):	
EMEMA2002	See DL Photos	Snowy / Sunny 0°C	

SURFACE WATER QUALITY

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (Same As Above)
NDR-BeckLK	11:30	7	CM	20/Oct/22	

Air Temperature:	°C	DO:		%
H2O Temperature:	°C	DO:		mg/L
pH:		TDS:		g/L
Conductivity:	µS/cm or mS/cm	ORP:		mV
Depth:	m	Duplicate Taken:		Y / N

Water Sampling / Quality Comments:

DISCRETE WATER PROFILE SAMPLING

Interval (m)	Depths (m)	SW Temp (deg C)	pH	Cond. (µS mS/cm)	Turbidity (NTU)	DO %	DO mg/L	TDS	ORP	Comments (Sample ID, time, layer Sample ID)
	0	6.4	7.47	0.243	-0.13	36.4	4.49		211.7	
1	1	6.3	7.41	0.243	-0.15	41.9	5.17		220.4	
1	2	6.3	7.40	0.241	-0.17	45.2	5.58		222.7	
1	3	6.3	7.46	0.242	-0.09	49.0	6.06		225.3	
1	4	6.3	7.39	0.241	-0.03	51.7	6.39		227.0	
1	5	6.3	7.41	0.242	-0.01	53.7	6.64		228.1	
1	6	6.3	7.41	0.242	-0.12	55.6	6.87		229.0	
1	7	5.9	7.12	0.359	3.66	58.4	7.27		230.5	
.5	7.5	4.6	7.18	0.401	0.12	60.2	7.72		-67.3	
.5	8.0	4.4	7.19	0.415	-0.13	60.1	7.77		-99.8	
1	9.0	4.2	7.19	0.427	-0.41	61.1	7.97		-99.6	
1	10.0	4.0	7.20	0.439	-0.45	62.3	8.11		-110.7	
1	11.0	3.9	7.21	0.445	-0.46	63.6	8.35		-117.7	
1	12.0	3.9	7.21	0.450	-0.48	65.6	8.62		-123.9	
1	13.0	3.8	7.22	0.451	-0.43	66.1	8.71		-126.2	
1	14.0	3.8	7.22	0.454	-0.37	67.6	8.90		-129.8	

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

Water Profile / Site Access / Other Comments:

Zooplankton collected

Secchi disk → up .9 Down 1.3m

Bankfull Profile and Transect Discharge

Stream Name: WEST RUSSEGAU RIVER

Stream Code: WBR-

Site Code: S-06

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

[redacted] Discharge Approximates Baseflow yes ☐ no ☐

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

2 3 4 - 7

2023 06 09

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variances in Velocity or Depth	High Variances in Velocity or Depth
> 3.0	5+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	5
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

Ht. Represents Bankfull? ☐ Yes ☐ No

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD	.	
Right BFD	.	
Max. Chann. Depth	.	
Left Active Chann.	.	
Right Active Chann.	.	

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
LB	0.7	774	0			.
	0.95	734	0			.
	1.3	869	0			.
	1.61	920	0			.
	1.87	1082	0			.
WE	1.95	1134	2			.
	2.58	1471	363			.
	3.0	1503	404			.
	9.0	1514	437			.
	5.0	1479	408			.
	6.0	1437	366			.
	7.0	1475	422			.
	8.0	1493	338			.
	9.0	1461	395			.
	10.0	1418	386			.
	11.0	1356	268			.
	12.0	1257	143			.
WE	12.96	1174	13			.
	14.0	1003	0			.
	15.0	837	0			.

Comments:
Coords 17 U 477097
5410013.

Crew Leader (Init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected

Diagnostic Indicators of Channel Stability: Additional Observations

Stream Code: WRR | Site Code: S-06 | Sample | Date (yyyy-mm-dd): 2023-06-04 | Transect No.: 3 | Page No.: 2 of 2

RB

Channel Profile

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)
	16.0	617
	16.7	365
	17.0	295
	17.1	287

Velocity Measurements

Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
0			
0			
0			
0			

Comments

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)

Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)

Bankfull Profile and Transect Discharge

Page No. 1 of 2

Stream Name: West Buskegau River

Discharge Approximates Baseflow? yes ☐ no ☐

Stream Code: WBR-5

Site Code: 06

Sample:

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 2.5
Right Entrenchment Width (m): 3.0
Total Entrenchment Width (m): 5.5

Date: 2023 06 04

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 5.0	5+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): .
Point Spacing (m): .

Record only on the 1st transect.
Site Length (m): .
Transect Spacing (m): .

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
LB Observ.	0.8	240	0			.
	0.9	313	0			.
	1.0	806	0			.
	1.32	978	0			.
	1.8	1092	0			.
WEK	1.93	1098	2			.
	2.3	1204	129			.
	3.6	1260	232			.
	4.0	1240	221			.
	5.0	1202	244			.
	6.0	1201	294			.
	7.0	1337	355			.
	8.0	1303	336			.
	9.0	1314	334			.
	10.0	1328	339			.
	11.0	1347	349			.
	12.0	1319	302			.
	13.0	1298	248			.
WEK	14.0	1102	9			.
	15.0	948	0			.

Comments:
wind shaking tape → discrepancies of 0-10mm.
coords are same as water

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
ASD				

WBR

Channel Stability: Additional Observations

Site Code: 5-06

Sample:

Date (yyyy-mm-dd): 2023-06-04

Transect No.: 3 of 3

Page No.: 2 2

Mandatory Fields In Grey Must be filled out for processing

Channel Profile

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)
~~LB~~	15.45	894
	16.0	693
RB	17.0	261
	17.34	99
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Velocity Measurements

Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
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Comments

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)
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Velocity Measurements

Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
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BIOSAMPLING FORM

wood.

Confirm set #'s

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) 25 traps

Project Site / Project Number: TCRK / OMEMA20045

Waterbody or Watercourse Name: Jacko CK

Start Date: (DD/MMM/YY) / Time: (24HR) 02JUN/2023 14:30

End Date: (DD / MMM / YY) / Time (24HR) 02/JUN/23 16:39

Area Description: (Habitat Type / Site Features)

Sample ID: TCRK - 01-MT1

Method Effort: (Minutes/Sets)

UTM Coordinates: (mN, mE, Zone, Acc.) 1TU

Samplers Initials: PR, JS

Page: 1 of 2

See Net Form: Y / N

Species	Fish #	Species Code (Mnth)	Length (mm) Fork	Length (mm) Total	Round Weight (g) kg	Retained Aging / Tiss. / Body	Aging Structures (Sc, Pc, Sp, Otol)	Tissue (WB / FIB)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), Stomach, Isotope/Lipid, etc.)
FNSC			53	56	1.50					FNSC = Finescale Dace
			54	56	1.50					1&2 weights
			47	50	1.03					
			58	61	2.15					
			55	57	1.62					
			56	61	1.98					
			51	0	1.6					
			60	64	2.17					
			74	77	4.67					
			57	62	2.30					
BRST			54	59	1.55					BRST = Brook Stickleback
			—	46	0.97					
			—	53	1.45					
			—	55	1.34					
			—	056	2.36					
			—	55	1.25					take length -
			—	54	1.26					
			—	54	1.33					
			—	50	1.10					
			—	50	.24					
FHMN			49	53	1.37					save length
			49	53	1.35					
			55	58	1.81					
			58	61	2.09					
			60	65	2.17					
			60	63	2.3					
			63	66	2.73					
			52	55	1.48					
			53	62	2.15					
			55	59	1.97					
NRPD			74	78	3.72					NRPD = Northern Pearl Dace
			78	81	3.57					
			80	85	5.09					
			85	91	5.51					
			59	61	1.74					
			106	112	10.35					
			100	111	10.53					
			69	71	3.81					
			93	100	7.97					
			70	76	3.42					
WHSC			89	93	6.44					WHSC = White Sucker
			90	98	7.86					
			83	88	5.8					
			105	111	10.14					
			120	127	18.26					

Species Box Tally Area / Site Comments:

Total Plum call pages →

Species	Total Catch
FNDC	435
BRST	205
FHMN	124
NRDC	482

Species	Total Catch
WHSC	11
NRDC	19

QA/QC By:

Date:

Legend:
Sc - Scales
Pc - Pectoral Ray
Otb - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
FIB - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) x25

Project Site / Project Number: OMEMA23045

wood.

Waterbody or Watercourse Name: Jacko Ck

Start Date: (DD/MMM/YY) / Time: (24HR) 02/JUN/23 14:3

End Date: (DD / MMM / YY) / Time (24HR): 03/JUN/23 6:39

Area Description: (Habitat Type / Site Features) Stream

Sample ID: JCRK-01-MT1

Method Effort: (Traps/Rods/Dips)

UTM Coordinates: (mN, mE, Zone, Acc.)

Samplers In.

Page: 2 of 2

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g) kg	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NRBD			43	50	1.09					
			50	53	1.32					
			52	56	1.5					
			52	55	1.34					
			49	52	1.53					
			47	50	1.21					
			45	47	0.86					
			50	54	1.21					
			52	55	1.65					
			52	55	1.5					Scale lengths
WHSC			111	116	14 +					
			106	112	12.6					
			112	117	13.83					
			117	125	16.0					
			115	121	13.3					
			70	74	3.2					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

18:50 dom life traps

A. Stankiewicz, R. Dibblee — Sprue Crowfeet

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) 27 minnow traps

Project Site / Project Number: WSP / AMEMA 03345

Waterbody or Watercourse Name: North Driftwood River

Start Date: (DD/MMM/YY) / Time: (24HR) 30/MAY/23 17:30

End Date: (DD / MMM / YY) / Time (24HR) 02/JUN/23 09:10-10:30

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-S-CGB-MT

Method Effort: (Traps/Rods/Ops)

UTM Coordinates: (mN mE Zone Acc.) 30-37 Alt GPS

Samplers Initials: R.D.

Page: 1 of 2

See Net Form: Y / N

	Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
1	Finescale Dace			100	1080	11.97					FHMN = Fathead Minnow
1	Northern Redbelly			51	54	1.36					FNDC = Finescale Dace
2	NRBD			53	55	1.61					NRBD = Northern Redbelly Dace
3				47	5	1.34					
4				49	53	1.36					WHSC = White Sucker
2	Finescale Dace			54	56	1.53					
1	[redacted] PD			118	121	14.0					PD = Northern Pearl Dace
1	FHMN			71	77	3.60					
5	NRBD			50	54	1.39					
2	FHMN			51	55	1.28					
6	NRBD			54	56	1.66					
3	Finescale Dace			62	66	2.35					
7	NRBD			49	54	1.23					
2	PD			80	85	4.28					
4	FNDC			90	97	7.85					
1	WHSC			100	106	9.4					
3	FHMN			80	85	6.3					
8	NRBD			47	50	1.44					
2	WHSC			94	98	8.51					
3	PD			100	104	9.0					
3	WHSC			91	96	7.1					
4	WHSC			102	111	11.17					
9	NRBD			55	58	1.7					
5	FNDC			66	69	3.11					
6	FNDC			60	64	2.64					
5	WHSC			116	123	15.48					
7	FNDC			69	72	3.000					
8	FNDC			70	76	3.38					
9	FNDC			70	76	4.23					
10	FNDC			72	76	4.68					Sample lengths as per
4	PD			102	107	8.28					
5	PD			78	83	4.68					
1	BNST			49	49	1.14					
2				—	56	1.76					
3				—	53	1.29					
4				—	45	0.77					
5				—	51	1.03					
6				—	54	1.24					
7				—	46	0.78					
8				—	55	1.21					
9				—	55	1.62					some length
10				—	45	0.77					
	PD			63	66	2.57					
	NRBD hybrid			49	54	1.24					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

See field book & tally excluding these fish

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) 27 MT

Project Site / Project Number: OMEMA2304S

WSP

Waterbody or Watercourse Name: North Driftwood Dam

Start Date: (DD/MMM/YY) / Time: (24HR) 30/May/23 17:30

End Date: (DD / MMM / YY) / Time (24HR) 02/Jun/23 10:30

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-S-26B

Method Effort: (Traps/Reels/Days) x27

UTM Coordinates: (mN, mE, Zone, Acc.) 30-37 All GPS

Samplers In: AS/RD

Page: 2 of 2

See Net Form: Y / N

	Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
1	NRBD			50	51	1.75					
2	FHMN			66	67	3.21					
3	FHMN			55	56	2.00					
4	PD			66	71	3.09					
5	PD			90	95	6.63					
6	WHSC			106	113	12.55					
7	PD			93	99	7.54					
8	WHSC			123	129	15.72					
9	PD			92	98	7.64					
10	PD			97	102	9.35					

Species Box Tally Area / Site Comments:

Includes tally from field book + biosampling form →

Species	Total Catch	Species	Total Catch
NRBD	56	FNDC	938
FHMN	5	BRST	3866
WHSC	7	Rhinichthys	1
NPDC	119		

QA/QC By:

Date:

Legend.
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

Project / Client O MEMA 730 45 Date June 12/23

14:15

°C	DO%	DO mg/L	SPC	C	pH	NTU	Depth
16.8	84.1	8.17	0.080	67.4	7.80	-5.60	Surface
15.3	77.2	7.77	0.079	64.3	7.87	-5.99	1m
14.6	63.5	6.40	0.081	64.5	7.74	-6.38	2m
8.8	45.1	5.19	0.098	67.4	8.02	-6.76	3m
6.2	29.8	3.68	0.132	84.6	8.14	-6.41	4m
4.9	18.5	2.30	0.168	103.4	8.20	-5.94	5m
4.3	13.7	1.77	0.178	107.6	8.22	-5.84	6m
3.8	9.9	1.26	0.189	112.4	8.21	-5.56	7m
3.6	6.4	0.83	0.196	115.8	8.20	-5.38	8m
3.5	4.4	0.59	0.199	117.2	8.19	-5.23	9m
3.4	2.3	0.29	0.203	119.2	8.16	2.46	10m
10.2	50.7	5.73	0.084	59.9	7.78	-6.81	2.5m
6.9	32.1	4.04	0.113	74.1	7.94	-6.57	3.5m

Zooplankton sampling done at same spot

R.D., C.B.

Location Date

Project / Client

31

Rite in the Rain

Minnow traps 17, set 10Jun 17:00

11:10 MAR LK (Lift #2) on 11:10

	FL MM	TL MM	Wg	SPECIES
+1 LEECH +1 CRAY FISH	70	73	3.52	YELLOW PERCH
	58	61	2.32	"
	97	102	10.64	"
	88	92	7.79	"
	69	72	3.45	"
	54	56	1.87	"
	60	63	2.36	"
	100	106	13.62	"

5

Location _____ Date June 12/23

Project / Client _____

MAR LK CONT'D

	FL MM	TL MM	WG	SP
	68	71	3.25	YELLOW PERCH
	93	98	14.32	"

. YELLOW PERCH ~~HH~~ 1

GILL NETS

	FL MM	TL MM	W ~~LBS~~	
	537	568	0.88 LBS	NORTHERN PIKE
	786	831	6.67 LBS	"
	176	181	—	YELLOW PERCH
	858	872	9.89 LBS	NORTH. PIKE
	536	564	1.95 LBS	NORTH PIKE
	695	731	—	"
	532	568	—	"
	250	265	—	"
	327	353	—	"
	442	473	—	"

5 gill nets 12 June 2023

3 hr sets

Rite in the Rain

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

OMEMA23043

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
Ver-Ck	Cherry Lake	10/JUN/2023	0471198 5405396
Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):	
SHEMA23543	—	cloudy, 100%, cool	

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (□ Same as above)	
	13:10	8	AS			
Air Temperature:		°C		DO:		%
H2O Temperature:	See below	°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments:						

water

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (□ Same as above)	
Air Temperature:		°C		DO:		%
H2O Temperature:		°C		DO:		mg/L
pH:				TDS:		g/L
Conductivity:		µS/cm or mS/cm		ORP:		mV
Sample Depth:		m		Duplicate Taken:		
Comments: Zooplankton 2 tows for metals, 1 tow each for isotopes & taxonomy						

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L	pH	SPC µS/cm	Depth (m)	SW Temp (deg C)	DO %	DO mg/L	ORP mV	NTU
Surf.	17.9	90	8.54	7.93	165.3					57.8	-6.06
1.0	17.8	89.2	8.53	7.94	165.5					61.3	-6.07
2.0	17.3	81.4	7.85	7.91	164.4					63.9	-6.1
3.0	9.6	32.3	3.88	8.12	210.3					42.6	-6.14
4.0	4.9	21.1	2.36	7.99	201.5					BM	-5.90
5.0	4.3	8.9	0.94	8.29	238.1					-25	-6.44
6.0	3.9	1.4	0.18	8.27	254.3					-57.9	-6.49
7.0	3.8	0.9	0.12	8.29	277.9					-82.5	-6.69
8.0	3.7	0.7	0.09	8.30	287.9					-107.0	-6.75
9.0	3.7	0.6	0.08	8.30	289.5					-112.4	-6.74
10.0	3.7	0.5	0.06	8.30						-115.6	-6.71

YSI had 10 m long cord. Water depth at zooplankton and water sampling was approximately 21 m - note added by RD January 2024

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change of 1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

Comments:

ZOOPLANKTON SAMPLING

Sample ID	NDR-CherCk	Sample ID		Sample ID	
Sample Location	Same as above	Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required	2	No. Tows Required	1	No. Tows Required	1
Sample Date	10 JUN 2023	Sample Date		Sample Date	
Sample Time	13:10	Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments	Metals	Comments	Isotopes	Comments	taxonomy

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

Secchi: RD, AS. down = 1.32 m 100% cloud up = 1.09

QA/QC Completed by (Staff/Date)

wood.

GER-LK 18 minnow traps

set 10 June 16:30

lift 12 June 10:30

19 yellow perch

2 crayfish

A.S., R.D.

Measurements on separate page

26

Location GER LK Date June 12/23

Project / Client OMEMA23045

10:30 1:ft 18 minnowtraps

FL MM	TL MM	WG	SPECIES
86	90	7.42	YELLOW PERCH
97	101	10.83	YELLOW PERCH
72	76	4.31	YELLOW PERCH
92	96	8.41	"
94	97	9.60	"
92	96	9.00	"
68	70	1.47	"
99	103	11.02	"
60	63	2.17	"
61	65	2.43	"

+9 Yellow Perch

+2 Crappy Fish

5 nets ground lake

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): GN

Project Site / Project Number: OMEA23045

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
Gerry Lake	10/June/23	10/June/23	Lake

Sample ID:	Method Effort: (Traps/Rets/Dips)	UTM Coordinates: (zN, mE, mN, Zone, Acc.)	Samplers In.	Page: 1 of 1	See Net Form: Y/N
GerLK-GN	x5	17 471198 5405396	ASIRD		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tissue / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
GN1	4"	set @ 17 U	12:15	471351		pulled @ 5405543			15:15	
		NO CATCH								
GN2	RIN	set @ 17 U	12:15	471387		pulled @ 5405705			15:15	
NRPK	1		472	495	–					No weight - scale battery low
	2		319	344	–					
YLPR	1		65	69	2.74					
GLSH	1		89	99	5.30					
"	2		84	94	5.51					
"	3		NO	M&A Measurements						body is ~~bad~~ fragmented
YLPR	2		112	117	17.22					
GN3	4"	17 U		471246		5405804				
		NO CATCH								
		Some set times								
GN4	RIN	17 U		471275		5406047				
		set @	12:15			pulled @			15:55	
NRPK	1		315	334						No weight Scale battery low
	2		444	469						
	3		494	527						
YLPR	1		204	210						
GN5	RIN	set @ 17 U	12:15	471178		pulled @ 5405498			16:10	
		NO CATCH								

Species Box Tally Area / Site Comments:
YLPR = Yellow Perch
NRPK = Northern Pike
GLSH = golden shiner

Species	Total Catch
NRPK	3
YLPR	3
GLSH	3

Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

Total for 5 gill nets

Confirm set #1

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) 25 traps

Project Site / Project Number: JCRK / OMEMA20045

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
Jacko Ck	02/JUN/2023 14:30	02/JUN/23 16:39	

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers Initials	Page: ___ of 2	See Net Form: Y / N
JCRK - 01 - MT1		17U	PRS		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FNSC			53	56	1.50					FNSC = Finescale Dace
1			54	56	1.5				1	1g2 weight
			47	50	1.03					
			58	61	2.15					
			55	57	1.62					
			56	61	1.98					
			59	61	1.64					
			60	64	2.17					
			74	77	4.67					
			59	62	2.30					
BRST			~~54~~	54	1.55					BRST = Brook Stickleback
1			—	46	0.97					
			—	53	1.45					
			—	55	1.34					
			—	606	2.36					
			—	55	1.35					
			—	54	1.36					same length
			—	54	1.33					
			—	50	1.10					
			—	50	1.24					
FHMN			49	53	1.37					
			49	53	1.25					same length
			55	58	1.84					
			58	61	2.09					
			60	65	2.17					
			60	63	2.3					
			63	66	2.73					
			52	55	1.48					
			59	62	2.15					
			55	59	1.97					
NRDC			74	79	3.72					NRDC = Northern Pearl Dace
			78	81	3.57					
			80	85	5.00					
			85	91	5.51					
			59	61	1.74					
			106	112	10.25					
			100	111	10.53					
			69	71	3.21					
			93	100	7.97					
			70	76	3.42					
WHSC			89	93	6.44					WHSC = White Sucker
			96	98	7.86					
			83	88	5.8					
			135	141	10.74					
			120	127	18.26					

Species Box Tally Area / Site Comments:

Total from all pages →

Species	Total Catch	Species	Total Catch
FNDC	483	WHSC	11
BRST	905	NRDC	19
FHMN	164		
NRDC	188		

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) x 25

Project Site / Project Number: OMEMA23045

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
Jacko Ck	02/JUN/23 14:34	03/JUN/23 16:39	stream

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 2 of 2	See Net Form: Y / N
SCRK-01-MT1					

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NRBD			43	50	1.89					
			50	53	1.32					
			52	56	1.5					
			52	55	1.34					
			49	52	1.53					
			47	50	1.21					
			45	47	0.86					
			50	54	1.21					
			52	55	1.65					
			52	55	1.5					same length
WHSC			111	116	14.4					
			106	112	12.69					
			112	117	13.83					
			117	125	16.02					
			115	121	13.32					
			70	74	3.2					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

18:50 done 115-4 traps

FISHERIES NET CATCH / EFFORT FORM

WSP

SITE DESCRIPTION:

Sample ID	Waterbody Name			Project Code
JCRK-01-GN1	Jacko Ck			OMEMA23-15

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT) Easting	(LONG) North	Site Type (substr)	Site Type (cover)
		17U	423183	5401691		

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)
	—	

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

3 m

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
A.S, R.D	02/JUN/23	13:50	—	—	90	—	0.65	—

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
A.S, R.D	02/JUN/23	16:25	1	~28	18.4	—

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	Direction & Speed of Wind (knots / km/hr)	General Weather for Set Duration (duration precip)	General Weather for Set Duration (duration wave)	Duration (fishing hours)
	00	—	—	—	—	

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
NO	FISH					

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments
Net across narrow channel, at wider spot ~3m wide						

WATER QUALITY READING:

Date: 2 June 2023 Time: 16:15

Temperature: (°C)	18.4	DO: (%)	81.0
Cond.: (uS/cm) or (Ms/cm)	54.8	DO: (mg/L)	7.60
Turbidity: (NTU)	~6.51	pH:	5.08
TDS: (g / L)	—	ORP:	177.0
Salinity: (ppm)	—	Depth: (m)	

Comments: 5 gill net sets
backpack electrofishing
minnow traps

See Bio Sheet Data (Y / N)

QA/QC By:

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year

FISHERIES NET CATCH / EFFORT FORM

WSP

SITE DESCRIPTION:

Sample ID	Waterbody Name			Project Code	
JCRK-01-GN2	Jacko Creek			OMEMA2304	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT) Easting	(LONG) Northing	Site Type (substr)	(cover)
		17U	473249	5401603		
Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)				
—	—					

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
A.S. R.D.	02/JUN/23	1355	—	—	90	—	0.64	—

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
	02/JUN/23	1630	1	~28	18.4	—

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	Direction & Speed of Wind (knots / km/hr)	General Weather for Set Duration (duration precip)	General Weather for Set Duration (duration wave)	Duration (fishing hours)
	00	—	—	—	—	

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
NO FISH						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments
Net across creek ~2.8 m wide						
near large woody debris						

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year

WATER QUALITY READING: Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

OMEMA23045

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of 1

Date (yyyy-mm-dd): 2023-06-02

Stream Name: Jock Creek

Stream Code: JCRK-S

Site Code: 01

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☑ No

Obstructions to Flow *(Check all applicable types)*
☒ None Present ☐ Armouring ☐ Trampled Banks ☐ Inlets ☐ Wood Deflectors ☐ Other ☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☑	☑
Bank Material	☑	☑
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): >20.m
Right Entrenchment Width (m): >20.m
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 2.08
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	2.64	1189	☐ Yes ☐ No
Right BFD	5.0	0125	
Max. Chann. Depth	.		
Left Active Chann.	2.82	0275	
Right Active Chann.	4.9	0288	

low spot on hummocky bank

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.5	2188	0			.
02	1.0	2200	0			.
03	1.5	1893	0			.
04	2.0	2089	0			.
05	2.5	2112	0			.
06	2.66	1553	0			.
07	2.82	2175	0035			.
08	2.95	6500	0423			.
09	3.1	6110	0388			.
10	3.5	5557	0325			.
11	4.0	5564	0345			.
12	4.5	5531	0301			.
13	4.8	3118	0081			.
14	4.9	2888	0055			.
15	5.0	1125	0			.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

*LB
waterledge
shrubs & RB

Comments:
hummocky wetland. minor
substrate: sand/gravel/muck/silt
UTM: 10 473309 5401502

Crew Leader (init. & last name): A STANKIEWICZ

Crew	Recorder	Ent/Scanned	Verified	Corrected
RD AS	RD			

sub strate - sandy, some muck, small wood debris. Fish observed

Jocko 1 T2 cross-section of channel

OMEMA23045

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code: JCRK-L | Site Code: C1 | Sample: | Date (yyyy-mm-dd): 2023-06-02 | Transect No.: 02 of 03 | Page No.: 01 01

Channel Profile Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)	Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.3	171											
03	0.5	173											
LB 02	0.55	183											
04	0.58	320	65										
05	0.8	546	305										
06	1.0	569	321										
this is correct 07	1.5	501	262										
08	2.0	540	302										
09	2.4	580	344										
10	2.5	246	190										
RB 11	2.79	240	0										

Comments

RB higher than LB, could not get it straight when tape was on RB

ITU 473301 5401502

A. Stankiewicz crew leader

R. Dibbley recorder

OMEMA23845

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 1

Stream Name: Jacko Creek 1

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2013-06-02

Stream Code: JCRK

Site Code: 01

Sample: T3

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others

Indicators Used to Locate Bankfull Level	Left Bank	Right Bank
Inflection Point	☑	☑
Bank Material	☑	☑
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): <20 m
Right Entrenchment Width (m): <20 m
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 2.59
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD		
Right BFD		
Max. Chann. Depth		
Left Active Chann.	0.96	0375
Right Active Chann.	3.55	0451

Ht. Represents Bankfull? ☐ Yes ☐ No

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Observ.						
	0.06	0	0			
	0.96	375	140			
	1.3	376	195			
	1.8	376	239			
	2.3	401	270			
	2.6	420	286			
	3.1	399	254			

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	3.5	451	291			
WE	3.55	451	280			
	3.8	172	0			
	4.03	95	0			

Comments
* See water quality on back
Same as T1 + T2
RB is at a low spot in hummock
LB is 1cm higher and 9cm back from WE.

Crew Leader (init. & last name): R DIBBLEY

Crew	Recorder	Ent/Scanned	Verified	Corrected
AS/RD	AS			

<10% shade, minor aquatic vegetation, submergent <10% of channel

cross-section, not bankfull profile

OMEM A23045

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of 1

Stream Name: JOCKO CREEK

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-08

Stream Code: JCRK

Site Code: S-03

Sample: T1

Record only on the 1st transect.
Site Length (m): 071.0
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
- ☒ None Present
- ☐ Armouring
- ☐ Trampled Banks
- ☐ Inlets
- ☐ Wood Deflectors
- ☐ Other
- ☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 06.9
Point Spacing (m):

17 U 470594 5399909

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	5.0	1636	
Left Active Chann.	1.31	0993	
Right Active Chann.	8.2	0727	

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	1.05	0	0			.
	1.31	993	272			.
	1.37	1096	375			.
	1.5	1146	428			.
	2.2	1419	717			.
	3.0	1513	911			.
	4.0	1631	952			.
	5.0	1636	963			.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	6.0	1505	829			.
	6.6	1459	776			.
	7.0	1299	609			.
	7.6	1178	469			.
	8.0	930	235			.
	8.2	727	2			.
	8.5	576	0			.
	8.7	318	0			.
	9.1	100	0			.
	.					.
	.					.
	.					.

* WE water's edge

* WE

* veg starts

Comments: See notes about watercourse on back
RB is back 2.1m + up 562mm
LB is back
Substrate: lots of large woody debris, some silt, gravel + clay. started on left bank

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
R.D, A.S	A.S			

OMEMA23045

channel cross-section, not bankfull

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of 1

Stream Name: JERK CREEK

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-02

Stream Code: JERK

Site Code: S-03

Sample: T2

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow (Check all applicable types)
☒ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level	Left Bank	Right Bank
Inflection Point	☑	☑
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 8.1
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.	01.58	0877	
Right Active Chann.	09.7	0887	

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.3	0763	0			
	1.2	0547	0			
	1.58	0877	0002			
	1.8	0948	80			
	2.0	1081	218			
	2.4	1251	357			
	3.1	1541	704			
	4.0	1635	816			
	5.0	1764	950			
	6.0	1833	1019			
	7.0	1815	989			
	8.0	1704	882			
	8.41	1648	804			
	8.75	1421	571			
	9.0	1307	444			
	9.5	951	72			
	9.7	887	10			
	9.87	774	0			
	10.1	640	0			
	10.28	463	0			

10.43 10.28

*WE = water's edge

*RB beginning of boulder

Comments: *See Water quality on back
At bridge upstream side, started on left bank due to width difference & 9cm & sag in middle undercut at 10.1 → 10.28m.

Crew Leader (init. & last name):

Crew: AS/RD | Recorder: A.S | Ent/Scanned | Verified | Corrected

17U 476620 5399917

OMENA23045

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 1

Stream Name: JOCKO CREEK

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-03

Stream Code: JCRK-

Site Code: 503

Sample: T3

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
- ☒ None Present
- ☐ Armouring
- ☐ Trampled Banks
- ☐ Inlets
- ☐ Wood Deflectors
- ☐ Other
- ☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☒	☒
Bank Material	☒	☒
Top of Point Bar	☐	☐
Vegetation	☒	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 65.8
Right Entrenchment Width (m): 720 M
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 6.73
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	0.5	80	☐ Yes ☐ No
Right BFD	9.64		
Max. Chann. Depth	4.28	1481	
Left Active Chann.	1.27	0895	
Right Active Chann.	8.0	0815	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.5	0880				
02	0.9	0865				
03	1.2	0773				
04	1.27	0895	0040			
05	1.8	1106	0266			
06	2.0	1119	0277			
07	3.0	1348	0527			
08	4.0	1449	0616			
09	5.0	1456	0615			
10	5.9	1147	0313			
11	7.0	1129	0280			
12	7.5	1135	0180			
13	8.0	0815	0000			
14	8.33	0734				
15	8.68	0265				
16	8.77	0190				

substrate higher

Comments:
RB higher 64.5 mm, back 87 cm
HWM
started on left bank 17U 470665 5529899
~~4.28 2481 4.28~~

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
A.S R.D	R.D			

JCRK-01

JCRK-S-01

YSI Taken hand

18.4°C

81.0 DO%

7.60 DO mg/L

0.063 SPC mS/cm

54.8 C ~~uS/cm~~

5.08 pH

177.0 ORP

-6.5 NTU

ITU 4732971

5401493

↳ boulders under bridge
↳ visible undercutting + exposed roots along banks
↳ mixed deciduous/coniferous forest surrounding watercourse
↳ slow flowing, water is tannin coloured.

JCRK-S-03
T8

R. Dibbley, A. Stankiewicz Spring Crawford

ELECTROFISHING FORM

Project Site / Project Number: JCRK-S-01 / OMEMA03045

WSP

Waterbody or Watercourse Name: Jocko Creek	Date: (DD / MMM / YY) 03/JUN/23	Water Temp: 18.4	Shocking Method: BP	Pg: 1 of 1 Run: 1 of 1
UTM Start: 17U 473316 5401518	Start Time: (24 hrs) —	Stop Time: (24 hrs) 16:16	Netters: A.S	Site Area / Description: (Length X Width) Tannin coloured water creek through hydro corridor, grasses along bank
UTM End: 17U 473319 5401442				
Sample ID: JCRK-01	Elapsed Time: (hours)	Effort: (seconds) 1196	Voltage / % Power: —	Frequency / Range (high/low): — Pulse: —

	Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
1	FNDC			60	64	2.38					FNDC = Finescale Dace
2	BRST			—	41	0.9					BRST = Brook Stickleback
3				—	36	0.63					NRBD = Northern Redbelly Dace
4				—	45	1.0					
5				—	26	0.21					
6				—	39	0.62					
7				—	46	0.93					
8				—	38	0.74					
9				—	44	0.80					
10				—	45	0.85					
11				—	35	0.38					
12	NRBD			50	53	1.39					
	FNDC			54	57	1.58					
	BRST			—	56	1.19					
	FNDC			48	51	1.24					
	included in tally, below ↑										

BRST 9+12+11+9+11=52
FNDC 1+3=4

Species Box Tally Area / Site Comments:
Gill nets and minnow traps on different sheets

Species	Total Catch	Species	Total Catch
BRST	52		
FNDC	4		
NRBD	1		

QA/QC By:

Date:

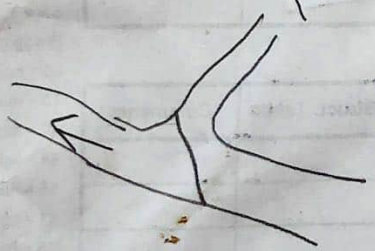
Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

743049 5401603 JCRK-01-GN3
63.5 cm deep 13:45
~2.8 m wide 16:30
near LwD

97mm mesh 4" 473302 5401568
max 65cm deep ~~3~~ m wide

④ 25mm mesh 2m wide JCRK-01-GN4
60-70 cm deep 13:25 set
17u 473320 5401547 16: to lift

⑤ 38mm mesh JCRK-01-GN5 13:30 set
0.5m deep 17u 473320 5401440
3m length in water
16:50 lift



Jocko Creek

No fish

JCRK-S-03

Water Quality
Taken @ bridge

17U 470617
5399915

18.3°C.
79.4 D%
7.47 DO mg/L
0.148 SCP mS/cm.
128.9 C uS/cm
7.23 pH
138.2 ORP
1.07 NTU



A. Stank, Wes, R. Dibbley — Spring — Crawford

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) Seine

Project Site / Project Number: 10MEMA23045 — WSP

Waterbody or Watercourse Name: North Branch Westfield River

Start Date: (DD/MMM/YY) / Time: (24HR) May 31/23 15:10

End Date: (DD / MMM / YY) / Time (24HR): May 31/23 15:40

Area Description: (Habitat Type / Site Features)

Sample ID: NDB.S04

Method Effort: (Traps/Rods/Dips) x4 hauls

UTM Coordinates: (mN, mE, Zone, Acc.) 17T 0470356 5412383

Samplers In: A.S.R.D.

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BRSB		3+1	+1+1	+1 = 7		4	Seine hauls			BRSB = Brook Stickleback
FHMN		1								FHMN = Fathead Minnow
MINNOW TRAPS						-32				WHSC = White Sucker
Set	30 May				19:30					
Lifted	31 May				16:40					NPDC = Northern Pearl Dace
BRSB	1			45	0.98					
	2			57	1.69					
	3			53	1.33					
	4			45	1.00					
	5			58	1.78					
	6			43	0.70					
	7			51	1.22					
	8			55	1.99					
	9			64	2.29					
	10			51	0.97					
	+	6+	8+	4+	4+9+	1+1 = 43				
WHSC	1		098	103	8.75	=1				
NPDC	1		061	081	4.99	=1				
		GILL NETS								
		x5 set @ 13:00								
		pulled @ 16:05								
		NO CATCH								

TOTAL:
BRSB = 50
FHMN = 1
WHSC = 1
NPDC = 1

Species Box Tally Area / Site Comments: Tadpole: =1.

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

A. Stank, Nicole, R. Dibblee — Spring Crawford

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Seine

Project Site / Project Number: 10MEMA 23045 — WSP

Waterbody or Watercourse Name: North Branch Wood River

Start Date: (DD/MMM/YY) / Time: (24HR): May 31/23 15:10

End Date: (DD / MMM / YY) / Time (24HR): May 31/23 15:40

Area Description: (Habitat Type / Site Features)

Sample ID: NDR S04

Method Effort: (Traps/Rods/Dips): x4 hauls

UTM Coordinates: (mN, mE, Zone, Acc.): 17U 0470356 5412383

Samplers In.

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BRSB		3+1+1+1+1 = 7					—			BRSB = Brook Stickleback
FHMN		1								FHMN = Fathead Minnow
MINNOW TRAPS -32										WHSC = White Sucker
Set 30 May 19:30										
Lifted 31 May 16:40										NPDC = Northern Pearl Dace
BRSB	1			45	0.98					
	2			57	1.69					
	3			53	1.33					
	4			45	1.00					
	5			58	1.78					
	6			43	0.70					
	7			51	1.22					
	8			55	1.99					
	9			64	2.29					
	10			51	0.97					
	+	6+8+4+4+9+1+1 = 43								
WHSC	1		098	103	8.75	= 1				
NPDC	1		061	081	4.99	= 1				
		GILL NETS								
		x5 set @ 13:00								
		pulled @ 16:05								
		NO CATCH								

TOTAL:
BRSB = 50
FHMN = 1
WHSC = 1
NPDC = 1

Species Box Tally Area / Site Comments: Tadpole: = 1.

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

NDR-S-04
31 May 13:20
Surface
Water

@ 3.0°C
75.4 DO%
6.51 DO mg/L

0.090 SPC - mS/cm
86.8 C mS/cm
7.15 pH
74.7 ORP mV
9.97 NTU

OMEMA23045

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of 2

Stream Name: North Driftwood River

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-05-31

Stream Code: NDR-

Site Code: S-04

Sample:

Discharge Approximates Baseflow? ☐ Yes ☑ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	a	b
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	b
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 10.0
Right Entrenchment Width (m): 05.1
Total Entrenchment Width (m): 15.1

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 09.2 wa
Point Spacing (m): 01.0

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☑ Yes ☐ No
Right BFD	11.71	723	
Max. Chann. Depth	7.23	1461	
Left Active Chann.	2.16	879	
Right Active Chann.	11.62	916	

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.3	1156	0			.
02	0.9	1110	0			.
03	1.1	92	0			.
04	1.4	1172	0			.
05	1.6	2001	0			.
06	1.9	1476	0			.
07	2.2	6774	0			.
08	2.46	8779	01			.
09	2.6	1106	211			.
10	2.94	1180	340			.
11	3.8	1378	583			.
12	4.8	1330	571			.
13	5.8	1357	619			.
14	6.8	1442	715			.
15	7.8	1449	710			.
16	8.8	1418	659			.
17	9.8	1384	578			.
18	10.8	1260	424			.
19	11.6	992	89			.
20	11.62	916	01			.

waders left

Comments:
Ali's GPS #43
* starting @ LB facing US
* not sure top of bank LB (recorded)

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
AS/RD	AS			

OMEMA23045

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code: NDR-C | Site Code: S-04 | Sample: | Date (yyyy-mm-dd): 2023-05-31 | Transect No. 1 of 3 | Page No. 02 02

Channel Profile

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	11.65	771	0			.
22	11.71	723	0			.
23	12.0	739	0			.
24	13.0	546	0			.
25	14.0	423	0			.
26	15.0	209	0			.
27	15.5	141	0			.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

OMEMA23045

cross section, not estimating bankfull

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3

Page No. 1 of 1

Stream Name: North Driftwood River

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-05-31

Stream Code: NOR-S

Site Code: S-04

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow?
☐ Yes ☒ No

Obstructions to Flow
(Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 9.1
Point Spacing (m): 1.5

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?	Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m) Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Left BFD	.		☐ Yes ☐ No				
Right BFD	.						
Max. Chann. Depth	5.0	570					
Left Active Chann.	1.7	318		21			.
Right Active Chann.	9.8	343		11			.
Observ. 01	0.3	198		0			.
02	0.6	601		0			.
03	0.9	185		0			.
04	1.7	318		21			.
05	1.3	600		310			.
06	2.0	655		358			.
07	3.0	692		466			.
08	4.0	698		483			.

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
09	5.0	768	570			.
10	6.0	775	564			.
11	7.0	763	546			.
12	8.0	733	495			.
13	8.8	666	400			.
14	9.0	562	291			.
15	9.5	341	408			.
16	9.8	343	11			.
17	10.0	245	0			.
18	10.6	599	0			.
	.					.
	.					.

Comments: Ali's GPS #44

Crew Leader (init. & last name):

Crew: AS-RJ | Recorder: AS | Ent/Scanned | Verified | Corrected

OMEMA23045

Cross Section, not estimating bankfull

~~Bankfull Profile and Transect Discharge~~

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 1

Stream Name: North Driftwood River

Discharge Approximates Baseflow: yes ☐ no ☒

Date (yyyy-mm-dd): 2023-05-31

Stream Code: NDR-S-04

Site Code: S-04

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow *(Check all applicable types)*
☒ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): .
Point Spacing (m): .

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	9.74	610	
Right Active Chann.	0.5	525	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Left Active Chann.	120			.
Right Active Chann.	50			.

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.3	0180				.
02	0.4	0240				.
03	0.43	0275				.
04	0.5	0525	050			.
05	0.8	0695	250			.
06	1.0	0750	330			.
07	2.0	0745	330			.
08	3.0	0787	400			.
09	4.0	0730	350			.
10	5.0	0820	440			.
11	6.6	0698	310			.
12	7.0	0678	280			.
13	8.0	0603	370			.
14	9.0	0675	270			.
15	9.6	0615	120			.
17	9.8	0580	0			.
18	10.0	0330	0			.
19	10.2	0340				.
16	9.74	610	120			.
	.					.

wetted edge

Comments
horsetail emergent, soft substrate → silty
Alis GPS 45 174 0470375 5412403

Crew Leader (init. & last name): A STANKIEWICZ

Crew	Recorder	Ent/Scanned	Verified	Corrected
A.S. R.D	RD			

OMEMA23045

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of 2

Stream Name: North Driftwood River

Discharge Approximates Baseflow: yes ☐ no ☒

Date (yyyy-mm-dd): 2023-06-09

Stream Code: NDR-5

Site Code: 06

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow?
☐ Yes ☒ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☑	☒
Bank Material	☒	☑
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L: R:

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 5.0
Right Entrenchment Width (m): 7.0
Total Entrenchment Width (m): 12.0

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 10.9 9
Point Spacing (m): 1.0

Channel Profile

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?	Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m): Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Left BFD	13.2	140	☐ Yes ☐ No				
Right BFD							
Max. Chann. Depth	6.67	1135					
Left Active Chann.	12.51	360		1			
Right Active Chann.	1.62	360		0			
LB	13.2	0140					
92	13.05	0167					

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
03	12.88	0250				
04	12.61	0280				
WE	12.5	0360	0001			
06	12.00		0231			
7	11.50		295			
8	11.0		403			
9	10.0		585			
10	9.0		678			
11	8.0		734			
12	7.0		751			
13	6.0		754			
14	5.0		748			

Comments:
wind shaking tape, started LB facing US
N 4693375 E 516320
*Banks eroded
eDNA sampling

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
AS, RD	AS, RD			

OMEMA23045

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code: NDR-5-06 | Site Code: | Sample: | Date (yyyy-mm-dd): 2023-06-09 | Transect No. 2 of 3 | Page No. 2

Channel Profile

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
15	4.0		721			
16	3.0		435			
17	2.0		142			
WE	1.62	360	0			
19	1.22	237	0			
20	0.8	103	0			

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)

Transect not bankfull

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields in Grey Must be filled out for processing

Stream Code	Site Code	Sample	Date (yyyy mm dd)	Transect No.	Page No.
NB-S	06		2003 09 05	T1 of T3	01 of 01

Channel Profile Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	12.0	055				.
2	11.1	057	0202			.
3	11.5	072	0132			.
4	11.0	091	0320			.
5	10.0	1042	0496			.
6	9.0	1124	0527			.
7	8.0		0646			.
8	7.0		0673			.
9	6.0		0581			.
10	5.0		0458			.
11	4.0		0430			.
12	3.0		0436			.
13	2.0		0271			.
14	1.6		0077			.
15	1.38	059	0			.
16	1.10	0450				.

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	.					.

Comments

wind shaking metre tape above water
started LB facing US
~2 m back from RB tape vert. ht = 0
~1.8 m back from LB vert ht = 0

R.D.

R.D; A.S.

LWD x SWD in substrate, fines, tannin coloured, slow flow - 0 M/M

621 Labou water
North Driftwood River

OMEMA23045

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields in Grey Must be filled out for processing

Stream Code	Site Code	Sample	Date (yyyy-mm-dd)	Transect No.	Page No.
NDR-S	06		2023-06-09	03 of 03	01 / 01

Channel Profile Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.65	0050	—			.
2	0.8	0268	—			.
3	.0	0405	—			.
4	.46	0681	0060			.
5	2.0	0812	0209			.
6	3.0	0649	0430			.
7	4.0	1128	0533			.
8	5.0	1053	0462			.
9	6.0	1086	0491			.
10	7.0	1194	0600			.
11	8.0	1138	0543			.
12	9.0	1064	0454			.
13	10.0	0955	0340			.
14	11.0	0980	0326			.
15	12.0	0756	0096			.
16	12.35	0665	0036			.

Channel Profile Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
17	12.7	0499				.
18	13.0	0499				.
19	14.0	0095				.
20	14.13	0077				.
						.
						.

NDR-S-OG water

9 June 2023 9:40 am

16.2°C

76.5 DO %

7.72 DO mg/L

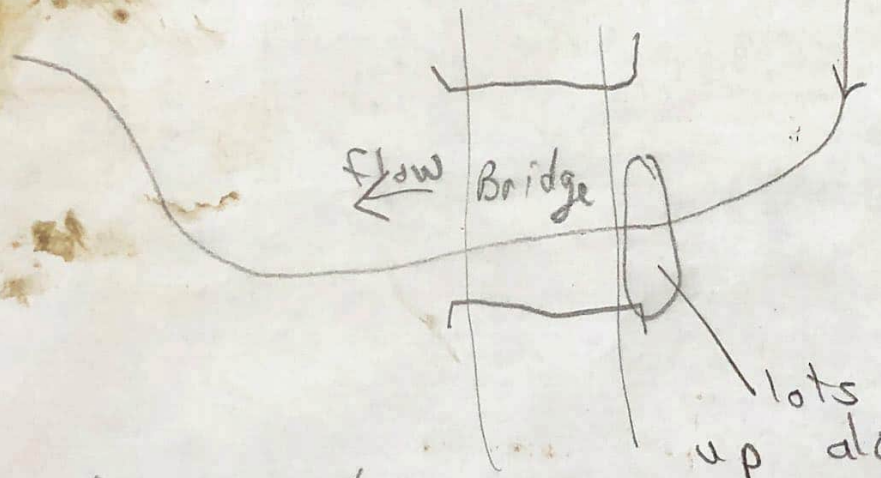
0.087 SPC ms/cm

72.6 C us/cm

7.98 pH

6.86 ORP mV

slow moving water
predominantly coniferous forest surrounds channel
deciduous trees along banks
erosion visible
undercutting observed, no slumping observed



lots of large tree trunks built up along upstream abutments

*bridge wood supports are deteriorated and not touching bottom of bridge anymore. Bridge not maintained.

A. Stankiewicz, R. Pibleby, S. Crawford

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): 27 Minnow traps

Project Site / Project Number: OMEMA2304S

Waterbody or Watercourse Name: North Drift

Start Date: (DD/MMM/YY) / Time: (24HR): 29/MAY/23 17:30

End Date: (DD / MMM / YY) / Time (24HR): 02/JUN/23 09:10-10:30

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-S-CCB-MT

Method Effort: (Traps/Floats/Days): 27

UTM Coordinates: (mN, mE, Zone, Acc.): 30-37 All GPS

Samplers In: RP, RD

Page: 1 of 2

See Net Form: Y / N

	Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pt, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
1	Finescale Dace			100	106	11.97					FHMN: Fathead Minnow
1	Northern Redbelly			51	54	1.36					FNDC = Finescale Dace
2	NRBD			53	55	1.61					NRBD = Northern Redbelly Dace
3	↓			47	51	1.34					WHSC = White Sucker
4				49	53	1.36					
2	Finescale Dace			54	56	1.53					
[illegible]	PD			118	121	14.0					PD = Northern Pearl Dace
1	FHMN			71	77	3.60					
5	NRBD			50	54	1.29					
2	FHMN			51	55	1.38					
6	NRBD			54	56	1.66					
3	Finescale Dace			62	66	2.35					
7	NRBD			49	54	1.22					
2	PD			80	85	4.23					
4	FNDC			90	97	7.85					
1	WHSC			100	106	9.41					
3	FHMN			80	85	6.3					
8	NRBD			47	50	1.44					
2	WHSC			84	98	8.27					
3	PD			100	109	9.60					
3	WHSC			91	96	7.1					
4	WHSC			102	111	11.18					
9	NRBD			55	58	1.7					
5	FNDC			66	69	3.11					
6	FNDC			60	64	2.64					
5	WHSC			116	123	15.48					
7	FNDC			69	72	3.000					
4	FNDC			70	76	3.38					same length as [illegible]
9	FNDC			70	76	4.23					
10	FNDC			72	76	4.68					
4	PD			102	107	8.28					
5	PD			72	83	4.68					
1	BNST			49	49	1.64					
2				—	56	1.76					
[illegible]				—	53	1.29					
[illegible]				—	45	0.77					
5				—	51	1.03					
6				—	54	1.24					
[illegible]				—	46	0.78					
8				—	55	1.21					same length as [illegible]
9				—	55	1.62					
10				—	45	0.77					
6	PD			63	66	2.57					
[illegible]	NRBD			48	54	1.64					

Species Box Tally Area / Site Comments:
gillnet ID'd from + hab/site forms also completed

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pv - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

see field book for tally excluding trace fish

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): 27 MT

Project Site / Project Number: OMEMA2304S

Waterbody or Watercourse Name: North Driftwood Arm

Start Date: (DD/MMM/YY) / Time: (24HR): 30/May/23 17:30

End Date: (DD / MMM / YY) / Time (24HR): 02/Jun/23 10:30

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-S-CCB

Method Effort: (Traps/Floats/Days): x27

UTM Coordinates: (mN, mE, Zone, Acc.): 30-37 All GPS

Samplers In: AS/RD

Page: 2 of 3

See Net Form: Y / N

	Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pt, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
10	NRBD			50	51	1.75					
11	FHMN			66	67	3.21					
5	FHMN			55	56	2.00					
6	PD			106	111	3.03					
7	PD			90	95	6.43					
8	WHSC			106	113	12.55					
9	PD			93	99	7.84					
1	WHSC			123	129	15.72					
9	PD			92	98	7.64					
10	PD			97	102	9.35					

Species Box Tally Area / Site Comments:
Indy does tally from field book + biosampling form →

Species	Total Catch	Species	Total Catch
NRBD	56	FNDC	938
FHMN	5	BRST	386
WHSC	7	Blacksucker	1
NPDC	119		

QA/QC By:

Date:

Legend:
Sc - Scales
Pv - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

R. Dibblee, A. Stankiewicz Spring Crawford

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) mostly sunny, very little breeze

Project Site / Project Number: WSP 10MEMA23045

Waterbody or Watercourse Name: North Driftwood River

Start Date: (DD/MMM/YY) / Time: (24HR) 01/JUN/2023 9:30

End Date: (DD / MMM / YY) / Time (24HR): 01/JUN/23 13:30

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-S-06B-GN

Method Effort: (Traps/Rods/Dips) —

UTM Coordinates: (mN, mE, Zone, Acc.) See below

Samplers In. RD AS

Page: 1 of 1

See Net Form: Y (N)

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NDR-S-06B-GN1 17U						NO FISH				
Set	09:30									
Lift	13:30									
90° angle to shore ponded area beside argo trail 0.85cm deep										
NDR-S-06B-GN2 17U 467499 5411257										
90° angle to shore, tied to shore RIN net										
water 0.88m deep										
Set 09:40										
Lift 13:30										
			FL	TL	Wt/g)	lengths in mm				
White sucker			170	181	54.11					
			207	218	0.095 kg					
			090	094	7.72					
			107	113	12.09					
Northern Pearl Dace			099	105	10.91					
11			104	109	11.40					
Finescale Dace			090	094	7.54					
White sucker			137	143	26.01					missing part of caudal fin
11 11			099	104	10.97					
NDR-S-06B-GN3 17U 467494 5411086										
Across creek, ~1m wide, 65cm deep										
4" mesh										
Set 09:50		Lift 13:05					NO FISH			
substrate - fines, LWD, SWD										
NDR-S-06B-GN4 17U 467503 5410730										
Across creek ~2.7m wide, 70cm deep										
Set 10:40		Lift 12:48					NO FISH			
RIN net - 7 emme 14mm in the channel										
substrate - fines, SWD, LWD										
NDR-S-06B-GN5 17U 467504 5410942										
Across creek ~2.5m wide, 63cm deep										
Set 10:00		Lift 12:40					NO FISH			
R										

Species Box Tally Area / Site Comments: surface water taken, see back for YSI

Species	Total Catch	Species	Total Catch
WHSC	6		
NRPD	2		
FNDC	1		

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

Surface Water

June 1 2023
@ 12:30
Bottles taken

Temp: 16.7
DO%: 74.8
DO mg/L: 7.27
SPC $\frac{ms}{cm}$: 0.025
C $\frac{us}{cm}$: 21.1
pH: 6.11
ORP mV: 123.3
NTU: 6.85

ITU 467501 5410994
↳ T3 taken at this too

NDR-S-06B 1 OMEMA23045

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code	Site Code	Sample	Date (yyyy-mm-dd)	Transect No.	Page No.
NDR	S	3468	2023-06-01	03 of 03	01 01

Channel Profile

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.3	0159				.
2	1.0	0136	0078			.
3	1.9	0847	0200			.
4	2.2	0303	2601			.
5	2.4	0330	296			.
6	2.5	0517	0481			.
7	2.8	0651	0618			.
8	3.8	0859	0821			.
9	4.1	0931	0795			.
10	5.3	0907	0894			.
11	5.8	0756	0710			.
12	6.2	0669	0620			.
13	6.4	0479	0430			.
14	6.6	0349	0295			.
15	7.0	0183	136-			.
16	7.2	0196	0141			.
17	7.4	0156	107			.
18	7.7	0105	0063			.
19	7.9	0118	0063			.

Comments

started LB (South)
- mossy banks - difficult to anchor stakes into it
- water onto banks
LOW SWD with fines substrate
- adjacent floodplain is mossy

174

Cross section not bankfull

R.D, A.S

OMEMA23845

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of 1

Stream Name: NORTH DRIFTWOOD

Discharge Approximates Baseflow: yes ☐ no ☑

Date (yyyy-mm-dd): 2023-06-01

Stream Code: NDR

Site Code: S-06B

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ ~~No~~

Obstructions to Flow *(Check all applicable types)*
☒ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☑	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): >15.
Right Entrenchment Width (m): >15.
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	1.25	0452	☐ Yes ☐ No
Right BFD	4.47	0207	
Max. Chann. Depth	.		
Left Active Chann.	0.65	0032	
Right Active Chann.	5.14	0119	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.5	44	0			.
02	0.65	32	10			.
03	1.0	62	47			.
04	1.1	278	263			.
05	1.25	452	441			.
06	1.48	576	571			.
07	1.7	721	716			.
08	2.2	794	790			.
09	2.7	830	825			.
10	3.2	907	902			.
11	3.9	909	899			.
12	4.2	792	787			.
13	4.31	806	818			.
RB	4.47	204	188			.
15	4.7	144	130			.
WE	5.14	119	100			.
17	5.5	113	89			.
	.					.
	.					.
	.					.

Comments:
Substrate same @ transect 1
174 467495 5410983
water onto banks

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
AS, RD	AS			

OMEMA23045

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey Must be filled out for processing

Transect No. [ ] of 3 | Page No. 1 of 2

Stream Name: NORTH DRIFTWOOD RIVER

Discharge Approximates Baseflow: yes ☐ no ☒

Date (yyyy-mm-dd): 2023-01-06

Stream Code: NDR

Site Code: S-06B

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☑	☑
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 30.0
Right Entrenchment Width (m): 30.0
Total Entrenchment Width (m): 60.0

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?	Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m) Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Left BFD	.		☐ Yes ☐ No				
Right BFD	5.5	222					
Max. Chann. Depth	.						
Left Active Chann.	0.34						
Right Active Chann.	1.76	+93	+56				
Observ. 1	0.3	+67	---				
2	1.0	+75	---				
3	1.6	+85	---				
4 (water edge)	1.76	+93	56				
5	2.0	+120	84				
6	2.2	+180	140				
7	2.3	0235	210				
8	2.7	0250	230				

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
9	2.9	0280	0265			
10	3.1	0290	0280			
11	3.2	0405	0395			
12	3.3	0545	0532			
13	3.4	0618	0590			
14	3.9	0611	0588			
15	4.1	0630	0607			
16	4.3	0650	0629			
17	4.6	0758	0733			
18	5.1	0654	0625			
19	5.33	0558	0531			
20	5.5	0222	0191			

LD

Comments: boggy on banks, shallow pockets of water outside of the wetted width. 17U 467507 5410948 lots small + large woody debris, substrate = organic matter > muck

Crew Leader (init. & last name): RDIBBLEY

Crew: RD, AS | Recorder: both | Ent/Scanned | Verified | Corrected

facing U/S, a

OMEMA23045

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code: NDR-S-06B | Site Code | Sample | Date (yyyy-mm-dd): 2023-06-01 | Transect No. 01 of 03 | Page No. 2 of 2

Channel Profile

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	5.8	186	141			
22	6.2	119	76			
23 (water edge)	6.34	163	56			
24	6.9	93	0			

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)

Comments:

Ontario

Ministry of Transportation

WATERCOURSE FIELD COLLECTION FORM

GENERAL INFORMATION			
Project #: OMEMA2304S	Project Description: Crawford		Date: June 3 2023.
Is Stream Realignment required for this section: ○ Yes ○ No ⊘ Unknown			
Collectors: AB RD		Time Started: 8:44	Time Finished: —
Weather Conditions: Sunny, Smoky, 10°C			
Air Temp (°C): 10°C	Water Temp (°C):	Conductivity (µS/cm):	Velocity (m/s):
Photos Numbers And Descriptions: Rox's phone			

LOCATION			
Name of Waterbody: DARK RIDAL-02	Drainage System: /	Crossing #: /	Station #: /
Location Of Crossing: /			
GPS Coordinates:		MTO Chainage: N/A	

North 48.76062, -81.38454
South 48.760058, -81.384772

Ontario

Ministry of Transportation

Township: —	MNRF District: Timmins

LAND USE AND POLLUTION

Surrounding Land Use:	Sources of Pollution:
coniferous Forest	None

EXISTING STRUCTURE TYPE

Bridge ○	Box Culvert ○	Open Foot Culvert ○	CSP ○	N/A ✓

Other ○ (Describe) —	Size: (w x h) m^2 —

SECTION TYPE AND MORPHOLOGY

Section (Reach) Identifier: 20m US to 50m DS	Section Location: (Include On Habitat Map)
Associated Wetland —	

Stream / River ✓	Channelized ○	Permanent ○	Intermittent ○	Ephemeral ○

Total Section (Reach) Length (m): 70m

Sub-Sections:	Run ○	Pool ○	Riffle ○	Flats ✓	Culvert ○	Other ○
Percentage of Area:				100%		
Mean wetted depth (m)				1.0 0-20 US 0.7 0-90 DS		
Mean wetted width (m)				3.4 water on banks DIS 0-50m		
Mean bankfull depth (m)				0.45 = water above		
Mean bankfull width (m)				2.8		

Water too deep towards. Can't see substrate, water tannin coloured and dark. UNK flow direction, assuming flows south.

- parts of channel wadable
- tannin coloured water, limits visibility in spots

Ontario

Ministry of Transportation

Substrate (type & %)							
Bedrock (Br)	***Boulder (Bo)***	***Cobble (Co)***	***Gravel (Gr)***	***Sand (Sa)***	***Silt (Si)***	***Clay (Cl)***	***Muck (Mu)***	***Detritus (D)***

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Bank	⊘	○	○	○
Right Bank	⊘	○	○	○
	Deposition Zone	**Protected Bank**	**Vulnerable Bank**	**Eroding Bank**
Left Bank	○	○	⊘	○
Right Bank	○	○	⊘	○

HABITAT

In-Stream Cover (% surface area):

Undercut banks:	Boulders:	Cobbles:	Organic Debris:	None
<10	~	—		○

Vascular Macrophytes:

Instream:

Overhanging:

Woody Debris:

Instream: <5

Overhanging: \

small wood debris in channel; not large wood debris as per MTO protocol for this

Shore Cover (% stream shaded):

100-90%	89-60%	59-30%	29-1%	None
○	○	○	⊘ grasses along shore	○

RDAL-02
OMEMA23045

Vegetation Type:				
Vegetation Type (%)	Submergent:	Floating:	Emergent:	None O
Predominant Species:	< 10	—	—	

MIGRATORY OBSTRUCTIONS		
Permanent	Seasonal	None ✓

POTENTIAL CRITICAL HABITAT		
Spawning	Groundwater	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES

Ontario

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OMEMA 23045

ADDITIONAL COMMENTS

80cm to 1.2m (0-20m US) (deep)
2.3-2.6m ~~deep~~ wide (0-20m US)
90cm-120cm deep (20-50m US)
2-2.8m across (20-50m US)
20-50m US
- water looks about 18cm below top of bank.

0-50m ds

wetted width ranged from 2.3 to 7.5m, with depth ranged from 65 to 95cm
water on banks at 7.5m wide area
channel genera

Additional Notes Appended? O No O Yes Number of Pages _____

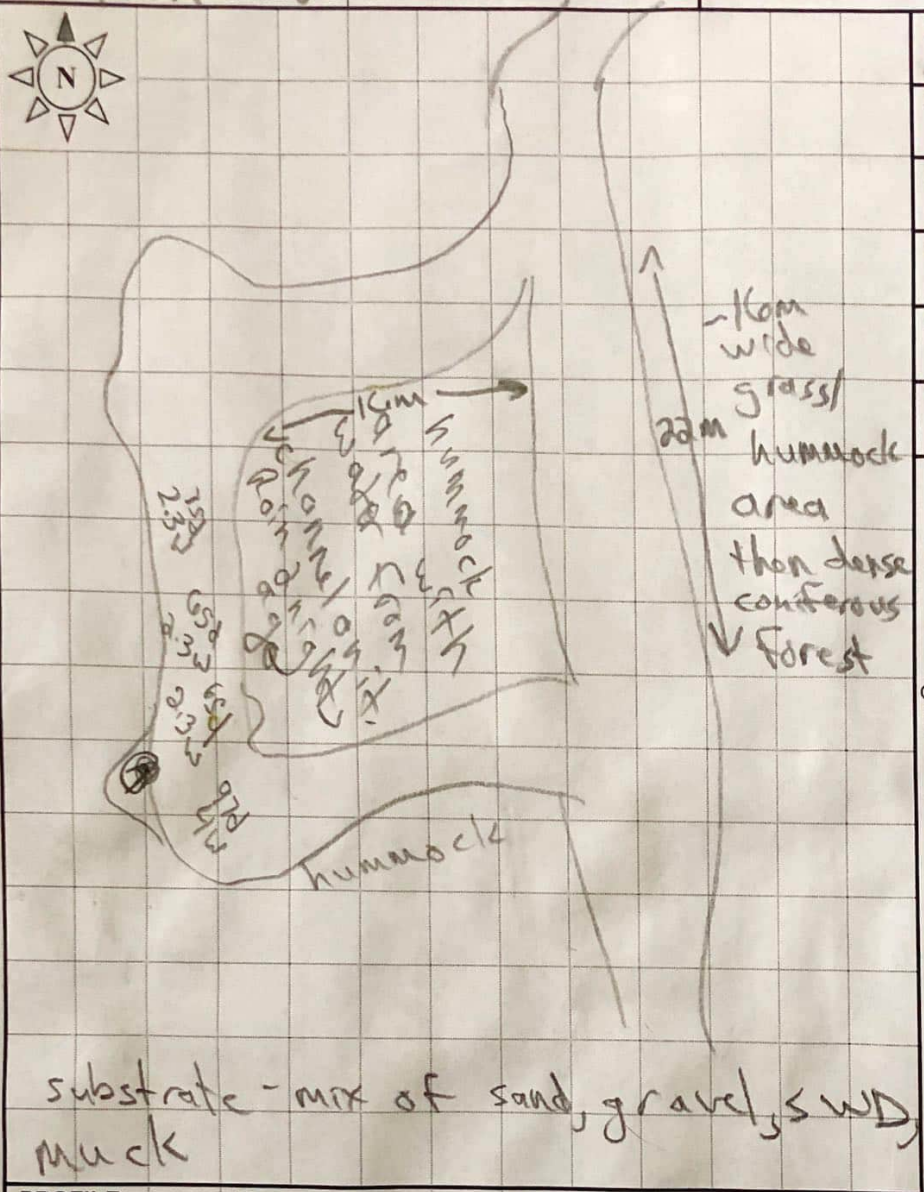
50+ds = ~~>~~50m downstream
channel widens into small ponded area.
0.5cm - 1.1m deep

WATER QUALITY 17U 471734
5400908

16.8°C
44.2 D%
4.29 DO mg/L
0.143 $\frac{ms}{cm}$
120.6C $\frac{us}{cm}$
6.54 pH
-6.51 NTU
133.4 ORP

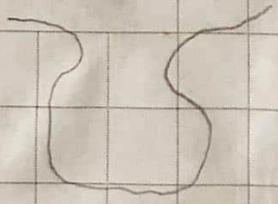
RDAL-02
+1 page drawing

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
RDAL-02			



substrate - mix of sand, gravel, SWD, muck

PROFILE: Horz. Scale Vert. Scale



PROJECT #: OMEMA23045

MAPPER: R. Dibbley

NAME OF WATERBODY:

CROSSING #:

STATION #:

DATE: YY-MMM-DD 23-JUN-03

LEGEND

10d depth (cm)
6w width (m)

➡ Riffle
⇨ Run/Glide
⬭ Pool
▇ Island/Bar

⁘ Fine Substrate
Gravel Substrate

oOooO Cobble /Boulder
*** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
//////// Eroded Bank

XXX Riprap / Other Stabilization

⬭ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

⊢► Seep/Spring
-------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
⌴ Culvert

(A) water on banks - 1m wetted width

+ MTO form (5 pgs)

Location RDAL-04

Project / Client 451

Date JUNE 13/23

15:35

Temp °C	DO%	DO mg/L	SPC	C
15.4	22.8	2.29	0.023	18.5

PH	NTU
5.73	-6.01

- Flow → north
- lots of small woody debris in channel
- Bog / swamp
- water depth 40-50cm
- channel bottom sometimes spongey
- lots of fines (fss)
- Channel in open wet area
- tamarack, alders, irises, ferns, peat
- little beaver dam south of Roxis Waypoint
- Water at TOB
- becomes braided

Location RDAL-03

Project / Client

Date June 14/23

11:00

- Coniferous forest
- no water course
- Peat, labrador tea, black spruce, few alder

BRST = Brook Stickleback

Location _____ Date _____

FHMN = Fathead Minnow

Project / Client _____

NRBD = Northern Redbelly Dace

	FL MM	TL MM	WG.	SPECIES
	64	69	3.98	FHMN
	50	53	1.50	FHMN
✓		59	1.57	IOWA DARTER
		62	1.51	IOWA DARTER
		ORANGE ON DORSAL FIN		
	60	65	2.79	FHMN
+1 BRST	47	50	1.02	FHMN
+2 BRST	50	55	1.48	FHMN
+1 TADPOLE +1 GIANT WATER BUG		52	1.00	IOWA DARTER
		59	1.45	"
+1 GIANT WATER BUG	53	57	1.49	FHMN
	48	52	1.33	FHMN
+1 BRST		56	1.34	IOWA DARTER
+1 LEECH	104	109	12.42	YELLOW PERCH
+1 BRST +1 GIANT WATER BUG		65	2.26	IOWA DARTER
		48	1.00	"
+2 BRST	97	100	10.50	YELLOW PERCH
	53	56	1.43	FINESCALE DACE
	85	88	6.54	YELLOW PERCH
	87	92	6.85	YELLOW PERCH
	87	89	7.10	"
	50	53	1.24	NRBD

Rite in the Rain

Location SUTHERLAND LK Cont'd

Project / Client

Date JUNE 13/23

	FL MM	TL MM	WG	SPECIES
+1 Giant water Bug	65	69	7.36	~~FINESCALE DACE~~
	49	.53	1.21	NRBD
+1 LEECH	63	.67	2.54	FINESCALE DACE
	50	52	1.57	NRBD
	48	50	1.17	NRBD
	49	52	1.23	FINESCALE
	50	54	1.47	NRBD
	68	71	2.96	FINESCALE
	53	57	1.61	NRBD
	54	57	1.46	NRBD
NRBD ++++ ++++ ++++ ||||	49	52	1.03	NRBD
	68	71	2.96	FINESCALE
	50	53	1.54	NRBD
~~BRST~~	60	65	2.45	FINESCALE
	46	50	1.03	NRBD
BRST 11			~~1.75~~	~~FINESCALE~~
	63	67	2.52	FINESCALE
	44	52	1.25	FINESCALE
FINESCALE DACE	LD Caddie fin split all the way to its base			
1	74	82	4.12	GOLDEN SHINER
	74	80	3.85	GOLDEN SHINER

Location Sutherland Lake Date

Project / Client minnow traps 25 traps

set June 12 17:30 lift 13 Jun

Finescale Dace 1+1+8+1 = 11

Brook stickleback 10+21+7+2 → = 40

Northern Redbelly Dace 1+9+19 → = 29

Golden Shiner 2 = 2

Yellow Perch 5+5 = 10

Fathead Minnow 1+7 = 8

Lowa Darter 5+7 = 12

Bluntnose minnow 1 = 1

R.D, C.B.

Rite in the Rain

Location SUTHERLAND LK Date JUNE 13/23

Project / Client YSI

11:30 48.791791 -81.391432

DEPTH	°C	DO%	DO mg/l	SPC	C—
SURFACE	17.4	97.6	9.34	0.207	176.8
1m	16.8	96.0	9.31	0.207	174.8
2m	16.2	93.3	9.16	0.208	172.6
3m	10.1	113.0	12.69	0.280	203.0
4m	6.5	98.2	12.06	0.285	183.7
5m	4.9	41.1	5.24	0.290	178.2
6m	4.3	7.7	1.00	0.291	175.5
7m	3.7	3.2	0.42	0.297	176.2
8m	3.5	2.0	0.26	0.303	178.9
9m	3.6	1.6	0.21	0.306	180.7
10m	3.5	1.5	0.20	0.312	184.2
2.5m	12.4	119.8	12.93	0.277	210.1
3.5m	7.6	102.9	12.29	0.289	192.6

water depth ~ 23m
YSI cable 10m long
Zooplankton also taken here
Water samples taken here

SECCHI down 2.54m
up "

Location Date

Project / Client

PH	NTU
8.13	-6.57
8.18	-6.69
8.14	-6.70
8.50	-6.64
8.66	-6.34
8.22	-6.29
8.11	-6.57
8.08	-6.50
8.07	-5.11
8.06	-4.58
8.04	-2.15
8.21	-6.98
8.45	-6.96

Rite in the Rain

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) 23

Project No: OMEMA 23045 Wood.

Waterbody Name:	Start Date (DD MMM YYYY) / Time (24HR):	End Date (DD MMM YYYY) / Time (24HR):	Area Description:
WBR-P-04	08 Jun 23	10 Jun 23 08:00	Pond

Sample ID:	Method #: (Traps / Rods / Dips)	UTM Coordinates (mN, mE, Zone, Acc.):	Samplers In.	Page: 1 of 2
WBR-P-04	23	48.863168, -81.34	AS, KD	see Net Form NO

Sample ID	Fish #	Species	Species Code	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Aging Structures (Sc, Pr, Dr, Oto)	Pres. for Analysis (Y/N)	Presumed age class (YOY / 1+)	Comments (Hg / Released / etc.)
FNDC				70	74	3.5				FNDC =
				60	65	1.98				Finescale Dace
				65	69	3.03				
				65	67	2.83				
				66	72	2.78				
				64	68	2.52				
				62	66	2.34				
				56	60	1.41				
				54	56	1.81				
				70	74	3.45				
NRBD				46	50	1.01				NRBD =
				45	49	1.20				Northern
				48	50	1.13				Redbelly
				54	54	1.28				Dace
				44	53	1.02				
				58	64	1.89				
				45	50	1.21				
				45	48	0.98				
				51	54	1.46				
				50	54	1.13				
FHMN				48	51	1.22				FHMN =
				40	45	0.74				Fathead
				68	73	3.71				Minnow
				42	45	0.73				
				61	65	3.03				
				42	45	0.82				
				46	50	1.23				
				42	45	0.90				
				77	80	4.61				
				47	50	1.11				
PD				64	69	2.65				NRDE Northern
				85	90	6.24				Pearl
				86	92	6.46				Dace
				103	110	9.69				
				70	74	2.85				
				71	76	3.15				
NRBD										= 210
FNDC			= 48							
FHMN			= 4							
BRST:			= 2							

Species Box Tally Area / Site Comments:

*See back for BRST measurements

Species	Total Catch	Species	Total Catch
NRBD	210		
FNDC	48		
FHMN	4		
BRST	2	Total #	

QA/QC By:

Date:

Aging Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"

Total For this page

BRST

#	total length
49	1.47
53	1.14
42	1.00
45	0.89
50	0.73
51	1.29
46	0.89
49	1.02
45	0.97
56	1.68

EDNA
WBR-BLTH-3 @ WBR-P-04
8 June 2023 15:30
Water quality
20°C
99.3 DO%
9.03 DO mg/L
0.030 SCP
27.0 Cond.
7.13 pH
69.3 ORP
2.23 NTU

West Buskegau River = WBR

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) 23

Project Site / Project Number: OMEMA23045 wood.

Waterbody or Watercourse Name: WBR

Start Date: (DD/MMM/YY) / Time: (24HR): 8 Jun 23 1600

End Date: (DD / MMM / YY) / Time (24HR): 10 Jun 23 0800

Area Description: (Habitat Type / Site Features): Pond

Sample ID:

Method Effort: (Trap/Rock/Dip):

UTM Coordinates: (mN, mE, Zone, Acc.): 48.863168, -81.347627

Samplers Initials: RD AS

Page: 1 of 2

See Net Form: Y / N

Species	Fish #	Species Code (4M/R)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pc, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NRDD	244									
	15		14	17	6	6	8	11	3	9
	1		16	19	6	10	5	6	5	16
	12		13	14	4	1	6	3	5	8
FNDC	3		10	9	3	0.5	6	5	4	7
	2		1	1	1	4	3	6	8	4
	16		6	8	2	4	3	1	6	3
BRST	14		7	6	2	6	3	6	4	2
	2		4	2	2	6	4	4	8	4
FHMN	1		6	3	3	5	6	5	5	9
	5		1	1		10				7
PD	3		2	2	4					
			68	72	3.88		14			
			124	132	15.25					
			62	71	2.42					
			68	70	2.77					

BRST = Brook stickleback

PD = Pearl Dace

Measured fish are included in tally counts above

Species Box Tally Area / Site Comments:
- tannin coloured water
- soft substrate

Species	Total Catch	Species	Total Catch
PD	19	NRDD	470
FHMN	10		
BRST	39		
FNDC	276		

QA/QC By:

Date:

Legend:
Sc - Scales
Pc - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

Total For this page

OMEMA23045

Rep channel cross-section

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code	Site Code	Sample	Date (yyyy-mm-dd)	Transect No.	Page No.
WBR-S-	04	TL	2023-06-04	01 of 03	01

West Buskegau River

Channel Profile

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.3	880				
02	1.0	1177				
03	1.3	3588				
04	2.0	0566				
05	2.4	0650				
06	2.74	0910	050			
07	3.0	1060	0190			
08	4.0	1236	0390			
09	5.0	1448	0555			
10	6.0	1379	0550			
11	7.0	1385	0561			
12	8.0	1375	0550			
13	9.0	1264	0437			
14	10.0	1260	0431			
15	11.0	1234	0400			
16	12.0	1139	0290			
17	12.4	1030	0180			
18	12.79	0915	0060			
19	13.4	0566				
20	13.7	0830				
21	14.0	0090				

TOB

Water edge

RB WE

Comments

most north
started U/S LB
done at already marked
spot from previous years

RD, AS, recorder R.D.

OMEMA23045

366 20 346 4 51

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of 1

Stream Name: WEST BUSKEGAW RIVER

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-04

Stream Code: WBR-5

Site Code: 04

Sample: rd

Record only on the 1st transect.
Site Length (m): .
Transect Spacing (m): .

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): .
Right Entrenchment Width (m): .
Total Entrenchment Width (m): .

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 12.0
Point Spacing (m): 01.00

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	1.2	0366	
Right Active Chann.	13.2	0376	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.3	0040				.
02	0.7	0218				.
03	1.0	0273				.
04	1.2	0366	0020			.
05	2.0	0451	0111			.
06	3.0	575	0264			.
07	4.0	0716	0414			.
08	5.0	849	553			.
09	6.0	0871	0572			.
10	7.0	0859	0565			.
11	9.0	0840	545			.
12	9.0	0788	0499			.
13	10.0	0764	0453			.
14	11.0	0736	0423			.
15	12.0	0670	0341			.
16	13.0	0445	0105			.
17	13.2	0376	0010			.
18	13.4	0295				.
19	13.6	0192				.
20	13.7	0125				.

Velocity Measurements

Comments: started WLS LB
middle transect

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
RD, AS	RD			

OMEMA23045

channel cross-section

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code	Site Code	Sample	Date (yyyy-mm-dd)	Transect No.	Page No.
WBR-5	04	T	2023-06-04	of 03	01 01

West Buskegau River

Channel Profile Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.5	0930	—			.
02	0.9	0910	—			.
03	1.3	0379	—			.
04	1.5	0465	0020			.
05	2.0	0605	0190			.
06	3.0	0764	0360			.
07	4.0	0815	0416			.
08	5.	0887	0557			.
09	6.	0989	0550			.
10	7.0	0957	0600			.
11	8.0	0964	0576			.
12	9.0	0936	0549			.
13	10.0	0885	0488			.
14	11.0	0899	0431			.
15	12.0	0931	0200			.
16	12.6	0980	0030			.

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)
17	13.2	0355
	.	
	.	
	.

~2.8m from waters edge to top of RB slope

substrate - clay, sand, gravel

no aquatic veg observed

slow flow - flat

FISHERIES NET CATCH / EFFORT FORM

SITE DESCRIPTION:

Sample ID	Waterbody Name			Project Code
WBR-S-04-GNI	West Buckegaun River			GMEMA23045
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	**Mesh Size(s)** (mm/in)	**Coordinates (UTM NAD 83)** (UTM Zone)	(LAT)	(LONG)	**Site Type** (substr)	(cover)
x5 nets	various	17U	476570	5412913		
Trap/Hoop Size (m)	**Net/Leader length** (m)	**Substrate Composition and Cover Types** (list all substrate types in area of net)				

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
R. Drobaley A. Stankiewicz	05/JUN/23	13:00			90			

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
	same	17:00	—	—	—	—

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	(knots / km/hr)	General Weather for Set Duration (duration precip)	(duration wave)	Duration (fishing hours)
	0					4.0

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
~~147 mm Pike~~						
~~1 NRRK~~						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments
NRRK	1	444	471	1.43 lbs	—	147' net
Northern Pike						

WATER QUALITY READING:

Date: 4 June Time: 13:45

Temperature: (°C)	20.7	DO: (%)	86.9
Cond.: (µS/cm) or (Ms/cm)	—	DO: (mg/L)	7.79
Turbidity: (NTU)	4.23	pH:	7.01
TDS: (g / L)	—	mV ORP:	78.9
Salinity: (ppm)	—	Depth: (m)	—

Comments:
RI 51, 76 & 115 in water - no fish
19, 32, 38 in water - no fish
4" - no fish

See Bio Sheet Data (Y / N)

QA/QC By:

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Minnow

Project Site / Project Number: UMEMA23045

WSP

Waterbody or Watercourse Name: West Muskeg Creek

Start Date: (DD/MMM/YY) / Time: (24HR): 07/Jun/23 13:15

End Date: (DD / MMM / YY) / Time (24HR): 08/Jun/23 13:30

Area Description: (Habitat Type / Site Features): River

Sample ID: WBR-S-04-MT1

Method Effort: (Traps/Rods/Days): x 25

UTM Coordinates: (mN, mE, Zone, Acc.): AGS Phone

Samplers In.: ABIRD

Page: 1 of 1

See Net Form: Y/N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fil.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
TRPR	1		76	80	5.02					
	2		76	82	5.01					
	3		45	48	1.012					
	4		46	50	1.19					
	5		48	52	1.41					
	6		47	52	1.28					
Tesselated	7		76	81	4.97					Darter
	8		45	48	1.22					
BRBT	1									Jumped out
	2		—	132	11.53					

TRPR = Trout Perch

BRBT = Burbot

TSDR = Tesselated Darter

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch
TRPR	7		
TSDR	1		
BRBT	2		

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

ELECTROFISHING FORM

Project Site / Project Number: ONEMA 23045.

WSP

Waterbody or Watercourse Name: West Buskegaun

Date: (DD / MMM / YY): 08/06/23.

Water Temp: 19.

Shocking Method: Backpack

Pg: 1 of 1 Run: 1 of 1

UTM Start: Air Phone

UTM End:

Start Time: (24 hrs): 12:00

Stop Time: (24 hrs): 12:40.

Netters: 1.

Site Area / Description: (Length X Width): 50m x 10m

Sample ID: WBR-S-04-EF1

Elapsed Time: (hours)

Effort: (seconds): 1453

Voltage / % Power: 335 V

Frequency / Range (high/low): 30

Pulse:

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
TRPR	1		48	50	1.18					
	2		47	51	1.16					
	3		54	56	1.606					
	4		71	79	3.95					
	5		52	56	1.43					
	6		49	52	1.35					
	7		92	94	7.53					
	8		49	52	1.33					
	9		49	51	1.44					
	10		46	48	1.02					
NRPK	1		4.00	424	1.21 lbs					
Cyprinid sp	1		24	25	0.13					YOY/UNK
NRPK	2		233	248	0.171kg					
BRST	1		—	34	0.35					
LNDC	1		54	56	1.63					
Cyprind sp.	2		26	27	0.18					YOY/UNK.

TRPR = trout perch

NRPK = Northern Pike

BRST = brook stickleback

LNDC = longnose dace

Species Box Tally Area / Site Comments:

TRPR

12

Species	Total Catch	Species	Total Catch
NRPK	2	LNDC	1
TRPR	10		
Cyp. sp	2		
BRST	9		

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
FIlL - Fillet or Dorsal Epaxial

WBR-S-04 4 June 2023 13:45

YSI water

20.1 temp °C

86.9 DO %

7.79 " mg/L

0.060 SPC MS/cm

55.4 C

7.01 pH

70.9 ORP mV

4.23 NTU

17U 476570 5412913

2 of 2

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 2 | Page No. 1 of 2

Stream Name: West Buskegaw River

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-07

Stream Code: WBR-5

Site Code: 06

Sample:

Discharge Approximates Baseflow? ☐ Yes ☑ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 2.5
Right Entrenchment Width (m): 3.0
Total Entrenchment Width (m): 5.5

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 12.1
Point Spacing (m): 01.0

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	0.8	220	☐ Yes ☐ No
Right BFD	17.0	261	
Max. Chann. Depth	.		
Left Active Chann.	1.93	1098	
Right Active Chann.	14.0	1102	

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
LB 01	0.8	220	0			.
	0.9	313	0			.
	1.0	806	0			.
	1.32	978	0			.
	1.8	1092	0			.
WET	1.93	1098	2			.
	2.3	1204	129			.
	3.6	1260	232			.
	4.0	1240	221			.
	5.0	1202	209			.
	6.0	1201	294			.
	7.0	1337	355			.
	8.0	1303	336			.
	9.0	1314	334			.
	10.0	1328	339			.
	11.0	1347	349			.
	12.0	1319	302			.
	13.0	1298	248			.
WET	14.0	1102	9			.
	15.0	948	0			.

Comments
wind shaking tape -> discrepancies of 0-10mm.
coords are same as water -> water taken here

Crew Leader (init. & last name):

Crew: ASRD | Recorder | Ent/Scanned | Verified | Corrected

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code	Site Code	Sample	Date (yyyy-mm-dd)	Transect No.	Page No.
WBR	S-06		2023-06-04	2 of 2	2 2

Channel Profile			Velocity Measurements			
Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
[illegible]	15.45	894	0			.
	16.0	693	0			.
RB	17.0	261	0			.
	17.34	99	0			.
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Channel Profile			Velocity Measurements			
Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
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channel profile, not bankfull

1 2

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 1 | Page No. 1 of 2

Stream Name: WEST BUSKEGAU RIVER

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-04

Stream Code: WBR-

Site Code: S-06

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow (*Check all applicable types*)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 11.0
Point Spacing (m): 01.0

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	0.7	74	☐ Yes ☐ No
Right BFD	17.1	295	
Max. Chann. Depth	.		
Left Active Chann.	1.95	1134	
Right Active Chann.	12.96	1174	

Velocity Measurements (*Recommended depth ratio from stream bottom is 0.4 m*)

	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Left Active Chann.	2			.
Right Active Chann.	13			.
LB Observ. 0.7	0			.
0.95	0			.
1.3	0			.
1.61	0			.
1.97	0			.
WE 1.95	2			.
2.58	363			.
3.0	404			.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	4.0	1514	438			.
	5.0	1479	408			.
	6.0	1437	366			.
	7.0	1475	422			.
	8.0	1403	338			.
	9.0	1461	395			.
	10.0	1448	380			.
	11.0	1356	268			.
	12.0	1257	143			.
WE	12.96	1174	13			.
	14.0	1003	0			.
	15.0	837	0			.

Comments: Coords 17 U 477097 5410013.

Crew Leader (init. & last name):

Crew: A.S., R.D.

Recorder: A.S. | Ent/Scanned | Verified | Corrected

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code	Site Code	Sample	Date (yyyy-mm-dd)	Transect No.	Page No.
WBR	S-06		2023-06-04	1 of 2	2 of 2

RB

Channel Profile Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	16.0	617	0			.
	16.7	365	0			.
	17.0	295	0			.
	17.1	287	0			.
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Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
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WATER PROFILE & SAMPLING FORM

WSI

A. Stankiewicz, R. Dibbley

SITE INFORMATION

Spring Crawford

Site ID	Watercourse / Waterbody	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-06	West Buxton River	04/06/23	17U 477107 5410043
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMEMA23045	—		

SURFACE WATER QUALITY

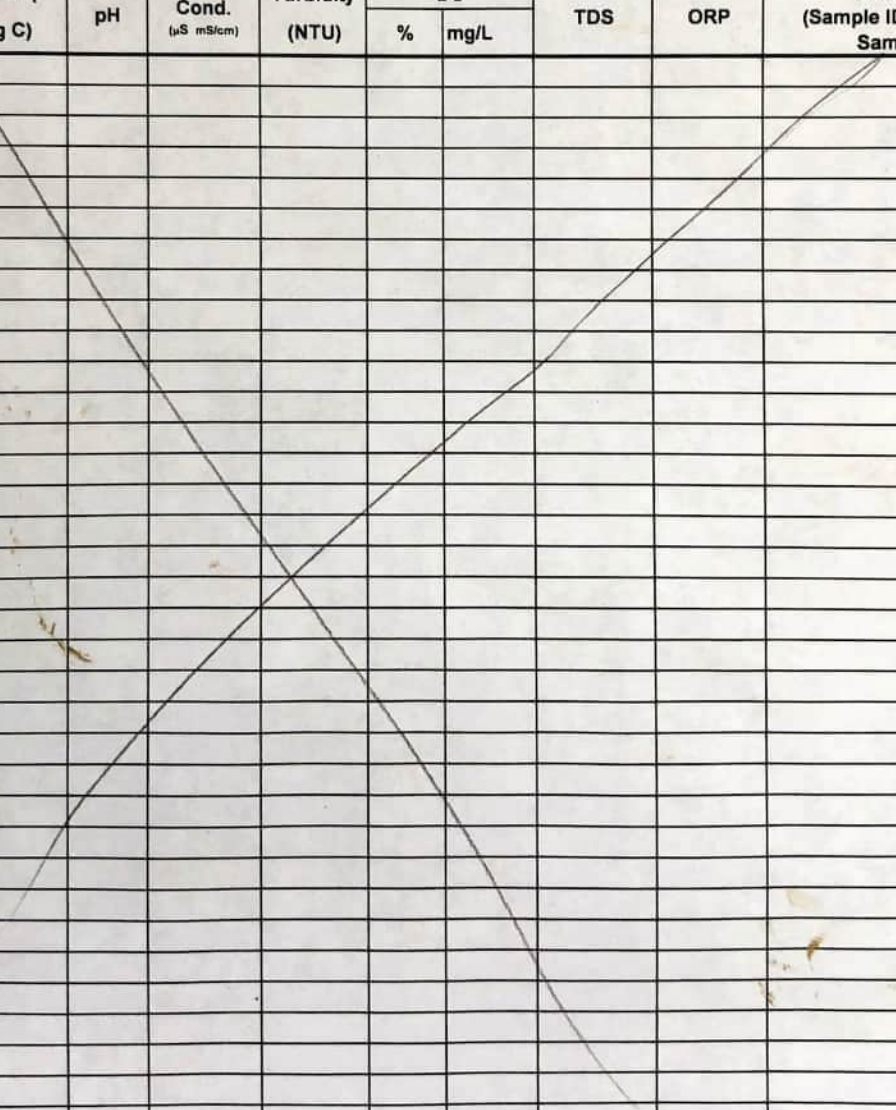
Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-06	15:20	—	RD	04/Jun/23	(□ Same As Above)

Air Temperature:	~~20.5~~	°C	DO:	95.1	%
H2O Temperature:	20.5	°C	DO:	~~9.76~~ 7.66	mg/L
pH:	7.23		TDS:		g/L
Conductivity:	0.075	µS/cm or mS/cm	ORP:	103.4	mV
Depth:		m	Duplicate Taken:		Y / N -

Water Sampling / Quality Comments: 993 NTU

DISCRETE WATER PROFILE SAMPLING

Interval (m)	Depths (m)	SW Temp (deg C)	pH	Cond. (µS mS/cm)	Turbidity (NTU)	DO %	DO mg/L	TDS	ORP	Comments (Sample ID, time, layer Sample ID)



Water Profile / Site Access / Other Comments:

2 transects also done at site

A.S, R.D.

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

Ministry of Transportation

Ontario

WATERCOURSE FIELD COLLECTION FORM

GENERAL INFORMATION			
Project # ONEMA23045	Project Description: Crawford CNC		Date: 31 May 2023
Is Stream Realignment required for this section: ○ Yes ○ No ◉ Unknown			
Collectors: R.D, A.S		Time Started: 10:01	Time Finished: 11:00
Weather Conditions: Sunny			
Air Temp (°C): -29	Water Temp (°C): 6.3	Conductivity (µS/cm): 347	Velocity (m/s): —
Photos Numbers And Descriptions: downloaded on project drive			

LOCATION			
Name of Waterbody: RDAL-06	Drainage System:	Crossing #: —	Station #: RDAL-06
Location Of Crossing: ~2.7km West of Hwy 655			
GPS Coordinates: 17U 469654 5411715		MTO Chainage: N/A	

Ontario

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Township:	MNRF District:
Timmins	South Porcupine, Timmins District

LAND USE AND POLLUTION

Surrounding Land Use:	Sources of Pollution:
coniferous forest, with open boggy grass on both sides of channel ~20-30 m on each side	unknown

EXISTING STRUCTURE TYPE

Bridge	Box Culvert	Open Foot Culvert	CSP	N/A
O	O	O	O	X

Other O (Describe)	Size: (w x h) m^2

SECTION TYPE AND MORPHOLOGY

Section (Reach) Identifier:	Section Location: (Include On Habitat Map)
50m U/S - 200m D/S	No structure -
Associated Wetland	

Stream / River	Channelized	Permanent	Intermittent	Ephemeral
X	O	O	O	O

Total Section (Reach) Length (m):

Sub-Sections:	Run O	Pool O	Riffle O	Flats X	Culvert O	Other O
Percentage of Area:				100 both		
Mean wetted depth (m)				US 0.60 - 1.30 1.0 DS 0.7 - 1.36 1.0		
Mean wetted width (m)				2.4 - 3.5 2.5 DS 2.4 - 3.5 US 3.0		
Mean bankfull depth (m)				DS 1.1 US 1.1		
Mean bankfull width (m)				DS 1.7 US 1.9		

water on banks

U/S = 0 - 20m upstream

D/S = 0 - 50m downstream

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Substrate (type & %)	limited assessment using ruler to make substrate-> feels sandy							
Bedrock (Br)	***Boulder (Bo)***	***Cobble (Co)***	***Gravel (Gr)***	***Sand (Sa)***	***Silt (Si)***	***Clay (Cl)***	***Muck (Mu)***	***Detritus (D)***
limited visibility, too deep, soft to walk in creek								

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Bank	O water on banks khaki coloured grass; minor undercutting	● -> banks vegetated with felt using ruler to	O	O
Right Bank	O feel banks.	● Expected to be stable.	O	O
	Deposition Zone	**Protected Bank**	**Vulnerable Bank**	**Eroding Bank**
Left Bank	O	O	●	O
Right Bank	O based on limited visibility	O	●	O

HABITAT

In-Stream Cover (% surface area):

Undercut banks:	Boulders:	Cobbles:	Organic Debris:	None
<10	O	O	10-25%	O

Vascular Macrophytes:	Woody Debris:
Instream: <5% observed	Instream: None observed
Overhanging: <5%	Overhanging: 0%
	very small wood debris - below the 100mm wide MTO

Shore Cover (% stream shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	●	O

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Vegetation Type:				
Vegetation Type (%)	Submergent:	Floating:	Emergent:	None 0
Predominant Species:	see note	0	0	in deep parts cannot observe bottom

MIGRATORY OBSTRUCTIONS		
Permanent	Seasonal potentially water level in summer	None ✓

POTENTIAL CRITICAL HABITAT		
Spawning	Groundwater	Other ✓

POTENTIAL ENHANCEMENT OPPORTUNITIES

N/A

From Google Earth:

pond ~55 m east/D/S ~ 115 m x 40 m

pond ~180 m D/S ~ 44 m x 9-30 m

OMEMA23245

31 May 2023

RDL-06

Ontario

Ministry of Transportation

ADDITIONAL COMMENTS

Water Quality — in-situ
Temp 16.25°C — no water sample
DO% 112.6
mg/L 1.24
uS/cm 0.042 ms
C 34.7 uS/cm
pH 6.09
ORP 73 mV
ORP -7.32

Additional Notes Appended? ◉ No ○ Yes — Number of Pages

All 3 locations relatively slow moving, silty, weed choked channels ranging from 1.7 to 7.3 m wide mostly ~3 m. Some shallower than locations in wider sections. Flows considered to pond ~55 m DS

0-50 m DS 1.7 to 7.3 m wide, mostly around 3 m wide. Some shallower depths in wider sections

50 m - 200 m DS beaver dam ~180 m DS Channel 0.6 to ~2 m wide shallower between pond + dam ~0.5 to 0.18 m deep

Fish observed. SOME MARSHES

KDL-06

Location _____ Date _____

Project / Client _____

June 7 2023
eDNA + habitat
WBR-BLTU-5
+ WBR-S-07 14:30

17 U 477328
5416353

Water Quality
9.0 °C
92.2 DO %
8.56 DO mg/L
0.082 SPC
72.2 C.
7.59 pH
62.6 ORP
13.05 NTU

Vol filtered: 1.2 L
+ rad sets.

477331 5416351
477384 5416439

Rite in the Rain

Project / Client _____ Date _____

WBR-BLTU-3

17 U 474538
5412486

8 June 2023 15:30

Water Quality ~~Same~~ same as WBR-9-04J

20.0 °C
99.3 DO%
9.03 DO mg/L
0.030 SCP
27.0 C
7.13 pH
69.3 ORP
2.23 NTU

*submitted bottles here

Location _____ Date _____

Project / Client _____

NDR-5-BC water

9 June 2023 9:40 am

10.2 °C
76.5 DO%
7.72 DO mg/L
0.087 SPC mS/cm
72.6 C uS/cm
7.98 pH
6.86 ORP mV

Location GER LK Date June 12/23

Project / Client

10:30

FL MM	TL MM	WG	SPECIES
86	90	7.42	YELLOW PERCH
97	101	10.83	YELLOW PERCH
72	76	4.31	YELLOW PERCH
92	96	8.41	"
94	97	9.60	"
92	96	9.00	"
68	70	1.47	"
99	103	11.02	"
60	63	2.17	"
61	65	2.43	"

+9 Yellow Perch
+2 Crayfish

11:10 MAR LK

+1 LEECH
+1 CRAYFISH

FL MM	TL MM	WG	SPECIES
70	73	3.52	YELLOW PERCH
58	61	2.32	"
97	102	10.64	"
88	92	7.79	"
69	72	3.45	"
54	56	1.87	"
60	63	2.36	"
100	106	13.62	"

Location Date June 12/23

Project / Client

MAR LK CONT'D

FL MM	TL MM	WG	SP
68	71	3.25	YELLOW PERCH
93	98	14.32	"

YELLOW PERCH ~~HH~~ I

GILL NETS

FL MM	TL MM	W LBS	
537	568	0.88 LBS	NORTHERN PIKE
786	831	6.67 LBS	"
176	181	–	YELLOW PERCH
858	872	9.89 LBS	NORTH. PIKE
536	564	1.95 LBS	NORTH PIKE
695	731	–	"
532	568	–	"
250	265	–	"
327	353	–	"
442	473	–	"

Rite in the Rain

80

Location MAR LK Date June 12/23

Project / Client

1415

°C	DO%	DO mg/L	SPC	C	pH	NTU	Depth
16.8	84.1	8.17	0.080	67.4	7.80	-5.60	Surface
15.3	77.2	7.77	0.079	64.3	7.87	-5.99	1m
14.6	63.5	6.40	0.081	64.5	7.74	-6.38	2m
8.8	45.1	5.19	0.098	67.4	8.02	-6.76	3m
6.2	29.8	3.68	0.132	84.6	8.14	-6.41	4m
4.9	18.5	2.30	0.168	103.4	8.20	-5.94	5m
4.3	13.7	1.77	0.178	107.6	8.22	-5.84	6m
3.8	9.9	1.26	0.189	112.4	8.21	-5.56	7m
3.6	6.4	0.83	0.196	115.8	8.20	-5.38	8m
3.5	4.4	0.59	0.199	117.2	8.19	-5.23	9m
3.4	2.3	0.29	0.203	119.2	8.16	-2.46	10m
10.2	50.7	5.73	0.084	59.9	7.78	-6.81	2.5m
6.9	32.1	4.04	0.113	74.1	7.94	-6.57	3.5m

Location Date

Project / Client

Location SUTHERLAND LK

Project / Client YSI

Date JUNE 13/23

11:30

DEPTH	°C	DO%	DO mg/L	SPC	C–
SURFACE	17.4	97.6	9.34	0.207	176.8
1m	16.8	96.0	9.31	0.207	174.8
2m	16.2	93.3	9.16	0.208	172.6
3m	10.1	113.0	12.69	0.286	203.0
4m	6.5	98.2	12.06	0.285	183.7
5m	4.9	41.1	5.24	0.290	178.2
6m	4.3	7.7	1.00	0.291	175.5
7m	3.7	3.2	0.42	0.297	176.2
8m	3.5	2.0	0.26	0.303	178.9
9m	3.6	1.6	0.21	0.306	180.7
10m	3.5	1.5	0.20	0.312	184.2
2.5m	12.4	119.8	12.93	0.277	210.1
3.5m	7.6	102.9	12.29	0.289	192.6

SECCHI down 2.54m

up "

Location

Date

Project / Client

pH	NTU
8.13	-6.57
8.18	-6.69
8.14	-6.70
8.50	-6.64
8.66	-6.34
8.22	-6.29
8.11	-6.57
8.08	-6.50
8.07	-5.11
8.06	-4.58
8.04	-2.15
8.21	-6.98
8.45	-6.96

743049 5401603 JCRK-01-GN3
63.5 cm deep
~2.8 m wide
near LWD
13:45
16:30

97mm mesh 4" 473302 5401568
max 65 cm deep ~~3~~ m wide

④ 25 mm mesh later 2m wide JCRK-01-GN4
60-70 cm deep
17U 473320 5401543

⑤ 38 mm mesh JCRK-01-GN5
0.5m deep 17U 473320 5401440
roots 3m length in water
16:50 LWD



Jacko Creek

No fish

JCRK-01

JCRK-S-01

YSI Taken hand

18.4°C

81.0 DO%

7.60 DO mg/L

0.063 SPC mS/cm

54.8 C ~~uS/cm~~

5.08 pH

177.0 ORP

-6.5 NTU

ITU 4732971

5401493

↳ boulders under bridge
↳ visible undercutting + exposed roots along banks
↳ mixed deciduous/coniferous forest surrounding watercourse
↳ slow flowing, water is tannin coloured.

JCRK-S-03
T8

JCRK-S-03

Water Quality
Taken @ bridge

17U 470617
5399915

18.3°C.
79.4 D%
7.47 DO mg/L
0.148 SCP mS/cm.
128.9 C uS/cm
7.23 pH
138.2 ORP
1.07 NTU



Confirm set #1

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) 25 traps

Project Site / Project Number: JCRK / OMEMA20045

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
Jacko Ck	02/JUN/2023 14:30	02/JUN/23 16:39	

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers Initials	Page: ___ of 2	See Net Form: Y / N
JCRK - 01 - MT1		17U	PRS		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FNSC			53	56	1.50					FNSC = Finescale Dace
1			54	56	1.5				1	1g2 weight
			47	50	1.03					
			58	61	2.15					
			55	57	1.62					
			56	61	1.98					
			59	61	1.64					
			60	64	2.17					
			74	77	4.67					
			59	62	2.30					
BRST			~~54~~	54	1.55					BRST = Brook Stickleback
1			—	46	0.97					
			—	53	1.45					
			—	55	1.34					
			—	606	2.36					
			—	55	1.35					
			—	54	1.36					same length
			—	54	1.33					
			—	50	1.10					
			—	50	1.24					
FHMN			49	53	1.37					
			49	53	1.25					same length
			55	58	1.84					
			58	61	2.09					
			60	65	2.17					
			60	63	2.3					
			63	66	2.73					
			52	55	1.48					
			59	62	2.15					
			55	59	1.97					
NRDC			74	79	3.72					NRDC = Northern Pearl Dace
			78	81	3.57					
			80	85	5.00					
			85	91	5.51					
			59	61	1.74					
			106	112	10.25					
			100	111	10.53					
			69	71	3.21					
			93	100	7.97					
			70	76	3.42					
WHSC			89	93	6.44					WHSC = White Sucker
			96	98	7.86					
			83	88	5.8					
			135	141	10.74					
			120	127	18.26					

Species Box Tally Area / Site Comments:

Total from all pages →

Species	Total Catch	Species	Total Catch
FNDC	483	WHSC	11
BRST	905	NRDC	19
FHMN	164		
NRDC	188		

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) x 25

Project Site / Project Number: OMEMA23045

wood.

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
Jacko Ck	02/JUN/23 14:34	03/JUN/23 16:39	stream

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 2 of 2	See Net Form: Y / N
SCRK-01-MT1					

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NRBD			43	50	1.89					
			50	53	1.32					
			52	56	1.5					
			52	55	1.34					
			49	52	1.53					
			47	50	1.21					
			45	47	0.86					
			50	54	1.21					
			52	55	1.65					
			52	55	1.5					same length
WHSC			111	116	14.4					
			106	112	12.69					
			112	117	13.83					
			117	125	16.02					
			115	121	13.32					
			70	74	3.2					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

18:50 done 115-4 traps

R. Dibblee, A. Stankiewicz Spring Crawford

ELECTROFISHING FORM

Project Site / Project Number: JCRK-S-01 / OMNRAB3045

WSP

Waterbody or Watercourse Name:	Date: (DD / MMM / YY)	Water Temp:	Shocking Method:	Pg: 1 of 1	Run: 1 of 1
Jacks Creek	03/JUN/23	18.4	BP		

UTM Start:	Start Time: (24 hrs)	Stop Time: (24 hrs)	Netters:	Site Area / Description: (Length X Width)
17N 473316 5401518	—	—	AS	
UTM End: 17N 473319 5401442				

Sample ID:	Elapsed Time: (hours)	Effort: (seconds)	Voltage / % Power:	Frequency / Range (high/low):	Pulse:
JCRK-01		1			

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging (Tiss. / Both)	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
FNDC			60	64	2.38					FNDC = Finescale Dace
BRST			[illegible]	41	0.9					BRST = Brook Stickleback
			[illegible]	36	0.63					NRBD = Northern Redbelly Dace
			[illegible]	45	1.0					
			[illegible]	36	0.21					
			[illegible]	39	[illegible]					
			[illegible]	46	0.9					
			[illegible]	37	0.54					
			[illegible]	47	0.80					
			[illegible]	45	0.85					
			[illegible]	45	0.88					
NRBD			58	53	1.39					
FNDC			54	57	1.58					
BRST			[illegible]	56	1.99					
FNDC			48	51	1.24					
included in tally below →										

BRST 9+12+11+9+11=52
FNDC 1+3=4

Species Box Tally Area / Site Comments: Gill nets and Minnow traps on different sheets

Species	Total Catch	Species	Total Catch
BRST	52		
FNDC	4		
NRBD	1		

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

FISHERIES NET CATCH / EFFORT FORM

WSP

SITE DESCRIPTION:

Sample ID	Waterbody Name			Project Code
JCRK-01-GN1	Jacko Ck			OMEMA23-15

Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT) Easting	(LONG) North	Site Type (substr)	Site Type (cover)
		17U	423183	5401691		

Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)
	—	

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

3 m

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
A.S, R.D	02/JUN/23	13:50	—	—	90	—	0.65	—

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
A.S, R.D	02/JUN/23	16:25	1	~28	18.4	—

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	Direction & Speed of Wind (knots / km/hr)	General Weather for Set Duration (duration precip)	General Weather for Set Duration (duration wave)	Duration (fishing hours)
	00	—	—	—	—	

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
NO	FISH					

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments
Net across narrow channel, at wider spot ~3m wide						

WATER QUALITY READING:

Date: 2 June 2023 Time: 16:15

Temperature: (°C)	18.4	DO: (%)	81.0
Cond.: (uS/cm) or (Ms/cm)	54.8	DO: (mg/L)	7.60
Turbidity: (NTU)	~6.51	pH:	5.08
TDS: (g / L)	—	ORP:	177.0
Salinity: (ppm)	—	Depth: (m)	

Comments: 5 gill net sets
backpack electrofishing
minnow traps

See Bio Sheet Data (Y / N)

QA/QC By:

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year

FISHERIES NET CATCH / EFFORT FORM

WSP

SITE DESCRIPTION:

Sample ID	Waterbody Name			Project Code	
JCRK-01-GN2	Jacko Creek			OMEMA2304	
Gear Type (Gillnet, Trapnet, Fyke Trap, Seine net, Fish Fence)	Mesh Size(s) (mm/in)	Coordinates (UTM NAD 83) (UTM Zone)	(LAT) Easting	(LONG) Northing	Site Type (substr)	(cover)
		17U	473249	5401603		
Trap/Hoop Size (m)	Net/Leader length (m)	Substrate Composition and Cover Types (list all substrate types in area of net)				
—	—					

Site Type - Substrate Codes:
1 = gravel/pebble/sand mix (GP + SA > 75%)
2 = boulder/rubble/cobble mix (BO + RC > 75%)
3 = sand (SA > 75%)
4 = soft mix (SI + MU + DE + soft CL > 75%)
5 = bedrock (BR > 75%)
6 = other (any other combination)

Substrate Acronyms:
BR = bedrock
BO = boulder
RC = rubble/cobble
GP = gravel/pebble
SA = sand SI = silt
CL = clay MU = muck
DE = detritus
MA = marl

Site Type - Cover Codes:
1 = no cover
2 = low (1 - 25%)
3 = moderate (25 - 75%)
4 = high (> 75%)

Cover Acronyms:
BO = boulders
MA = macrophytes
LT = log/tree
OT = other
NC = no cover

SET DESCRIPTION: (recorded at time of set to ensure compliance with NSCIN standards)

Field Crew	Set Date (dd/mmm/yy)	Set Time (24hr)	Net Length (1 - 60 m)	Dist. Off Shore (0 - 40 m)	Angle to Shore (0° - 90°)	Min Depth (m)	Mid Depth (m)	Max Depth (m)
A.S. R.D.	02/JUN/23	1355	—	—	90	—	0.64	—

LIFT DATA: (recorded at time of lift)

Note: a knot equals one "nautical mile" per hour or 1.9 km/hr (1.2 mph)

Field Crew	Lift Date (dd/mmm/yy)	Lift Time (24hr)	Effort Status (codes 1 - 3)	Air Temp. (°C)	Water Temp. (°C)	Wave Height (codes 1 - 5)
	02/JUN/23	1630	1	~28	18.4	—

Cloud Cover (%)	Precipitation (codes 00 - 95)	Direction & Speed of Wind (N,S,E,W)	Direction & Speed of Wind (knots / km/hr)	General Weather for Set Duration (duration precip)	General Weather for Set Duration (duration wave)	Duration (fishing hours)
	00	—	—	—	—	

Effort Status Codes:
1 = no problem
2 = minor problem, likely OK
3 = major problem, affected catch

Wave Height Codes:
1 = < 0.3 m (< 1 ft.)
2 = 0.3 - 0.6 m (1 - 2 ft.)
3 = 0.6 - 0.9 m (2 - 3 ft.)
4 = 0.9 - 1.2 m (3 - 4 ft.)
5 = > 1.2 m (> 4 ft.)

Precipitation Codes (at lift):
00 = no precipitation at lift time
10 = mist
40 = fog
51 = light drizzle
55 = heavy drizzle
61 = light rain
65 = heavy rain
71 = light snow
75 = heavy snow
80 = light rain shower
85 = heavy rain shower
95 = thunder storm

Duration Precipitation Codes:
1 = no precipitation during set
2 = < 4 hours of precipitation
3 = > 4 hours of precipitation
4 = constant precipitation

Duration Wave Codes (calm <0.3m):
1 = calm for entire set duration
2 = mostly calm & some rough
3 = mostly rough & some calm
4 = rough for entire set duration

FISH CATCH SUMMARY:

Species	Species Code	Total Catch	Length-tallied	Bio-sampled	Struct. Taken	Comments
NO FISH						

Species	Fish #	Fork Length	Total Length	Weight (g / kg)	Aging Struct.	Comments
Net across creek ~2.8 m wide						
near large woody debris						

Age Structures Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
YOY - Young Of the Year

WATER QUALITY READING: Date: _____ Time: _____

Temperature: (°C)		**DO:** (%)	
Cond.: (µS/cm) or (Ms/cm)		**DO:** (mg/L)	
Turbidity: (NTU)		**pH:**	
TDS: (g / L)		**ORP:**	
Salinity: (ppm)		**Depth:** (m)	

Comments:

See Bio Sheet Data (Y / N)

QA/QC By:

OMEMA23045

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of 1

Date (yyyy-mm-dd): 2023-06-02

Stream Name: Jock Creek

Stream Code: JCRK-S

Site Code: 01

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☑ No

Obstructions to Flow *(Check all applicable types)*
☒ None Present ☐ Armouring ☐ Trampled Banks ☐ Inlets ☐ Wood Deflectors ☐ Other ☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☑	☑
Bank Material	☑	☑
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): >20.m
Right Entrenchment Width (m): >20.m
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 2.08
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	2.64	1189	☐ Yes ☐ No
Right BFD	5.0	0125	
Max. Chann. Depth	.		
Left Active Chann.	2.82	0275	
Right Active Chann.	4.9	0288	

low spot on hummocky bank

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.5	2188	0			.
02	1.0	2200	0			.
03	1.5	1893	0			.
04	2.0	2089	0			.
05	2.5	2112	0			.
06	2.66	1553	0			.
07	2.82	2175	0035			.
08	2.95	6500	0423			.
09	3.1	6110	0388			.
10	3.5	5557	0325			.
11	4.0	5564	0345			.
12	4.5	5531	0301			.
13	4.8	3118	0081			.
14	4.9	2888	0055			.
15	5.0	1125	0			.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

*LB
waterledge
shrubs & RB

Comments:
hummocky wetland. minor
substrate: sand/gravel/muck/silt
UTM: 10 473309 5401502

Crew Leader (init. & last name): A STANKIEWICZ

Crew	Recorder	Ent/Scanned	Verified	Corrected
RD AS	RD			

sub strate - sandy, some muck, small wood debris. Fish observed

Jocko 1 T2 cross-section of channel

OMEMA23045

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields In Grey Must be filled out for processing

Stream Code: JCRK-L | Site Code: C1 | Sample: | Date (yyyy-mm-dd): 2023-06-02 | Transect No.: 02 of 03 | Page No.: 01 01

Channel Profile Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)	Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.3	171											
03	0.5	173											
LB 02	0.55	183											
04	0.58	320	65										
05	0.8	546	305										
06	1.0	569	321										
this is correct 07	1.5	501	262										
08	2.0	540	302										
09	2.4	580	344										
10	2.5	246	190										
RB 11	2.79	240	0										

Comments

RB higher than LB, could not get it straight when tape was on RB

ITU 473301 5401502

A. Stankiewicz crew leader

R. Dibbley recorder

OMEMA23845

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 1

Stream Name: Jacko Creek 1

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2013-06-02

Stream Code: JCRK

Site Code: 01

Sample: T3

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others

Indicators Used to Locate Bankfull Level	Left Bank	Right Bank
Inflection Point	☑	☑
Bank Material	☑	☑
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): <20 m
Right Entrenchment Width (m): <20 m
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 2.59
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD		
Right BFD		
Max. Chann. Depth		
Left Active Chann.	0.96	0375
Right Active Chann.	3.55	0451

Ht. Represents Bankfull? ☐ Yes ☐ No

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Observ.						
	0.06	0	0			
	0.96	375	140			
	1.3	376	195			
	1.8	376	239			
	2.3	401	270			
	2.6	420	286			
	3.1	399	254			

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	3.5	451	291			
WE	3.55	451	280			
	3.8	172	0			
	4.03	95	0			

Comments
* See water quality on back
Same as T1 + T2
RB is at a low spot in hummock
LB is 1cm higher and 9cm back from WE.

Crew Leader (init. & last name): R DIBBLEY

Crew	Recorder	Ent/Scanned	Verified	Corrected
AS/RD	AS			

<10% shade, minor aquatic vegetation, submergent <10% of channel

cross-section, not bankfull profile

OMEM A23045

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of 1

Stream Name: JOCKO CREEK

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-08

Stream Code: JCRK

Site Code: S-03

Sample: T1

Record only on the 1st transect.
Site Length (m): 071.0
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
- ☒ None Present
- ☐ Armouring
- ☐ Trampled Banks
- ☐ Inlets
- ☐ Wood Deflectors
- ☐ Other
- ☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 06.9
Point Spacing (m):

17 U 470594 5399909

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	5.0	1636	
Left Active Chann.	1.31	0993	
Right Active Chann.	8.2	0727	

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	1.05	0	0			.
	1.31	993	272			.
	1.37	1096	375			.
	1.5	1146	428			.
	2.2	1419	717			.
	3.0	1513	911			.
	4.0	1631	952			.
	5.0	1636	963			.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	6.0	1505	829			.
	6.6	1459	776			.
	7.0	1299	609			.
	7.6	1178	469			.
	8.0	930	235			.
	8.2	727	2			.
	8.5	576	0			.
	8.7	318	0			.
	9.1	100	0			.
	.					.
	.					.
	.					.

* WE water's edge

* WE

* veg starts

Comments: See notes about watercourse on back
RB is back 2.1m + up 562mm
LB is back
Substrate: lots of large woody debris, some silt, gravel + clay. started on left bank

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
R.D, A.S	A.S			

OMEMA23045

channel cross-section, not bankfull

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of 1

Stream Name: JERK CREEK

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-02

Stream Code: JERK

Site Code: S-03

Sample: T2

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow (Check all applicable types)
☒ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level	Left Bank	Right Bank
Inflection Point	☑	☑
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 8.1
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.	01.58	0877	
Right Active Chann.	09.7	0887	

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.3	0763	0			
	1.2	0547	0			
	1.58	0877	0002			
	1.8	0948	80			
	2.0	1081	218			
	2.4	1251	357			
	3.1	1541	704			
	4.0	1635	816			
	5.0	1764	950			
	6.0	1833	1019			
	7.0	1815	989			
	8.0	1704	882			
	8.41	1648	804			
	8.75	1421	571			
	9.0	1307	444			
	9.5	951	72			
	9.7	887	10			
	9.87	774	0			
	10.1	640	0			
	10.28	463	0			

10.43 10.28

*WE = water's edge

*RB beginning of boulder

Comments: *See Water quality on back
At bridge upstream side, started on left bank due to width difference & 9cm & sag in middle undercut at 10.1 → 10.28m.

Crew Leader (init. & last name):

Crew: AS/RD | Recorder: A.S | Ent/Scanned | Verified | Corrected

17U 476620 5399917

OMENA23045

Bankfull Profile and Transect Discharge

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 1

Stream Name: JOCKO CREEK

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-03

Stream Code: JCRK-

Site Code: 503

Sample: T3

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
- ☒ None Present
- ☐ Armouring
- ☐ Trampled Banks
- ☐ Inlets
- ☐ Wood Deflectors
- ☐ Other
- ☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☒	☒
Bank Material	☒	☒
Top of Point Bar	☐	☐
Vegetation	☒	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 65.8
Right Entrenchment Width (m): 720 M
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 6.73
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	0.5	80	☐ Yes ☐ No
Right BFD	9.64		
Max. Chann. Depth	4.28	1481	
Left Active Chann.	1.27	0895	
Right Active Chann.	8.0	0815	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
01	0.5	0880				
02	0.9	0865				
03	1.2	0773				
04	1.27	0895	0040			
05	1.8	1106	0266			
06	2.0	1119	0277			
07	3.0	1348	0527			
08	4.0	1449	0616			
09	5.0	1456	0615			
10	5.9	1147	0313			
11	7.0	1129	0280			
12	7.5	1135	0180			
13	8.0	0815	0000			
14	8.33	0734				
15	8.68	0265				
16	8.77	0190				

substrate higher

Comments:
RB higher 64.5 mm, back 87 cm
HWM
started on left bank 17U 470665 5529899
~~4.28 2481 4.28~~

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
A.S R.D	R.D			

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields in Grey Must be filled out for processing

Stream Code: WBR | Site Code: 5-06 | Sample: | Date (yyyy-mm-dd): 2023-06-04 | Transect No.: 3 of 3 | Page No.: 2 of 2

Channel Profile

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
[illegible]	15.45	894	0			.
	16.0	693	0			.
RB	17.0	261	0			.
	17.34	99	0			.
	.					.
	.					.
	.					.

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

Bankfull Profile and Transect Discharge

Mandatory Fields in Grey Must be filled out for processing

Transect No.: 3 of 3 | Page No.: 1 of 2

Stream Name: West Buskegaw River

Discharge Approximates Baseflow: yes ☐ no ☐

Stream Code: WBR-5

Site Code: 06

Sample:

Date (yyyy-mm-dd): 2023-06-04

Discharge Approximates Baseflow? ☐ Yes ☑ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): 2.5
Right Entrenchment Width (m): 3.0
Total Entrenchment Width (m): 5.5

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): . | Point Spacing (m): .

Record only on the 1st transect.
Site Length (m): .
Transect Spacing (m): .

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?	Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m): Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
Left BFD	.		☐ Yes ☐ No				
Right BFD	.						
Max. Chann. Depth	.						
Left Active Chann.	.						.
Right Active Chann.	.						.
LB Observ.	0.8	220		0			.
	0.9	313		0			.
	1.0	806		0			.
	1.32	978		0			.
	1.8	1092		0			.
WET	1.93	1098		2			.
	2.3	1204		129			.
	3.6	1260		232			.

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	4.0	1240	221			.
	5.0	1202	244			.
	6.0	1201	294			.
	7.0	1337	355			.
	8.0	1303	336			.
	9.0	1314	334			.
	10.0	1328	339			.
	11.0	1347	349			.
	12.0	1319	302			.
	13.0	1298	248			.
WET	14.0	1102	9			.
	15.0	948	0			.

Comments: wind shaking tape -> discrepancies of 0-10mm. coords are same as water

Crew Leader (init. & last name):

Crew: AB RD | Recorder | Ent/Scanned | Verified | Corrected

Diagnostic Indicators of Channel Stability: Additional Observations

Mandatory Fields in Grey Must be filled out for processing

Stream Code: WBR | Site Code: S-06 | Sample: | Date (yyyy-mm-dd): 2023-06-04 | Transect No.: 2 of 2 | Page No.: 2 of 2

Channel Profile

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	16.0	617	0			.
	16.7	365	0			.
	17.0	295	0			.
RB	17.1	287	0			.
	.					.

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	.					.
	.					.
	.					.
	.					.
	.					.

Bankfull Profile and Transect Discharge

1 2

Transect No.: 1 & 2 of 2 | Page No.: 1 of 2

Mandatory Fields in Grey Must be filled out for processing

Stream Name: WEST BUSKEGAU RIVER

Discharge Approximates Baseflow: yes ☐ no ☐

Date (yyyy-mm-dd): 2023-06-04

Stream Code: WBR-

Site Code: S-06

Sample:

Record only on the 1st transect.

Site Length (m): .

Transect Spacing (m): .

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): .

Right Entrenchment Width (m): .

Total Entrenchment Width (m): .

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): .

Point Spacing (m): .

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
LB	0.7	714	0			.
	0.95	734	0			.
	1.3	869	0			.
	1.61	920	0			.
	1.87	1082	0			.
WE	1.95	1134	2			.
	2.58	1471	363			.
	3.0	1503	404			.

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	4.0	1514	438			.
	5.0	1479	408			.
	6.0	1437	366			.
	7.0	1475	422			.
	8.0	1403	338			.
	9.0	1461	395			.
	10.0	1448	386			.
	11.0	1356	268			.
	12.0	1257	143			.
WE	12.96	1174	13			.
	14.0	1003	0			.
	15.0	837	0			.

Comments: Coords 17 U 477097 5410013.

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected

eDNA
WBR-BLTU-01
13:14

WBR-BLTU-02
13:45

WBR-S-06
Habitat
- mid-sized river, very shallow
- tape grass
- arrowhead
- yellow pond lily
- sandy gravel substrate
- mussels
- low flow
- banks - alder, grasses, rushes, swamp milkweed lots of
- woody debris, interrupting flow, fallen logs
- some boulders
- left bank - deep cut
- right bank gradual
- mature conifers upland
- tea stained water

Rite in the Rain

Location

Project / Client Crawford

Date 16 Jul 23

MatR-02

Habitat

- large river - flow dependent on dams (low today)
- pondweed sp. > floating + emergent macrophytes
- arrowhead
- horsetail
- rushes
- banks lined w/ rushes, sedges, grasses willow sp., dogwood
- slightly turbid
- low woody debris
- upland dominated by birch, poplar, some conifer
- moderately entrenched banks
- species - walleye, pike, perch, sturgeon, trout (local knowledge)
- rocky substrate w/ clay (sharp operator)
- dead white sucker observed in water

Location

Date

Project / Client

Depth Profile:

Width (m)	Depth (m)	
0	0	
~~0~~	0.8	
5	1.8	*width increments were estimated (did not have long enough tape)
10	2.5	
15	2.9	
20	2.8	
25	3.4	
30	3.5	
35	3.2	
40	2.9	
45	3.35	~~to confirm w/ Google Earth~~
50	3.5	
55	2.9	
60	2.5	-84m on AD GPS
65	1.8	
70	0.6	
75	0	
80		

Stand @ left bank

Rita in the Rain

Location _____ Date _____

Project / Client _____

MatR-01

Habitat

- horsetail dominat riparian zone, some arrowhead
- cedar dominat upland
- clay, silt substrate w/ some boulders
- unstable banks
- little macrophyte growth
- left bank shoeline boulder dominat just downstream of riffle
- right riparian zone sedges, fern, veteh

Location _____ Date _____

Project / Client _____

Depth Profile

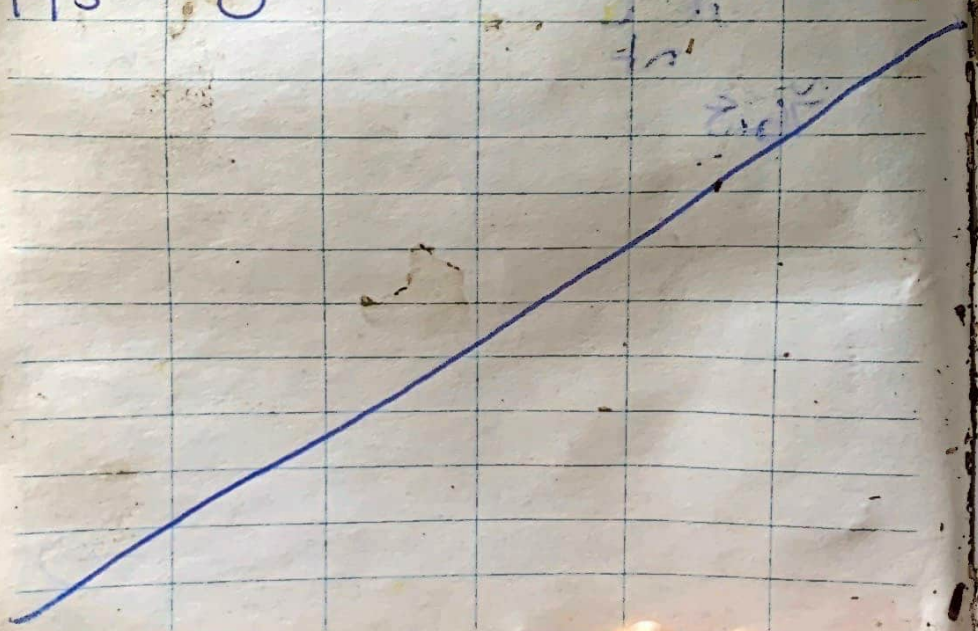
Width (m)	Depth (m)	
0	0	started at left bank
5	0.7	
10	0.75	
15	0.95	
20	0.9	width estimated
25	1.2	
30	1.4	
35	1.4	actual depth = 1.73m (AD GPS)
40	1.3	
45	1.25	
50	1.35	
55	1.3	
60	1.3	
65	1.15	
70	1.2	
75	1.1	
80	1.1	
85	1.0	
90	0.9	
95	1.15	
100	0.95	
105	0.85	

Rite in the Rain

Location _____ Date _____

Project / Client _____

110	0.75
115	0.65
120	0.65
125	0.55
130	0.5
135	0.55
140	0.6
145	0.8
150	0.7
155	1.2
160	0.9
165	0.9
170	0.6
175	0



Location _____ Date _____

Project / Client _____

RDAL-02

- floodplain, no active channel
- floodplain dominated by grasses, rushes
- some woody debris + snags
- upland area dominated by alder + conifer

SW: 17:12 AD GPS

17.7 °C

45.3 DO %

4.28 DO mg/L

0.199 SPC mS/cm

0.171 C mS/cm

6.77 pH

76.5 ORP

Crawford Summer Program

- 14/07/23 KW/MB
- warm/hot (20-25C), partly cloudy, ~~light~~ S wind (15-10km/hr)

WBR-P-04

- MTs set at 10:45
  - 20 traps
- WQ @1:00

21.9 °C	0.036 SPC
76.4 DO%	34.3 C
6.51 DO mg/L	5.41 pH

- large wetland with open water center, 0.5-1m throughout with highly organic bottom, two beaver houses u.s. BK from trail, abundance of sub and emergent veg with sedges, bullrushes, grasses, cat, green and leopard frogs observed, forest upland trans. trees from willows/alder into black spruce and tamarack dominated system with balsam fir, poplar (trembling aspen).

- WBR-S-04
- WQ @ 11:45

19.8 °C 0.078 SPC
88.0 DO% 70.0 C
7.70 DO mg/L 6.52 pH

15/07/23 KW/MB
- overcast, humid, hot (~25), little wind

KC-BCTC-ALT UP 12:50
(Alt. upstream)

20.4 °C 0.364 SPC
79.1 DO% 333.1 C
6.85 DO mg/L 7.02 pH

16/07/23 KW/MB
- similar conditions to 15/07/23

Prosser Lakes:
- eDNA samples collected between 10-11

21.8 °C 0.101 SPC
83.2 DO% 94.8 C
7.01 DO mg/L 7.20 pH

Scale: 1 square = _____

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)

Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-06	14:40		CM/AD	15/07/23	AD GPS (□ Same as above)

Air Temperature:		°C	DO:	84.7	%
H2O Temperature:	20.3	°C	DO:	7.73	mg/L
pH:	7.13		TDS:		g/L
SPC Conductivity:	0.080	µS/cm or mS/cm	ORP:	126.9	mV
Sample Depth:	0.1	m	Duplicate Taken:		

Comments:
C=0.075 mS/cm

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion upper, lighter water layer
Thermocline middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

WATER PROFILE & SAMPLING FORM

WSP

SITE INFORMATION

Site ID	Watercourse / Waterbody	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	

SURFACE WATER QUALITY

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.) (□ Same As Above)
WBR-5-07	16:00	Client sample	CM/MB	17/07/23	CU GPS 1207

Air Temperature:		°C	DO:	86.0	%
H2O Temperature:	21.8	°C	DO:	7.81	mg/L
pH:	6.59		TDS:		g/L
Conductivity:	41.2	µS/cm or mS/cm	ORP:		mV
Depth:	0.1	m	Duplicate Taken:		Y / N

Water Sampling / Quality Comments:
0.086 SPC mS/cm

DISCRETE WATER PROFILE SAMPLING

Interval (m)	Depths (m)	SW Temp (deg C)	pH	Cond. (µS mS/cm)	Turbidity (NTU)	DO %	DO mg/L	TDS	ORP	Comments (Sample ID, time, layer Sample ID)

WATER PROFILE & SAMPLING FORM

wsp

SITE INFORMATION

Site ID	Watercourse / Waterbody	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	

SURFACE WATER QUALITY

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR-S-04	15:00		CH/BB	17/07/23	MU 476572, 5412713 ☐ Same As Above

Air Temperature:	~~26.5~~	°C	DO:	96.2	%
H2O Temperature:	20.8	°C	DO:	8.00	mg/L
pH:	6.37		TDS:		g/L
Conductivity:	75.0	(µS/cm) or mS/cm	ORP:		mV
Depth:		m	Duplicate Taken:	(Y) / N -	

Water Sampling / Quality Comments:
DUP taken 0.081 SPC mS/cm

DISCRETE WATER PROFILE SAMPLING

Interval (m)	Depths (m)	SW Temp (deg C)	pH	Cond. (µS mS/cm)	Turbidity (NTU)	DO %	DO mg/L	TDS	ORP	Comments (Sample ID, time, layer Sample ID)

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine)

Project Site / Project Number: OMEMA23045

WSP

Waterbody or Watercourse Name: Gerry Lake

Start Date: (DD/MMM/YY) / Time: (24HR) 11-Jul-23 16:30

End Date: (DD / MMM / YY) / Time (24HR)

Area Description: (Habitat Type / Site Features)

Sample ID: MDR-GerLk

Method Effort: (Traps/Nets/Dips) 22

UTM Coordinates: (mN, mE, Zone, Acc.) various MD · GPS

Samplers In. MD / CM

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Y. Perch	1		90	97	8.30	N	N	N		lots of black spot
	2		110	116	15.89					"
	3		100	105	11.56					
	4		90	96	7.13					
	5		69	73	3.86					lots of black spot
	6		68	72	3.05					
	7		70	74	3.67					
	8		73	76	3.23					
	9		70	74	3.86					lots of black spot
	10		75	80	4.50					" "

Species Box Tally Area / Site Comments:

HH 1 + 103 YP

1 Iowa Darter

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / (Gillnet) / Seine)

Project Site / Project Number:

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR)	Area Description: (Habitat Type / Site Features)
Gerry Lake	11/07/23	12/07/23 / 14:20	

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: 1 of 1	See Net Form: Y / N
NDP-GoLK-GN1-5	5	Adew GPS	CM/AD		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NP	1		370	396	310					GN 4
1	2		379	405	370					
NO CATCH										GN3
NP	1		485	515	740					GN5 mort
NO CATCH										GN2
NO CATCH										GN1

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine)

Project Site / Project Number:

WSP

Waterbody or Watercourse Name: Sutherland Lake

Start Date: (DD/MMM/YY) / Time: (24HR)

End Date: (DD / MMM / YY) / Time (24HR): 13/07/23 17:00

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-SutLKGN15

Method Effort: (Traps/Rods/Dips)

UTM Coordinates: (mN, mE, Zone, Acc.) AD GPS

Samplers In: CM/AD

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g) kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NO CATCH										GN4
"										GN3
N. Pike	1		620	666	1700					GN2 mort
N. Pike	1		650	689	2000					GN5 mort
"	2		710	759	2780					" mort
"	3		658	691	2050					" mort
Y. Perch	4		222	231	150					" mort
N Pike	5		665	721	2170					
NO CATCH										GN1

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine) 5

Project Site / Project Number: QMEMA 23045

WSP

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / Time: (24HR) 13-Jul/23 11:00

End Date: (DD / MMM / YY) / Time (24HR) 13-Jul-23 15:00

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-DVS LK GN1-5

Method Effort: (Hrs/Mins/Days) 5

UTM Coordinates: (mN, mE, Zone, Acc.)

Samplers In. AD/CM

Page: _____ of _____

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NO CATCH										GN 1
NO CATCH										GN 2
NO CATCH										GN 3
NO CATCH										GN 4
NO CATCH										GN 5

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine)

Project Site / Project Number: WSP

Waterbody or Watercourse Name: Sutherland Lake

Start Date: (DD/MMM/YY) / Time: (24HR) 13/07/23

End Date: (DD / MMM / YY) / Time (24HR) 14/07/23

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-SUTLK-MT1

Method Effort: (Traps/Rods/Dips) 20

UTM Coordinates: (mN, mE, Zone, Acc.) AD GPS

Samplers In. CM/AD

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g) / kg	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Y. Perch	1		104	110	11.88	–	–	–		
BSB	2		–	62	1.64					
Iowa Darter	3		–	55	1.44					
BSB	4		–	52	1.00					
BSB	5		–	52	1.05					
Golden Shiner	6		46	50	1.00					
Blacknose Shiner	7		54	60	1.43					
Golden Shiner	8		47	50	1.05					
	9		50	54	1.37					
	10		46	50	1.11					
I. Darter	11		–	54	1.24					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine)

Project Site / Project Number: WSP

Waterbody or Watercourse Name: DavisLake

Start Date: (DD/MMM/YY) / Time: (24HR) 13/07/23 / 11:00

End Date: (DD / MMM / YY) / Time (24HR) 14/07/23 / 12:00

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-DSLK-MT1

Method Effort: (Traps/Rods/Dips) 20

UTM Coordinates: (mN, mE, Zone, Acc.) ADGPS

Samplers In. CM/AD

Page: 1 of 1

See Net Form: Y/N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
Y.Perch	1		113	120	13.23	–	–	–		
	2		79	82	4.44					
Finescale	3		76	80	5.26					
	4		65	70	3.16					
	5		74	79	4.26					
BSB	6		–	49	0.88					
	7		–	46	0.89					
FSD	8		62	67	3.25					
BSB	9		~~72~~	42	0.81					
YP	10		87	92	5.65					
FSD	11		60	64	2.34					
BSB	12		-	58	1.43					
FSD	13		57	60	2.65					
Iowa Darter	14		–	70	2.67					
FSD	15		61	67	3.08					
	16		64	67	3.21					
ID	17		–	56	1.09					
BSB	18		–	48	1.24					
ID	19		–	52	0.95					
BSB	20		-	46	0.85					
ID	21		–	53	1.18					
ID	22		–	52	1.21					
YP	23		104	109	9.05					
FSD	24		46	50	1.00					
ID	25		~~55~~	55	1.06					
ID	26		–	61	1.29					
BSB	27		–	44	0.86					
ID	28		-	51	1.12					
ID	29		–	53	1.17					
ID	30		–	66	2.00					

Species Box Tally Area / Site Comments:

ID 1111

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)

Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
RDAL-06	11:20	0	CMMB	17/07/23	HU 469688, 5411706 (□ Same as above)

Air Temperature:		°C	25.9 DO:		%
H2O Temperature:	17.9	°C	2.24 DO:		mg/L
pH:	4.96		TDS:		g/L
Conductivity:	36.2	µS/cm or mS/cm	ORP:		mV
Sample Depth:	0.1	m	Duplicate Taken:		

Comments:
0.042 SPC mS/cm

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-DvSLK		13/Jul/2023	
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMSMA 2045			

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	15:00	–	AD/CM		(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments: Secchi depth 6.5m

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L	SPC mS/cm	S mS/cm	pH	Depth (m)	SW Temp (deg C)	DO %	DO mg/L	SPC mS/cm	S mS/cm	pH
0	23.4	107.8	9.28	0.226	0.219	8.46	15	4.0	–	–	0.4	0.239	7.25
1	21.9	106.9	9.48	0.226	0.212	8.47	16	4.0	–	–	0.402	0.241	7.24
2	21.5	103.1	9.24	0.225	0.210	8.43	17	4.0	–	–	0.404	0.242	7.22
3	18.3	123.8?	11.87?	0.209	0.237	8.19	18	4.0	–	–	0.407	0.244	7.23
4	13.3	–	–	0.221	0.219	8.38	19	4.0	–	–	0.408	0.244	7.22
5	10.3	–	–	0.220	0.208	8.29	20	4.0	–	–	0.409	0.245	7.23
6	7.9	–	–	0.320	0.203	8.10	21	4.0	–	–	0.409	0.245	7.22
7	6.5	–	–	0.312	0.201	7.70	22	4.0	–	–	0.409	0.245	7.22
8	4.7	–	–	0.317	0.213	7.58	–	End of	YSI	cord			
9	4.2	–	–	0.318	0.228	7.36							
10	4.1	–	–	0.320	0.234	7.33							
11	4.0	–	–	0.320	0.234	7.29							
12	4.0	–	–	0.320	0.237	7.26							
13	4.0	–	–	0.318	0.238	7.26							
14	4.0	–	–	0.319	0.239	7.25							

DO probe likely malfunctioning - no more DO data, Readings varied from 1307.-0.0; 7.00

Comments: DO probe recalibrated w/ similar result

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID	NDR-DvSLK	Sample ID	NDR-DvSLK	Sample ID	NDR-DvSLK
Sample Location	Davis Lake	Sample Location	Davis Lake	Sample Location	Davis Lake
Total Water Depth	21 m	Total Water Depth	21 m	Total Water Depth	21 m
No. Tows Required	1	No. Tows Required	1	No. Tows Required	5
Sample Date	13 Jul 23	Sample Date	13 Jul 23	Sample Date	13 Jul 23
Sample Time	14:30	Sample Time	14:45	Sample Time	1500
Vertical Tow Length	21 m	Vertical Tow Length	21 m	Vertical Tow Length	21 m
No. Containers	1	No. Containers	1	No. Containers	1
Comments	Isotope	Comments	Taxonomy	Comments	Metals

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date):

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-SutLk	Sutherland Lake	14/07/23	ADGPS

Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments: Secchi depth 2.75

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO * %	DO * mg/L	C mS/cm	pH	Depth (m)	SW Temp (deg C)	DO %	DO mg/L		
0.1	22.8	92.3	7.97	0.207	8.10						
1	22.5	96	8.35	0.205	8.06						
2	20.9	91.6	8.30	0.200	7.99						
3	12.6	126.8	13.54	0.211	7.97						
4	7.4	–	–	0.187	7.69						
5	5.4	–	–	0.178	7.45						
6	4.9	–	–	0.183	7.34						
6.5	4.9	–	–	0.185	7.30						

Comments: 6.5 m depth * DO reading incorrectly, despite calibration

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID	NDR-SutLk-TZ	Sample ID	NDR-SutLk-MZ	Sample ID	NDR-SutLk-IZ
Sample Location	Sutherland Lake	Sample Location	Sutherland Lake	Sample Location	Sutherland Lake
Total Water Depth	6.5 m	Total Water Depth	6.5 m	Total Water Depth	6.5 m
No. Tows Required	2	No. Tows Required	5	No. Tows Required	2
Sample Date	14-07-23	Sample Date	14-Jul-23	Sample Date	14-Jul-23
Sample Time	14:30	Sample Time	14:30	Sample Time	14:30
Vertical Tow Length	6.0 m	Vertical Tow Length	6.0 m	Vertical Tow Length	6.0 m
No. Containers	1	No. Containers	1	No. Containers	1
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date): _____

WATER PROFILE & SAMPLING FORM

WSP

SITE INFORMATION

Site ID	Watercourse / Waterbody	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
NDR-GeLK		12/07/23	Adam GPS
Project Number	**Photo Number's**	**Weather Description (wind, precipitation/duration, cloud cover):**	
		partially sunny	

SURFACE WATER QUALITY

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	13:00		CM/AD		(□ Same As Above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Depth:		m	Duplicate Taken:		Y / N -

Water Sampling / Quality Comments:

DISCRETE WATER PROFILE SAMPLING

Interval (m)	Depths (m)	SW Temp (deg C)	pH	Cond. (µS mS/cm)	Turbidity (NTU)	DO %	DO mg/L	TDS	ORP	Comments (Sample ID, time, layer Sample ID)
	0.1	21.2	8.13	0.204	-	80	7.27	-	182.3	
1	1	20.1	8.09	0.198	-	76.1	6.99	-	167.7	
1	2	14.3	7.29	0.171	-	29.1	3.02	-	161.6	
1	3	7.7	7.31	0.209	-	7.6	0.93	-	163.2	
1	4	5.2	7.38	0.227	-	4.3	0.55	-	58.4	
1	5	4.1	7.41	0.397	-	2.3	0.28	-	17.2	
1	6	3.9	7.44	0.256	-	1.6	0.21	-	-16.8	
1	7	3.8	7.49	0.274	-	1.2	0.15	-	-35.7	
1	8	3.8	7.49	0.479	-	1.2	0.15	-	-51.6	
1	9	3.8	7.50	0.486	-	0.9	0.12	-	-63.6	
1	10	3.8	7.50	0.491	-	0.8	0.11	-	-66.4	
1	11	3.8	7.49	0.491	-	0.8	0.11	-	-67	
1	12	3.8	7.48	0.292	-	0.8	0.11	-	-69.5	
1	13	3.8	7.50	0.292	-	0.7	0.10	-	-73.5	
1	14	3.8	7.50	0.291	-	0.7	0.10	-	-75.2	
1	15	3.8	7.49	0.291	-	0.4	0.12	-	-77.5	
1	16	3.8	7.47	0.291	-	1.0	0.14	-	-80.4	
1	17	3.8	7.47	0.291	-	1.2	0.16	-	-82.4	

Water Profile / Site Access / Other Comments:

Epilimnion upper, lighter water layer
Thermocline middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion lower, heavy, cool water layer

DETAILED BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine)

WSP

Waterbody or Watercourse Name:	Start Date: (DD / MMM / YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time: (24HR)	Area Description: (Habitat Type)
	11/07/23 / 16:00	12-Jul-23 / 17:00	

Sample ID:	Method #: (Traps/ Rods/ Dips)	Project Number:	UTM Coordinates (mN, mE, Zone, Acc.)	Samplers In.	Page: ____ of ____	See Net Form Y/N
NDR-Mar-Lk	MT1 22	OMEMA2304	various - See AD GPS	AD/KM		

Species	Fish #	Species Code	Length (mm)		Round Weight					Sex	Maturity	Retained	Aging Structures	Tissue	Comments
			Fork	Total	Body (g /kg)	L. Tissue (g)	R. Tissue (g)	Liver (g)	Gonad (g)	(M/F)	(M / IM / I)	Aging/Tiss/Bot h	(Sc, Pr, Dr, Oto)	(WB / Fill.)	(Hg / Condition / etc.)
Yellow Perch	1		75	77	4.58										
	2		96	99	9.84										
	3		85	88	7.53										
	4		86	91	7.57										Trematodes, Blackspot
	5		64	67	3.51										Blackspot
	6		69	73	3.84										Blackspot
	7		82	86	6.27										
	8		59	63	2.47										
	9		102	105	10.93										Blackspot
	10		76	79	4.62										

Species Box Tally Area / Site Comments:

53YP

Species	Catch	Species	Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

DETAILED BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine)

wsp

Waterbody or Watercourse Name:	Start Date: (DD / MMM / YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time: (24HR)	Area Description: (Habitat Type)
	12-Jul-23 / 10:30	12-Jul-23 / 16:00	—

Sample ID:	Method #: (Traps/ Rods/ Dips)	Project Number:	UTM Coordinates (mN, mE, Zone, Acc.)	Samplers Initials	Page: ____ of ____	See Net Form Y/N
MDR-MarLk	5	OMEMA23055	various - AD GPS	AD/CM		

Species	Fish #	Species Code *	Length (mm)		Round Weight					Sex	Maturity	Retained	Aging Structures	Tissue	Comments
			Fork	Total	Body (g /kg)	L. Tissue (g)	R. Tissue (g)	Liver (g)	Gonad (g)	(M/F)	(M / IM / 9)	Aging/Tissa/Both	(Sc, Pr, Dr, Oto)	(WB / Fill.)	(Hg / Condition / etc.)
NO		CATCH													GN 5
—															—
Muskrat			—	Released											GN 4
—															—
Northern Pike	1		390	430	410										GN 3
"	2		490	520	770										GN 3
Yellow Perch	3		170	180	80										GN 3
"	4		185	195	80										GN 3
—															—
NO CATCH															GN 2
—															—
NO CATCH															GN 1

Species Box Tally Area / Site Comments:

GN 1 - 3" 4 - 2.5"
2 - 4" 5 - 3.5"
3 - 2"

Species	Catch	Species	Catch
		✓	

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. ___ of ___

Date (yyyy-mm-dd): 2023-07-17

Stream Name:

Stream Code:

Site Code: WBR-S-07

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L ___ R ___

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

Ht. Represents Bankfull? ☐ Yes ☐ No

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD	0.0	0
Right BFD	.	0
Max. Chann. Depth	.	
Left Active Chann.	3.3	1700
Right Active Chann.	16.9	1700

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	2.0	1050	.0			.
2	5.3		290			.
3	7.3		440			.
4	9.3		450			.
5	11.3		570			.
6	13.3		500			.
7	15.3		320			.
8	17.3	1400	0			.
9	19.3	1000	0			.
10	21.3	600	0			.
11	23.3	300	0			.
12	24.3	0	0			.
13	.					.
14	.					.
15	.					.
16	.					.
17	.					.
18	.					.
19	.					.
20	.					.

Comments
3.7
WW = 14.6
BW = 14.6 + 3.7 + 8 = ( )
CM GPS 1269
~ cms upstream

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
CM MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. ____ of ____

Stream Name

Date (yyyy-mm-dd) 2013-07-17

Stream Code

Site Code: WBR-S-07

Sample

Record only on the 1st transect.

Site Length (m): ____.____

Transect Spacing (m): ____.____

Discharge Approximates Baseflow?
☐ Yes ☐ No

Obstructions to Flow
(Check all applicable types)

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): ____.____

Right Entrenchment Width (m): ____.____

Total Entrenchment Width (m): ____.____

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): ____.____

Point Spacing (m): ____.____

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD	0.0	0
Right BFD	0.0	
Max. Chann. Depth	.	
Left Active Chann.	7.6	2050
Right Active Chann.	22.4	2050

Ht. Represents Bankfull? ☐ Yes ☐ No

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	2.0	700	0			.
2	4.0	145	0			.
3	6.0	2000	0			.
4	10.0		210			.
5	12.0		350			.
6	14.0		500			.
7	16.0		490			.
8	18.0		390			.
9	20.0		250			.
10	22.0		50			.
11	22.4	2050	0			.
12	24.0	2000	0			.
13	26.0	1800	0			.
14	28.0	1300	0			.
15	30.0	500	0			.
16	32.0	0	0			.
						.
						.
						.
						.

Comments
wetted width = 14.9m
bankfull width = 31m
CM GPS 1267

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected
CM/MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 6 of

Stream Name

Date (yyyy-mm-dd) 2017-07-17

Stream Code

Site Code: WBR-S-07

Sample

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 14.55
Point Spacing (m): 1.82

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	0	0	☐ Yes ☐ No
Right BFD		0	
Max. Chann. Depth			
Left Active Chann.	1.35	2000	
Right Active Chann.	18.4	2000	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	2.0	350	0			
2	4.0	1500	0			
3	6.0		270			
4	8.0		330			
5	10.0		350			
6	12.0		390			
7	14.0		200			
8	16.0		170			
9	18.0		40			
10	20.0	1600	0			
11	22.0	1600	0			
12	24.0	200	0			
13	24.9	0	0			
14						
15						
16						
17						
18						
19						
20						

Comments
WW=14.55m
bankfull = 24.9m
CMGPS 1268
facing upstream

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected
CM/MB				

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)

Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):
		Overcast cool

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
Mat2-01	11:15	Client samples	CM/AD	16/07/23	ADGPS (□ Same as above)

Air Temperature:		°C	DO:	85.5	%
H2O Temperature:	21.7	°C	DO:	7.71	mg/L
pH:	7.62		TDS:		g/L
Conductivity:	0.115	µS/cm or mS/cm	ORP:	130.2	mV
Sample Depth:	2.1	m	Duplicate Taken:		

Comments: SPC = 0.122 mS/cm

Sample ID	Time (24hrs)	Bottles (#)	Sampler (intails)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:		%
H2O Temperature:		°C	DO:		mg/L
pH:			TDS:		g/L
Conductivity:		µS/cm or mS/cm	ORP:		mV
Sample Depth:		m	Duplicate Taken:		

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion upper, lighter water layer
Thermocline middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date) _____

SURFACE WATER QUALITY, ZOOPLANKTON & PROFILE SAMPLING FORM

SITE & SAMPLE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)

Project Number	Photo Number's	Weather Description (wind, precipitation/duration, cloud cover):
		Overcast, cool

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
MatR-02	10:15	Client samples	CM/AD	6/07/23	AD GPS (□ Same as above)

Air Temperature:		°C	DO:	%
H2O Temperature:	21.5	°C	DO: 82.9 / 7.39	mg/L
pH:	7.53		TDS:	g/L
Conductivity:	0.114	µS/cm or mS/cm	ORP: 132.9	mV
Sample Depth:	0.1	m	Duplicate Taken:	

Comments: 0.125PC mS/cm

Sample ID	Time (24hrs)	Bottles (#)	Sampler (initials)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
					(□ Same as above)

Air Temperature:		°C	DO:	%
H2O Temperature:		°C	DO:	mg/L
pH:			TDS:	g/L
Conductivity:		µS/cm or mS/cm	ORP:	mV
Sample Depth:		m	Duplicate Taken:	

Comments:

DISCRETE WATER PROFILE SAMPLING

Depth (m)	SW Temp (deg C)	DO %	DO mg/L			Depth (m)	SW Temp (deg C)	DO %	DO mg/L		

Comments:

Epilimnion: upper, lighter water layer
Thermocline: middle layer, rapid decrease in temperature, a change in >1°C over a depth of 1 meter
Hypolimnion: lower, heavy, cool water layer

ZOOPLANKTON SAMPLING

Sample ID		Sample ID		Sample ID	
Sample Location		Sample Location		Sample Location	
Total Water Depth	m	Total Water Depth	m	Total Water Depth	m
No. Tows Required		No. Tows Required		No. Tows Required	
Sample Date		Sample Date		Sample Date	
Sample Time		Sample Time		Sample Time	
Vertical Tow Length	m	Vertical Tow Length	m	Vertical Tow Length	m
No. Containers		No. Containers		No. Containers	
Comments		Comments		Comments	

Calculate No. Tows required from Total Depth:

> 25 m	1 tow (from 25 m to the surface)	4 - 6 m	2 tows (from total depth -1m to the surface)
7 - 25 m	1 tow (from total depth -1m to the surface)	2 - 3 m	5 tows (from total depth -1m to the surface)
		< 2	10 tows (from total depth -1m to the surface)

QA/QC Completed by (Staff/Date) _____

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine)

Project Site / Project Number:

WSP

Waterbody or Watercourse Name:

Start Date: (DD/MMM/YY) / Time: (24HR)

End Date: (DD / MMM / YY) / Time (24HR): 15/07/23 / 16:30

Area Description: (Habitat Type / Site Features)

Sample ID: WBR-P-04

Method Effort: (Traps/Rods/Dips): 20

UTM Coordinates: (mN, mE, Zone, Acc.): KWGPS

Samplers In: CW AD

Page: 1 of 2

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
NRD	1		63	67	224	—	—	—	—	
BSB	2		—	55						lost
BSB	3			54						lost
NRD			47	50	1.59					
NRD	4		72	76	3.89					
FSD			76	80	5.96					
FSD			88	90	9.22					
NRD			69	73	4					
NRD			58	60	2.63					
NRD	10		68	70	2.51					
NRD			65	72	2.34					
NRD			56	60	3.06					
FSD			56	60	2.03					
FSD			84	86	5.56					
BSB				46	1					
NRD			60	63	2.5					
NRD			56	58	2.45					
FSD			63	67	3.54					
NRB			116	123	15.59					
FSD			65	69	6.86					
FSD			53	56	1.28					
FSD			46	48	1.00					
FSD			56	60	2.38					
FSD			46	50	1.16					
BSB				50	1.18					
BSB				46	1					
BSB				46	1.12					
FHM			57	61	2.48					
BSB				52	1.54					
BSB				45	1.38					
FHM			58	62	2.70					
FHM			58	62	2.28					
FHM			52	56	1.74					
FHM				50	2.36					
FHM			58	61	3					
FHM			53	56	2.09					
BSB				46	1.83					
BSB				48	1.45					

Species Box Tally Area / Site Comments:

See bulk tally sheet

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
SC - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BULK FISH TALLY

Method Used: (Minnow Trap / Angling / Dip Net / Seine / Gill Net)

wood.

Capture Waterbody Name:	Release Waterbody Name:	Start Date (DD MMM YYYY) / Time (24HR):	End Date (DD MMM YYYY) / Time	Area Description:

Sample ID:	Method #: (Traps / Rods / Dips / Area/ Nets)	UTM Coordinate:	Samplers In.	PG: 2 of 2
WBR-P-04				

Species	# Released (Tally)	Total Count
NRD	[illegible] +21+64+53+50+30+70+3+23 +12	Alive Dead
BSB	[illegible] +3	Alive Dead
FSD	[illegible] +30 [illegible] +20+11+28+15+20+12+25+6 ~~10~~+16+10+15+17+5+58+4+8+48	Alive Dead
		Alive Dead
		Alive Dead
		Alive Dead
		Alive Dead
		Alive Dead
		Alive Dead

Species										
nge										
dv.										

s/Notes:

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No ___ of ___

Date (yyyy-mm-dd) 2017-07-15

Stream Name

Stream Code

Site Code: WBR-S-06

Sample

Record only on the 1st transect.

Site Length (m)

Transect Spacing (m)

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☑
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m)

Right Entrenchment Width (m)

Total Entrenchment Width (m)

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m)

Point Spacing (m)

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	16.1	0	☐ Yes ☐ No
Right BFD	1.0	0	
Max. Chann. Depth			
Left Active Chann.	13.75	1000	
Right Active Chann.	2.5	450	

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	1.5	120	0			
2	2.0	285	0			
3	3.0		146			
4	4.0		130			
5	5.0		189			
6	6.0		260			
7	7.0		294			
8	8.0		308			
9	9.0		210			
10	10.0		205			
11	11.0		200			
12	12.0		206			
13	13.0		80			
14	14.5		938			
15	15.0		771			
16	15.5		547			
17	15.9		290			
18	16.1		0			
19						
20						

Comments

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected

Diagnostic Indicators of Channel Stability

Mandatory Fields in Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. ___ of ___

Stream Name

Date (yyyy-mm-dd) 2023-07-15

Stream Code

Site Code: WBR-S-06

Sample

Record only on the 1st transect.

Site Length (m) ___.___

Transect Spacing (m) ___.___

Discharge Approximates Baseflow?
☐ Yes ☐ No

Obstructions to Flow
(Check all applicable types)

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m) ___.___
Right Entrenchment Width (m) ___.___
Total Entrenchment Width (m) ___.___

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m) ___.___
Point Spacing (m) ___.___

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	17.0	0	☐ Yes ☐ No
Right BFD	1.0	0	
Max. Chann. Depth	.		
Left Active Chann.	15.5	1200	
Right Active Chann.	4.85	910	

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	1.0	0	0			.
2	2.0	386	0			.
3	3.0	652	0			.
4	4.0	820	0			.
5	4.85	910				.
6	5.3		120			.
7	6.0		220			.
8	7.0		240			.
9	8.0	~~236~~	223			.
10	9.0	~~225~~	225			.
11	10.0	~~247~~	224			.
12	11.0	~~249~~	249			.
13	12.0	~~209~~	209			.
14	13.0	~~206~~	200			.
	14.0	~~2~~	225			.
	15.0		194			.
	15.5	1200	0			.
	16.0	1046	0			.
	16.5	850	0			.
	18.8	695	0			.

cont'd on back

Comments

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected

Horz Vert Hegt
16.9 2160
17

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. ____ of ____

Date (yyyy-mm-dd): 2 0 1 _ - 0 7 - 1 4

Stream Name:

Stream Code:

Site Code: WBR-S-06

Sample:

Record only on the 1st transect.

Site Length (m): ____.____

Transect Spacing (m): ____.____

Discharge Approximates Baseflow?
☐ Yes ☐ No

Obstructions to Flow
(Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level	Left Bank	Right Bank
Inflection Point	☑	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☑
Min. Width:Depth	☐	☐

Others: L ____ R ____

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): ____.____

Right Entrenchment Width (m): ____.____

Total Entrenchment Width (m): ____.____

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): ____.____

Point Spacing (m): ____.____

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	17.5		☐ Yes ☐ No
Right BFD	1.0	0	
Max. Chann. Depth	.		
Left Active Chann.	15.55	1440	
Right Active Chann.	5.3	1120	

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	1.0	0	0			.
2	2.0	420	0			.
3	3.0	773	0			.
4	4.0	960	0			.
5	5.0	1080	0			.
6	5.3		0			.
7	6.0		100			.
8	7.0		261			.
9	8.0	~~305~~	305			.
10	9.0	~~331~~	331			.
11	10.0	~~320~~	320			.
12	11.0	~~315~~	310			.
13	12.0	~~300~~	300			.
14	13.0		321			.
15	14.0		356			.
16	15.0		334			.
17	15.55	1440	0			.
18	16.35	1285	0			.
19	16.7	1140	0			.
20	16.95	688	0			.

Comments:
Right bank chosen w/ inflection point, but could be higher b/c slope + gradat. continues 30m back
Sloped due to gradation change
Transect

Cont'd on back

Crew Leader (init. & last name): ____.____

Crew	Recorder	Ent/Scanned	Verified	Corrected

Obs.	Horz Loc (m)	Var. Height (hm)
21	17.1	484
22	17.3	209
24	17.5	0

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of 1

Date (yyyy-mm-dd): 2013-07-14

Stream Name: WBR-S-04

Stream Code

Site Code

Sample: TI

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow?
☐ Yes ☐ No

Obstructions to Flow
(Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 1.0

Point Spacing (m): 1.25

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	1.0		☐ Yes ☐ No
Right BFD	1.0		
Max. Chann. Depth	1.0		
Left Active Chann.	1.0		
Right Active Chann.	1.0		

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	1.25	0				
	2.0	450				
	3.0	1150				
	4.05	1500	0			
	5.0		200			
	6.0		480			
	7.0		540			
8	8.0		640			
9	9.0		750			
	10.0		730			
	11.0		640			
	12.0		680			
	13.0		520			
	14.0		340			
	14.7		130			
	15.0	1500	0			
	16.0	1200				
	17.0	800				
	18.0	850				
20	19.0	1000				
21	21.0	500				
22	22.0	300				
23	23.0	100				
24	24.0	0				

20-3 800

Comments
- see T3 for hab
- long run, upstream of riffle and log debris

Crew Leader (init. & last name): JC WEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
WB				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of 1

Stream Name: WBR-S-04

Date (yyyy-mm-dd): 2023-07-14

Stream Code:

Site Code:

Sample: T2

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (*Check all applicable types*)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements (*Recommended depth ratio from stream bottom is 0.4 m*)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.5	0				.
	1.0	200				.
	2.0	800				.
	2.8	1200	0			.
	3.3		240			.
	4.3		310			.
	5.3		270			.
8	6.3		280			.
9	7.3	[illegible]	220			.
	8.3		320			.
	9.3		400			.
	10.3		180			.
	11.3		220			.
	12.3		160			.
	13.3		80			.
	13.8	1200	0			.
	15.0	1170				.
	16.0	1200				.
	17.0	1180				.
20	18.0	1050				.
21	18.5	720				.
22	18.8	230				.
23	18.9	50				.
24	19.0	0				.

Comments: shallower riffle/glide section - see T3 for hab

Crew Leader (init. & last name): K WELSE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 2

Date (yyyy-mm-dd): 2023-07-17

Stream Name: WBR-5-04

Stream Code:

Site Code:

Sample: 13

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.5	0				
	1.1	250				
	1.7	570				
	2.4	720				
	3.0	1000				
	3.6	1090				
	4.4	1100				
8	5.0	1100				
9	5.8	1200				
	6.6					
	7.4					
	8.0					
	8.7					
	9.4					
	10.0					
	10.8					
	11.6					
	12.4					
	13.2					
20	14.0					

Velocity Measurements

Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
0			
130			
200			
310			
390			
450			
480			
490			
550			
620			
670			
670			

Comments

Sand sub with gravel and cobble, CWD in stream, sub and emerg. veg., wider stream with moderate flow, riffle-pool-run sequences, C channel, steep 1-2m banks with low gradient in point bars, forest up dominated by BS, tamarack, cot., riparian with grasses/sedges/alder/willow

Crew Leader (init. & last name): K WEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 2 of 2

Date (yyyy-mm-dd) 2023-07-14

Stream Name: WBR-S-04

Stream Code:

Site Code:

Sample: T3

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	14.8		650			
	15.6		540			
	16.4		370			
	17.2		180			
	17.8		80			
	17.9	1200	0			
	18.3	~~1275~~ 0				
28	18.7	360				

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
29	19.0	206				
30	19.8	0				

Comments:

Crew Leader (init. & last name): K WELSE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): Seine netting

Project Site / Project Number: OMEMA 23045

WSP

Waterbody or Watercourse Name: Little Buckhorn R.

Start Date: (DD/MMM/YY) / Time: (24HR): 14/JUL/2023 14:55

End Date: (DD / MMM / YY) / Time (24HR): 14/JUL/2023

Area Description: (Habitat Type / Site Features): Small permanent watercourse

Sample ID:

Method Effort: (Traps/Rods/Dips): SN

UTM Coordinates: (mN, mE, Zone, Acc.)

Samplers In.: MB/KW

Page: 1 of 1

See Net Form: Y / N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
TRPR	1		74	82	4.97	Seine Net			1	
	2		98	109	11.98				1	
	3		23	25	---					Won't register on scale
	4		72	81	4.29					
	5		25	28	---					
~~GR~~LGPR	6		29	30	0.23g					Log perch
			SN2							
			No fish							
			tested	on	SN1 ending	location				

Species Box Tally Area / Site Comments: TRPR: XXX = 30 + 5 (Pass1)

Species	Total Catch	Species	Total Catch
TRPR	35		

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

ELECTROFISHING FORM

Project Site / Project Number: ONEMA 23045

WSP

Waterbody or Watercourse Name:	Date: (DD / MMM / YY)	Water Temp:	Shocking Method:	Pg: 1 of ___ Run: ___ of ___ .
West Buchanan Brook	14/07/23	19.8	Backpack	

UTM Start:	Start Time: (24 hrs)	Stop Time: (24 hrs)	Netters:	Site Area / Description: (Length X Width)
	13:00	13:20,	KW	P1: 855s -> 2WD, 1BURT, 7TP, 1 LND, 5 BND, 1
UTM End:	13:50	14:10,		P2: 702s -> 4LND, 3LP, 10TP, 2 SS, 1 BURT, 1
	14:25	14:40		P3: 441s -> 4TP, 4 LND

Sample ID:	Elapsed Time: (hours)	Effort: (seconds)	Voltage / % Power:	Frequency / Range (high/low)	Pulse:
	55/60		300	60	12% DC.

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
WS	1		144	154	340					See photos
Bullhead	2		-	118	9.52					
TP	3		72	80	4.40					
TP	4		76	83	4.96					
~~WS~~/SS	5		-	82	5.40					See photos
TP	6		72	83	5.20					
LND	7		83	87	6.00					
TP	8		58	64	2.37					
TP	9		60	66	2.70		#1			
TP	10		56	61	2.02					
WS	11		37	41	-					not registering on scale
BND	12		28	30	-					" " "
BND	13		33	36	-	QCS				
BND	14		23	25	-					
BND	16		28	30	-					
TP	16		26	28	-					
BND	17		26	27	-					
LND	18		72	~~77~~	3.96					
LP	19			85	5.00					
TP	20		76	85	4.98					
SS	21			90	6.25					
LND	22		84	89	6.74					
TP	23		57	61	2.02					
BURT	24		-	-	-		#2			Cast
LP	25			102	10.19					
LND	26		87	93	7.11					
LP	27			102	9.11					
TP	28		57	62	2.47	QCS				
TP	29		57	63	2.25					
LND	30		62	66	2.72					
TP	31		53	58	1.82					
TP	32		56	62	2.04					
TP	33		52	56	1.64					
JD	34		-	50	1.01					
TP	35		59	65	2.40					
TP	36		56	62	2.30					
SS	37		-	60	2.83					
TP	38		58	64	2.69					
LND	39		66	72	3.50					
TP	40		58	66	2.18	Pass #3				
LND	41		58	65	2.42					
TP	42		57	65	2.30					
TP	43		56	63	2.30					

Species Box Tally Area / Site Comments:

BND: 17 ~~BND~~ TP: 1

P1 P2 P3

LND (44) 65 71 2.61

BND (45) 33 35 -

~~SNI' TRR'~~

Species	Total Catch	Species	Total Catch	QA/QC By:
				Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

Diagnostic Indicators of Channel Stability

178 °C, 82.0% DO, 7.36 mg/L, 0.055 SPC, 51.1 C, 4.85 pH

Mandatory Fields in Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of 1

Stream Name: JCRK-01

Date (yyyy-mm-dd): 2023-07-13

Stream Code:

Site Code:

Sample: T1

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (*Check all applicable types*)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements (*Recommended depth ratio from stream bottom is 0.4 m*)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	0.6	0				.
	0.8	100				.
	0.9	100	60			.
	1.2		200			.
	1.4		700			.
	1.6		800			.
	1.8		800			.
	2.0		750			.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	2.2		620			.
	2.4		740			.
	2.6		700			.
	2.65	100	0			.
	2.8	50				.
	3.0	0				.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

Comments
Floating bog/muskeg banks dominated by grasses/sedges/moss, highly undercut banks, E-class channel, wooder hydrology, highly organic substrate, forest upland dominated by black spruce and tamarack

Crew Leader (init. & last name): K WEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields in Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of 1

Stream Name: JCRK-01

Date (yyyy-mm-dd): 2023-07-13

Stream Code:

Site Code:

Sample: 2

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	0.5	0				
	0.51	170	0			
	0.7		360			
	0.9		310			
	1.1		320			
	1.3		330			
	1.5		306			
	1.7		200			

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	1.9		100			
	2.1		80			
	2.2	170				
	2.4	140				
	2.6	160				
	2.8	120				
	3.0	60				
	3.2	0				

Comments: Bankfull = wetted width on LB - see T1 for

Crew Leader (init. & last name): K WEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 1

Stream Name: JCRK-01

Date (yyyy-mm-dd): 2013-07-13

Stream Code:

Site Code:

Sample: T3

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	0.5	0				.
	0.6	136				.
	0.65	220	0			.
	0.7		190			.
	0.9		220			.
	1.1		300			.
	1.3		320			.
	1.5		380			.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	1.7		380			.
	1.8		360			.
	1.81	220	0			.
	1.82	0				.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

Comments: - see T1 for Hab

Crew Leader (init. & last name): K WEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

ELECTROFISHING FORM

Project Site / Project Number: OMEGA 23045

WSP

Waterbody or Watercourse Name:	Date: (DD / MMM / YY)	Water Temp:	Shocking Method:	Pg: 1 of 1 Run: 1 of 1
Jacko Creek	13/07/23		Backpack	

UTM Start:	Start Time: (24 hrs)	Stop Time: (24 hrs)	Netters:	Site Area / Description: (Length X Width)
	11:20	11:45	MB	P1 = 300s P2 = 285s P3 = 325
UTM End:				

Sample ID:	Elapsed Time: (hours)	Effort: (seconds)	Voltage / % Power:	Frequency / Range (high/low)	Pulse:
JCRK-01-EF1			300	60	12

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BSB	1			46	1.10					BRST
BSB	2			41	0.45					
BSB	3			46	0.78					
BSB	4			43	0.78					
NRD	5		81	85	4.99					NRDC
BSB	6			40	0.49					
FNDC	7		61	65	2.65				1+	FNDC
BSB	8			35	0.25					
BSB	9			33	0.26					
FNDC	10		49	53	1.07		Pass			
BSB	11			53	0.35					
BSB	12			35	0.25					
~~FNDC~~ NRBD	13		65	69	2.53		300 seconds			
NRD	14		69	75	2.86					
BSB	15			50	1.35					
NRBD	16		53	56	1.66					
NRBD	17		55	59	1.25					
BSB	18			59	0.67					
NRBD	19		43	45	-					not registering on scale
BSB	20			51	0.59					
FNDC	21		54	57	1.96		Pass #2			
~~BRST~~	22		~~53~~	53	1.83					
FNDC	23		66	70	2.99					
NRDC	24		44	47	0.72					
Northern Pearl Dace	25		61	66	2.23		295 seconds			NRPD
FNDC	26		53	56	1.63					
NRDC	27		58	62	2.04					
NRPR	28		68	74	3.33					
NRDC	29		44	48	1.02					
NRPR	30		45	49	1.22					
FNDC	31		79	82	4.96					
NRPR	32		62	66	2.41					
NRDC	33		63	67	2.76					
FNDC	34		55	58	2.02					
FNDC	35		54	59	2.01		Pass #3			
FNDC	36		63	66	2.40					
~~NRBD~~ NRPD	37		44	47	1.32		312 seconds			Northern Pearl Dace
FNDC	38		54	58	1.73					
~~FNDC~~	39		63	67	2.66					
NRPD	40		44	47	0.67					
FNDC	41		49	53	1.87					Disgusting growths. *kept in alcohol
FNDC	42		61	65	1.45					
FNDC	43		54	59	1.66					
FNDC	44		68	72	2.99					

Species Box Tally Area / Site Comments:

BSB: ++++ ++++ ++++ ++++ ++++ = 25

Pass 2: BRST ⊠⊠⊠ = 29
NRDC • = 1

Pass 3: BRST ⊠⊠⊡ = 22

P2: ~~22~~ 30 BRST
3 NRDC, NRPD 5 4 NRBD

P1: 37 BSB, 2 NRD,

P3: 22 BRST, 1 NRDC, FNDC 9,

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

Diagnostic Indicators of Channel Stability

Mandatory Fields in Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 1

Date (yyyy-mm-dd): 2023-07-13

Stream Name: WDR-J-06

Stream Code:

Site Code:

Sample: T3

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

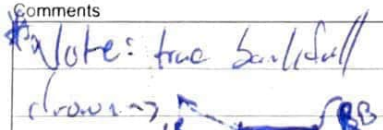
Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m).*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.6	0				
2	0.9	116				
3	1.8	280				
4	2.3	400				
5	2.5	440	0			
6	3.0		90			
7	3.8		320			
8	4.6		480			
9	5.4		590			
10	6.2		650			
11	7.0		650			
12	7.8		640			
13	8.6		630			
14	9.2		570			
15	10.0		420			
16	10.7		150			
17	10.9	480	0			
18	11.2	340				
19	11.5	220				
20	11.9	110				
21	12.0	0				

Comments
*Note: true bankfull approximately 1.5m higher, channel shape as drawn



- see T1 for hub.

Crew Leader (init. & last name): K WEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of

Stream Name: NDR-S-06

Date (yyyy-mm-dd): 2023-07-13

Stream Code:

Site Code:

Sample: 12

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☑ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD		
Right BFD		
Max. Chann. Depth		
Left Active Chann.		
Right Active Chann.		

Ht. Represents Bankfull? ☐ Yes ☐ No

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.5	0				
2	0.8	110				
3	1.4	290				
4	1.9	450				
5	2.25	700	0			
6	2.6		170			
7	3.2		250			
8	4.0		350			
9	4.8		460			
10	5.6		510			
11	6.2		530			
12	7.0		590			
13	7.8		640			
14	8.6		650			
15	9.2		590			
16	10.0		490			
17	10.8		370			
18	11.2		250			
19	11.7		120			
20	11.8	700	0			
21	12.5	560				
22	13.0	400				
23	14.0	200				
24	15.0	0				

Comments:
See T1 for hab & M. Site
- upstream of bridge
- lily pads

Crew Leader (init. & last name): K WEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

In-situ: 18.7°C, 69.2% DO, 6.25 mg/L, 0.055 SPC, 83.7 C%, 6.48 pH

@ 9:30

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of

Stream Name: MDR-S-06

Date (yyyy-mm-dd): 2023-07-13

Stream Code:

Site Code:

Sample: T1

Discharge Approximates Baseflow? ☒ Yes ☐ No

Obstructions to Flow (Check all applicable types)
- ☐ None Present
- ☐ Armouring
- ☐ Trampled Banks
- ☐ Inlets
- ☐ Wood Deflectors
- ☐ Other
- ☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements (Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.6	0				
2	0.8	240				
3	1.4	450				
4	1.8	600				
5	2.2	730				
6	2.4	800	0			
7	3.0		220			
8	3.8		270			
9	4.6		340			
10	5.4		360			
11	6.0		330			
12	6.8		410			
13	7.4		440			
14	8.0		350			
15	8.8		320			
16	9.6		370			
17	10.4		300			
18	11.2		340			
19	12.0		230			
20	12.8		60			
21	13.0		800			
22	13.4	690				
23	13.9	410				
24	14.4	290				
25	15.0	0				

Comments:
Low velocity and flow
↳ see reverse for hab.

Crew Leader (Init. & last name): K WEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

- low velocity and flow
- dark, tannin stained water
- submergent and emergent veg., grasses on both
- alder, grasses, and other low shrubs/plants on banks
- black spruce dominates forest upland with the odd tamarack
- fines/clay substrate, some gravel with occassional cobble piece
- LWD in-channel
- B class/irregular meandering.

eDNA WATER SAMPLING FORM

wsp

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
Negative Controls			
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMEMA23045			

eDNA SAMPLE COLLECTION

Sampler Initials _____

Sample ID	Time (24 hr)	Bottles (# / vol.)	Sample Gear	Comments

Replicate (#)	Replicate ID	Depth (m)	Time taken (24 hr)	Duplicate taken? Y / N	Location Coordinates (UTM mE, mN, Zone, Acc.)
1					
2					
3					
4					
5					
6					

Habitat Description (Provide a sketch of habitat and replicate locations within site)

- Multiple days -> Crawford Summer eDNA

eDNA FILTERING

Sampler Initials KW/AG

Sample ID	Time (24hrs)	Bottles (# / vol.)	Sample Gear	Filtering Location
				Lab / (Field Filtered)

Replicate (#)	Replicate ID	Vol. Start (mL)	Vol. End (mL)	Filtered Vol. (mL)	Comments
1	KC-NC		15/07/23	2000	
2					
3	FRLK-NC		16/07/23	2000	17:15
4					
5					
6					

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Air Temperature	°C		DO	%	OTHER:
H2O Temperature	°C		DO	mg/L	
pH	pH		TDS	g/L	
Conductivity	µS/cm or mS/cm		ORP	mV	
Turbidity	NTU		Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): MT

Project Site / Project Number: OMEMA23045

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR)	Area Description: (Habitat Type / Site Features)
Ickery Creek	13/07/23 13:00	14/07/23 16:00	

Sample ID:	Method Effort: (Traps/Pods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers Ini.	Page: ___ of ___	See Net Form: Y / N
SCRK-01-MT1	20		TW/MB		

Species	Fish #	Species Code (NWR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BSB	1			42	1.16					
	2			45	1.67					
	3			60	2.59					
	4			61	2.61					
	5			51	1.09					
	6			60	1.30					
	7			42	1.03					
	8			43	1.03					
	9			40	0.74					
BSB	10			46	1.47					
FNSD	11		58	62	2.33					
	12		52	56	1.47					
	13		62	66	3.14					
	14		61	65	2.97					Wart
	15		65	70	2.87					
	16		57	61	2.36					
	17		55	59	1.57					
	18		65	69	3.79					
	19		54	56	1.61					
FNSD	20		51	54	1.35					
NRBD	21		41	45	–					
	25									
~~NRBD~~	30									
~~LC~~ NRD	31		80	86	5.30					
	32		100	111	10.96					
	33		100	110	10.01					
	34		90	96	6.56					
	35		72	76	4.00					
	36		71	77	7.19					
	37		70	76	4.17					
	38		44	46	1.20					
	39		49	53	1.03					
	40		42	46	1.20					
FHM			65	70	3.81					
LC		++++ ++++								
NRD										
FNSD		++++ ++++ ++++

BSB: 15+20+6+20+20+20+20+10+5+5+3

FNSD: 20+6+12+25+20+5+10+40+20+12+15+5+8+4

NRD: 8+6+6+8+10+12+30+25+20+30+15+13+4+8+8

eDNA WATER SAMPLING FORM

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	Kidd Creek	15/JUN/23	
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
24E4H2304S			

eDNA SAMPLE COLLECTION

Sampler Initials KW/MB

Sample ID	Time (24 hr)	Bottles (# / vol.)	Sample Gear	Comments
	11:20		Nalgene	

Replicate (#)	Replicate ID	Depth (m)	Time taken (24 hr)	Duplicate taken? Y / N	Location Coordinates (UTM mE, mN, Zone, Acc.)
1	KL-BLTU-04	0.2	15:20		x2 1L Nalgene bottles
2	KL-BLTU-03	0.2	14:30		"
3	KL-BLTU-02	0.2	11:20		"
4	KL-BLTU-UPALT	0.2	12:50		"
5	KL-BLTU-WOI-DS	0.2	13:15		"
6					

Habitat Description (Provide a sketch of habitat and replicate locations within site)

eDNA FILTERING

Sampler Initials KW/MB

Sample ID	Time (24hrs)	Bottles (# / vol.)	Sample Gear	Filtering Location
	20:20		Vampire	Lab / Field Filtered

Replicate (#)	Replicate ID	Vol. Start (mL)	Vol. End (mL)	Filtered Vol. (mL)	Comments
1	KL-BLTU-04			1500	20:20
2	KL-BLTU-03			1500	20:25
3	KL-BLTU-02			1200	20:35
4	KL-BLTU-UPALT			1600	20:45
5	KL-BLTU-WOI-DS			1200	20:55
6					

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Air Temperature	°C		DO	%	OTHER:
H2O Temperature	°C		DO	mg/L	
pH	pH		TDS	g/L	
Conductivity	µS/cm or mS/cm		ORP	mV	
Turbidity	NTU		Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

eDNA WATER SAMPLING FORM

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
WBR	West Buskegaw River	15/07/23	
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
CMEMA23045			

eDNA SAMPLE COLLECTION

Sampler Initials AD/CM

Sample ID	Time (24 hr)	Bottles (# / vol.)	Sample Gear	Comments
	13:14		Nalgene	

Replicate (#)	Replicate ID	Depth (m)	Time taken (24 hr)	Duplicate taken? Y / N	Location Coordinates (UTM mE, mN, Zone, Acc.)
1	WBR-BLTU-01	0.2	13:14		02 1L grabs
2	WBR-BLTU-02	0.2	13:45		" "
3					
4					
5					
6					

Habitat Description (Provide a sketch of habitat and replicate locations within site)

eDNA FILTERING

Sampler Initials KW/MG

Sample ID	Time (24hrs)	Bottles (# / vol.)	Sample Gear	Filtering Location
	19:55		Vampire	Lab / (Field Filtered)

Replicate (#)	Replicate ID	Vol. Start (mL)	Vol. End (mL)	Filtered Vol. (mL)	Comments
1	WBR-BLTU-01			1200	19:55
2	WBR-BLTU-02			1200	20:05
3					
4					
5					
6					

WATER QUALITY

Sampler Initials _____

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Air Temperature	°C	DO	%	OTHER:
H2O Temperature	°C	DO	mg/L	
pH	pH	TDS	g/L	
Conductivity	µS/cm or mS/cm	ORP	mV	
Turbidity	NTU	Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

eDNA WATER SAMPLING FORM

wsp

SITE INFORMATION

Site ID	Waterbody	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
	Prosser Lake	16/OCT/23	
Project Number	**Photo Number's**	**Weather Description** (wind, precipitation/duration, cloud cover):	
OMEMA2304S			

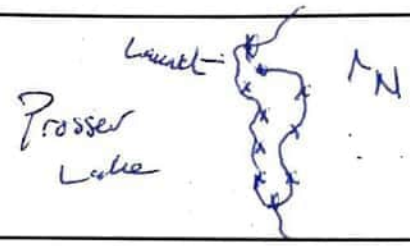
eDNA SAMPLE COLLECTION

Sampler Initials KW/MB

Sample ID	Time (24 hr)	Bottles (# / vol.)	Sample Gear	Comments
	10:00		Nalgene	

Replicate (#)	Replicate ID	Depth (m)	Time taken (24 hr)	Duplicate taken? Y / N	Location Coordinates (UTM mE, mN, Zone, Acc.)
1	PROLK-BLTU-W4	0.2	10:55		
2	-E3	0.2	10:20		
3	-E2	"	10:25		
4	-W3	"	10:50		
5	-W1	"	10:42		
6	-OUT	"	10:10		
7	-E4	"	10:15		
8	-E1	"	10:35		
9	-W2	"	10:45		
10	-IN	"	10:40		

Habitat Description (Provide a sketch of habitat and replicate locations within site)



eDNA FILTERING

Sampler Initials KW/MB

Sample ID	Time (24hrs)	Bottles (# / vol.)	Sample Gear	Filtering Location
	16:07		Olympus	Lab / Field Filtered

Replicate (#)	Replicate ID	Vol. Start (mL)	Vol. End (mL)	Filtered Vol. (mL)	Comments
1	PROLK-BLTU-W4			2000	16:07
2	-E3			2000	16:15
3	-E2			2000	16:20
4	-W3			2000	16:29
5	-W1			2000	16:33
6	-OUT			2000	16:38
7	-E4			2000	16:45
8	-E1			2000	16:51
9	-W2			2000	16:57

WATER QUALITY

Sampler Initials KW/MB

Sample ID	Time (24hrs)	Bottles (# / approx. total vol.)	Date (DD/MMM/YYYY)	Location Coordinates (UTM mE, mN, Zone, Acc.)
				(☐ Same As Above)

Air Temperature	°C		DO	%	OTHER:
H2O Temperature	°C		DO	mg/L	
pH	pH		TDS	g/L	
Conductivity	µS/cm or mS/cm		ORP	mV	
Turbidity	NTU		Depth	m	

Comments (water colour, sheen, plankton/algal bloom):

See Field Notebook

10 - IN 2000 17:02

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 1

Date (yyyy-mm-dd) 2 0 1 _ - _ _ - _ _

Stream Name: NDR-S-04

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow?
☐ Yes ☒ No

Obstructions to Flow
(Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
0.5	60			.
0.9	490			.
1.4	800			.
1.7	1080			.
1.8	1170		0	.
2.0			120	.
3.0			450	.
4.0			630	.

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Velocity Measurements: Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	5.0		690			.
	6.0		640			.
	7.0		420			.
	8.0		360			.
	8.7		100			.
	8.8	1170	0			.
	9.5	1100				.
	10.0	1050				.
	11.0	1100				.
	15.0	700				.
	18.0	300				.
	20.0	0				.

Comments: On long point bar

Crew Leader (init. & last name): KWEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of 1

Stream Name: NOR-S-OH

Date (yyyy-mm-dd): 2013-07-12

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow?
☐ Yes ☒ No

Obstructions to Flow
(Check all applicable types)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements
(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	0.7	60				
	1.0	156				
	1.5	280				
	1.8	490	10			
	1.9		240			
	3.0		560			
	3.8		690			
	4.6		740			
	5.2		770			
	6.0		790			
	6.8		750			
	7.4		650			
	8.0		650			
	8.8		540			
	9.4		390			
	10.0		170			
	10.26	490				
	10.6	230				
	10.9	250				
	11.2	40				
	11.3	0				

Comments:
On stream level see T1 for Hab.
- differ in lack of cobble/bridge material

Crew Leader (init. & last name): K WELSE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields in Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of 2

Stream Name: NSR-S-04

Date (yyyy-mm-dd): 2023-07-12

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☒ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors
Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

Ht. Represents Bankfull? ☐ Yes ☐ No

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD	0.4	0
Right BFD	10.4	0
Max. Chann. Depth	5.5	1040
Left Active Chann.	0.88	420
Right Active Chann.	9.75	420

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.4	0				
2	0.6	270				
3	0.8	300				
	0.88	420	0			
	1.0		200			
	1.5		430			
	2.0		490			
	2.5		480			
	3.0		490			
	3.5		500			
	4.0		510			
	4.5		550			
	5.0		610			
	5.5		620			
	6.0		620			
	6.5		600			
	7.0		580			
	7.5		550			
	8.0		510			
	8.5		490			

Comments: Sample location at old bridge/road crossing, gently rolling banks with grasses/sedges/shrubs, upland with willow/alder, balsam fir/hemlock/black spruce, sand/gravel/organics + cobble at crossing, banks mostly fines, submergent and emergent veg.

Crew Leader (init. & last name): K WEISE

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB				

Diagnostic Indicators of Channel Stability

Mandatory Fields in Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 2 of 2

Stream Name: NDR-S-04

Date (yyyy-mm-dd): 2023-07-12

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow?
☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	9.0		380			.
	9.5		150			.
	9.75	420				.
	9.85	340				.
	10.0	140				.
	10.2	110				.
	10.4	0				.
	.					.

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

Comments

22.5 °C	0.094	SPC
104.6 DO %	89.3	C
8.77 DO mg/L	6.73	pH

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): MT

Project Site / Project Number: AMEMA23045

WSP

Waterbody or Watercourse Name: NDR-S-04

Start Date: (DD/MMM/YY) / Time: (24HR): 11/07/23 13:00

End Date: (DD / MMM / YY) / Time (24HR): 12/07/23 17:00

Area Description: (Habitat Type / Site Features)

Sample ID: NDR-S-04-MT1

Method Effort: (Traps/Reels/Dips): 20

UTM Coordinates: (mN, mE, Zone, Acc.)

Samplers In: KW/MB

Page: 1 of 2

See Net Form: Y/N

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
SPTS	1		65	67	2.43					
SPTS	2		73	76	3.56					
CS	3		95	100	10.86					See picture
SPTS	4		65	70	3.11					
YLP	5		122	126	22.68					
SPTS	6		70	73	3.37					
CS	7		71	77	4.86					
SPTS	8		65	71	3.01					
SPTS	9		68	70	3.48					
SPTS	10		64	69	2.86					
SPTS	11		70	76	3.54					
CS	12		89	97	8.96					
YLP	13		114	119	17.00					
SPTS	14		72	79	4.62					
SPTS	15		69	76	4.42					
SPTS	16		69	76	4.50					
WS	17		63	67	3.29					
CS	18		64	70	3.14					
SPTS	19		64	71	2.79					
YLP	20		80	84	5.99					
SPTS	21		62	70	2.75					
SPTS	22		64	71	2.74					
WS	23		72	77	4.60					
SPTS	24		61	67	2.97					
CS	25		78	83	0.75					
SPTS	26		65	70	3.03					
SPTS	27		64	67	3.00					
YLP	28		71	75	4.58					
SPTS	29		60	64	2.77					
SPTS	30		63	70	3.00					
YLP	31		73	79	4.86					
CS	32		93	101	10.76					
GS	33		85	92	8.84					
WS	34		60	65	3.60					
CS	35		60	66	2.48					
SPTS	36		60	66	3.00					
CS	37		70	77	3.84					
SPTS	38		64	70	3.07					
SPTS	39		62	65	2.96					
SPTS	40		72	78	3.01					
YLP	41		80	82	4.77					
CS	42		89	96	8.40					
SPTS	43		65	72	2.74					
SPTS	44		70	76	3.61					
SPTS	45		65	70	2.57					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): MT

Project Site / Project Number: OMEMA23043

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR)	Area Description: (Habitat Type / Site Features)
NOR-S-04	11/07/23 16:00	12/07/23 17:00	

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers in.	Page: 2 of 2	See Net Form: Y/N
NOR-S-04-MT1	20		DW/MB		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
SPTS	46		57	63	1.79					
YLP	47		82	86	5.02					
WD CS	48		78	86	6.20					
SPTS	49		65	70	2.87					
SPTS	50		68	77	3.85					
WD CS	51		84	95	8.03					
WP	52		73	77	4.84					
SPTS	53		70	76	2.72					
YLP	54		69	72	4.40					
SPTS	55		66	73	3.26					
WS	56		83	87	6.35					
SPTS	57		62	67	3.15					
WD CS	58		65	70	3.30					
WD CS	59		79	84	5.00					
SPTS	60		59	65	2.30					
WD CS	61		74	79	4.22					
WD CS	62		60	66	2.70					
WD CS	63		74	81	5.58					
SPTS	64		62	67	2.86					
SPTS	65		61	67	3.00					
SPTS	66		60	66	2.84					
SPTS	67		65	71	3.24					
WD CS	68		60	70	3.01					
SPTS	69		63	67	2.86					

Species Box Tally Area / Site Comments:

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
WB - Whole Body
Fill. - Fillet or Dorsal F

BIOSAMPLING FORM

Method Used: (Minnow Trap / Angling / Dip Net / Gillnet / Seine): MT

Project Site / Project Number:

WSP

Waterbody or Watercourse Name:	Start Date: (DD/MMM/YY) / Time: (24HR)	End Date: (DD / MMM / YY) / Time (24HR):	Area Description: (Habitat Type / Site Features)
NDR-S-06B	11/07/23 13:00		

Sample ID:	Method Effort: (Traps/Rods/Dips)	UTM Coordinates: (mN, mE, Zone, Acc.)	Samplers In.	Page: ____ of ____	See Net Form: Y / N
NDR-S-06B-MT1	20		KW/MB		

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fil.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)

Diagnostic Indicators of Channel Stability

Mandatory Fields in Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 2 of 2

Stream Name: JCRK-03-T3

Date (yyyy-mm-dd): 2023-07-12

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	7.4		525			.
22	7.8		525			.
23	8.2		500			.
24	8.6		465			.
25	9.0		505			.
26	9.4		495			.
27	9.8		470			.
28	10.2		410			.
29	10.6		250			.
30	11.0		040			.
31	11.1	0	0			.
32	11.2	950				.
33	11.3	770				.
34	11.8	690				.
35	12.7	410				.
36	14.0	410				.
37	15.5	410				.
38	16.0	210				.
39	16.5	100				.
40	16.7	0				.

Comments:

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 1 of 2

Date (yyyy-mm-dd): 2023-07-12

Stream Name: JCRK-23-T3

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☑	☑
Top of Point Bar	☐	☐
Vegetation	☑	☑
Min. Width:Depth	☐	☐

Others: L R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD		
Right BFD		
Max. Chann. Depth		
Left Active Chann.		
Right Active Chann.		

Ht. Represents Bankfull? ☐ Yes ☐ No

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.3	0	0			
2	0.6	40				
3	0.9	150				
4	1.2	270				
5	1.5	450				
6	1.8	620				
7	2.1	770				
8	2.4	950	0			
9	2.7		115			
10	3.0		230			
11	3.4		210			
12	3.8		550			
13	4.2		700			
14	4.6		710			
15	5.0		750			
16	5.4		770			
17	5.8		720			
18	6.2		670			
19	6.6		600			
20	7.0		552			

Comments:

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
NB/KW				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 1 of 2

Stream Name: JCRK-03-T2

Date (yyyy-mm-dd): 2023-07-12

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m): .

Transect Spacing (m): .

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m): .

Right Entrenchment Width (m): .

Total Entrenchment Width (m): .

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): .

Point Spacing (m): .

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD	.	
Right BFD	.	
Max. Chann. Depth	.	
Left Active Chann.	.	
Right Active Chann.	.	

Ht. Represents Bankfull? ☐ Yes ☐ No

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.2	0				.
2	0.4	50				.
3	0.6	140				.
4	0.8	405				.
5	0.9	655	0			.
6	1.0	—	340			.
7	1.2		405			.
8	1.6		355			.
9	2.0		470			.
10	2.4		575			.
11	2.8		790			.
12	3.2		900			.
13	3.6		975			.
14	4.0		1035			.
15	4.4		965			.
16	4.8		895			.
17	5.2		925			.
18	5.6		865			.
19	6.0		820			.
20	6.4		845			.

Comments: See T1

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB/KW				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 2 of 2

Stream Name: JCRK-03-T1

Date (yyyy-mm-dd): 2023-07-12

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements

(Recommended depth ratio from stream bottom is 0.4 m)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	7.0		505			
22	7.2		390			
23	7.4		220			
24	7.6		200			
25	7.8		0			
26	7.9	460				
27	8.1	320				
28	8.3	140				
29	8.4	50				
30	8.5	0				

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)

Comments:

Rip. veg: milkweed, prickly rose, graminoids, meadow rue, clovers, vetch/pea vine, overstories of alder w. upland transition to black + white spruce, birch, balsam poplar, trembling aspen. Also red osier dogwood prominent along banks.

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB/KW				

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 & 2

Stream Name: JCRK-03-T1

Date (yyyy-mm-dd): 2023-07-12

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.2	0				
2	0.4	190				
3	0.6	640				
4	0.72	740	0			
5	0.80	0	60			
6	1.0		205			
7	1.4		410			
8	1.8		570			
9	2.2		640			
10	2.4		670			
11	3.0		685			
12	3.4		560			
13	3.8		745			
14	4.2		755			
15	4.6		765			
16	5.0		765			
17	5.4		715			
18	5.8		730			
19	6.2		710			
20	6.6		660			

Comments: *See Water Quality on Back
Small, permanent watercourse w. vertical (>45°) banks, sand & gravel dom. sub with some cobble boulder, Irregular meandering channel pattern. Some submergent macrophytes. Cover dom. by OV(40%); SWD(30%), LWD(10%) + Emergent veg (20%). Total cover for fish ~ 14%. continued p3.2

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB/KW				

Water Quality

Temp	17.4°C	SPC	0.113
Conductivity		ORP	196.2
DO%	111.9		
DO (mg/L)	10.38		
pH	6.59		

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 2 of 3 | Page No. 2 of 2

Stream Name: JCRK-03-T2

Date (yyyy-mm-dd): 2023-07-12

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.
Site Length (m):
Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (*Check all applicable types*)
☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L / R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth
Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height
Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):
Right Entrenchment Width (m):
Total Entrenchment Width (m):

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect
1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m):
Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements (*Recommended depth ratio from stream bottom is 0.4 m*)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
21	6.8		555			.
22	7.2		450			.
23	7.6		280			.
24	8.0		100			.
25	8.27	655	0			.
26	8.5	535				.
27	8.8	440				.
29	9.1	310				.
30	9.4	200				.
31	9.7	180				.
32	10.0	0				.
	.					.
	.					.
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Velocity Measurements

Observ.	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
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				.

Comments: See T1

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected

ELECTROFISHING FORM

Project Site / Project Number:

WSP

Waterbody or Watercourse Name:	Date: (DD / MMM / YY)	Water Temp:	Shocking Method:	Pg: ___ of ___ Run: ___ of ___
NDR-S-04	11/07/			
UTM Start:	**Start Time: (24 hrs)**	**Stop Time: (24 hrs)**	**Netters:**	**Site Area / Description: (Length X Width)**
				P1 : 373 P2 : 361 P3: 385
UTM End:				
Sample ID:	**Elapsed Time: (hours)**	**Effort: (seconds)**	**Voltage / % Power:**	**Frequency / Range (high/low)** / **Pulse:**
NDR-S				

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
CS	1		60	~~66~~	2.55					
BSB	2			45	1.12					
BSB	3			49	1.34					
FTHM	4		41	38	0.59					
BSB	5			50	1.54					
BSB	6			38	0.44					
BSB	7			39	0.47					
L>										
1 FNSD	8	->	escapee							

Species Box Tally Area / Site Comments:

P1; 3 BSB, 1 FNSD
P2; 1 BSB, 1 CS
P3; 1 BSB, 1 FTHM

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

ELECTROFISHING FORM

Project Site / Project Number: OMEMA2304/5

WSP

Waterbody or Watercourse Name:	Date: (DD / MMM / YY)	Water Temp:	Shocking Method:	Pg: 1 of 1 Run: ___ of ___
NDR-S-06B	11/07/23		Backpack	

UTM Start:	Start Time: (24 hrs)	Stop Time: (24 hrs)	Netters:	Site Area / Description: (Length X Width)
C1	P1: 14:15	P1: 14:30	KW	P1: 342s, C1 to C3
UTM End:	P2: 14:30	P2: 14:45		P2: 353s, way points
C3	P3: 14:45	P3: 15:00		P3: 320s

Sample ID:	Elapsed Time: (hours)	Effort: (seconds)	Voltage / % Power:	Frequency / Range (high/low)	Pulse: DC:
NDR-S-06B-EF1	0.75	995	350 V	60 Hz	16%

Species	Fish #	Species Code (MNR)	Length (mm) Fork	Length (mm) Total	Round Weight (g / kg)	Retained Aging / Tiss. / Both	Aging Structures (Sc, Pr, Dr, Oto)	Tissue (WB / Fill.)	Presumed age class (YOY / 1+)	Comments (Metals Analysis (Hg), disease, malformation, etc.)
BSB	1			44	0.73					
	2			42	0.66					
	3			35	0.40					
	4			42	0.68					
	5			40	0.56					
	6			34	0.37					
	7			55	1.30					
	8			36	0.41					
	9			54	1.01					
	10			47	0.83					
	11			47	1.01					
	12			34	0.39					
	13			32	0.39					
	14			45	0.85					
	15			45	0.81					
	16			35	0.40					
	17			30	0.39					
FNSD	18		63	67	2.81					
	19		56	60	2.13					
	20		54	59	1.49					

Species Box Tally Area / Site Comments:

P1: 6 BSB, 2 FNSD

P2: 6 BSB, 1 FNSD

P3: 3 BSB

Species	Total Catch	Species	Total Catch

QA/QC By:

Date:

Legend:
Sc - Scales
Pr - Pectoral Ray
Oto - Otoliths
Dr - Dorsal Ray
yoy - Young Of the Year
1+ - Older than "yoy"
WB - Whole Body
Fill. - Fillet or Dorsal Epaxial

Diagnostic Indicators of Channel Stability

Transect No. 2 of 3 | Page No. 2 of 3

Mandatory Fields In Grey
Must be filled out for processing

Stream Name: * waypoint "C2" — NDR-S-06B-Transect2

Date (yyyy-mm-dd): 2023-07-11

Stream Code

Site Code

Sample

Record only on the 1st transect.

Site Length (m)

Transect Spacing (m)

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow (*Check all applicable types*)

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☑	☑
Min. Width:Depth	☐	☐

Others
L
R

Entrenchment
Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m)

Right Entrenchment Width (m)

Total Entrenchment Width (m)

Transect & Point Layout
Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 1.7

Point Spacing (m)

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)
Left BFD		
Right BFD		
Max. Chann. Depth		
Left Active Chann.		
Right Active Chann.		

Ht. Represents Bankfull? ☐ Yes ☐ No

Velocity Measurements (*Recommended depth ratio from stream bottom is 0.4 m*)

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.0					
2	0.1	170				
3	0.2	0	530			
4	0.4		570			
5	0.6		615			
6	0.8		610			
7	0.9		630			
8	1.0		650			
9	1.2		750			
10	1.4	1	740			
11	1.6		645			
12	1.7	170	0			
13	1.9	100				
14	2.2	0				

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
9	1.2		750			
10	1.4	1	740			
11	1.6		645			
12	1.7	170	0			
13	1.9	100				
14	2.2	0				

Comments

Frequent undercut banks. Riparian margins of graminoids + Alder, Tamarack + black spruce overstories upland. No flow scour/alluvial deposition. 100% organic substrates.

Crew Leader (init. & last name)

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB/KL	MB			

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 3 of 3 | Page No. 3 of 3

Stream Name: waypoint "C3" — NDR-S-06B-Transect 3

Date (yyyy-mm-dd): 2023-07-11

Stream Code

Site Code

Sample

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☐	☐
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width.

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 1.6

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD	.		☐ Yes ☐ No
Right BFD	.		
Max. Chann. Depth	.		
Left Active Chann.	.		
Right Active Chann.	.		

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.0	0				.
2	0.2	120	0			.
3	0.4		45			.
4	0.6		55			.
5	0.8		120			.
6	1.0		200			.
7	1.2		400			.
8	1.4		450			.
9	1.5		370			.
10	1.6	120	0			.
11	1.61	0	0			.
~~12~~	.					.
~~13~~	.					.
~~14~~	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.
	.					.

Comments

Riparian veg of alder, sedges, aquatic grasses, spike rushes. Further upland dom of tamarack & black spruce. Low flow. Frequent undercut banks 100% organic subs. No flow scour/alluvial deposition. Very low relief

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB/KW	MB			

Diagnostic Indicators of Channel Stability

Mandatory Fields In Grey
Must be filled out for processing

Transect No. 1 of 3 | Page No. 1 of 3

Stream Name: NDR-S-06B * Waypoint "C1"

Date (yyyy-mm-dd): 2023-07-11

Stream Code:

Site Code:

Sample:

Record only on the 1st transect.

Site Length (m):

Transect Spacing (m):

Discharge Approximates Baseflow? ☐ Yes ☐ No Unk

Obstructions to Flow *(Check all applicable types)*

☐ None Present ☐ Armouring
☐ Trampled Banks ☐ Inlets
☐ Wood Deflectors ☐ Other
☐ Inorganic Deflectors

Others:

Indicators Used to Locate Bankfull Level

	Left Bank	Right Bank
Inflection Point	☐	☐
Bank Material	☐	☐
Top of Point Bar	☐	☐
Vegetation	☑	☑
Min. Width:Depth	☐	☐

Others: L R

Entrenchment

Entrenchment Height = 2 x Max. Channel Depth

Entrenchment Width = horiz. distance from the location of the Max. Channel Depth to the bank at the Entrenchment Height

Record either the Left and Right width or the Total Width

Left Entrenchment Width (m):

Right Entrenchment Width (m):

Total Entrenchment Width (m):

Transect & Point Layout

Use this table to determine the number of measured points per transect, given the minimum stream width

Minimum Width (m)	Low Variance in Velocity or Depth	High Variance in Velocity or Depth
> 3.0	8+1 every 2 m	10+1 every 1m
1.5 - 3.0	5	8
1.0 - 1.49	3	6
< 1.0	2	4

Point Spacing = Active Channel Width / Points per Transect

1st Point = Point Spacing / 2 (from left bank)

Active Channel Width (m): 1.4

Point Spacing (m):

Channel Profile

	Horiz. Loc. (m)	Vert. Ht. (mm)	Ht. Represents Bankfull?
Left BFD			☐ Yes ☐ No
Right BFD			
Max. Chann. Depth			
Left Active Chann.			
Right Active Chann.			

Velocity Measurements *(Recommended depth ratio from stream bottom is 0.4 m)*

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
1	0.0	0				
2	0.2	70				
3	0.4	140	0			
4	0.6		200			
5	0.8		400			
6	1.0		400			
7	1.2		400			
8	1.4		290			

Velocity Measurements

Observ.	Horiz. Loc. (m)	Vert. Ht. (mm)	Water Depth (mm)	Observ. Depth (mm)	Turns/ Min.	Velocity (m/s)
9	1.6		425			
10	1.75		130			
11	1.8	140	0			
12	2.0	70				
13	2.2	0				
14						

Comments: Conducted channel measurements U/S of floating fen/muskeg in wet meadow bordered by willow, alder + wpl. spp. & tamarack, black spruce; channel narrows/shallows U/S of open floating fen area. No real indicators & flow scour/alluvial deposition. Bed material 100% organic. Dominant riparian veg. is graminoid (sedge, rush & bulrush)

Crew Leader (init. & last name):

Crew	Recorder	Ent/Scanned	Verified	Corrected
MB/KW	MB			

Crawford AMEMA23045 17 JUL 2023

WBR-S-07 Habitat notes

Primarily shallow run at time of site visit
Infrequent RIPPLE, Immediate riparian
margins on overstory of alder w. trees
below. Moderately steep banks ~ 20-40°.
But up to 2m high above wetted width.
Upland veg: along left us bank is
black spruce + tamarack.
IV is tape grass & yellow pond lily, bur
duckweed, arrowhead
FBI - Total cover avail to fish ~ 14%;
Comprised of IV (65%), LWD (25%),
OV alder (10%), low flow
Very minor patches of small cobbles, large
+ small gravel, Primarily silty sand
bed
- several large bodied fish obs. darting
away
potamogeton.

Scanned with CamScanner

APPENDIX C1: WATERCOURSE FIELD COLLECTION FORM

GENERAL INFORMATION			
Project # OMFMA23045	Project Description: baseline - highway realignment		Date: 17/23
Is Stream Realignment required for this section: O Yes O No ⊘ Unknown			
Collectors: CM, MB		Time Started: 10:47	Time Finished: 11:20
Weather Conditions: Overcast			
Air Temp (°C):	Water Temp (°C):	Conductivity (µS/cm):	Velocity (m/s):
Photos Numbers and Descriptions:			

LOCATION			
Name of Waterbody: RDAL-06 upstream	Drainage System: —	Crossing #: —	Station #: —
Location of Crossing: —			
GPS Coordinates: 17U 469695 5411715		MTO Chainage: —	
Township: Timmins		MNRF District: Timmins	

LAND USE AND POLLUTION	
Surrounding Land Use: Forest ~800m from highway	Sources of Pollution: N/A

EXISTING STRUCTURE TYPE				
Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A O
Other O (Describe) —		Size: (w x h) m^2 —		

SECTION TYPE AND MORPHOLOGY

important upstream (beaver dam)

Section (Reach) Identifier:			Section Location: (Include on Habitat Map)	
Associated Wetland yes				
Stream/River ○	Channelized ○	Permanent ⊘	Intermittent ○	Ephemeral ○
Total Section (Reach) Length (m): 20m				

Sub-Sections:	Run ○	Pool ○	Riffle ○	Flats ○	Culvert ○	Other ○
Percentage of Area:				100%		
Mean wetted depth (m)				1.05		
Mean wetted width (m)				2.7		
Mean bankfull depth (m)				1.30		
Mean bankfull width (m)				4.7		
Substrate (type & %)						100%

Bedrock (Br)	*Boulder (Bo)*	*Cobble (Co)*	*Gravel (Gr)*	*Sand (Sa)*	*Silt (Si)*	*Clay (Cl)*	*Muck (Mu)*	*Detritus (D)*

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Bank	✓	○	○	○
Right Bank	✓	○	○	○
	Deposition Zone	Protected Bank	Vulnerable Bank	Eroding Bank
Left Bank	○	✓	○	○
Right Bank	○	✓ sedges	○	○

HABITAT

In-Stream Cover (% surface area):

Undercut banks:	Boulders:	Cobbles:	Organic Debris:	None
35%			45%	○

instream overhanging veg with some woody debris

Vascular Macrophytes: sedges	Woody Debris:
Instream: pondweed sp.	Instream: logs
Overhanging: sedges	Overhanging: none

* Confirm pics

Shore Cover (% stream shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	Ø	O	O

Vegetation Type:

Vegetation Type (%)	Submergent 33-1.	Floating: 33-1.	Emergent: 33-1.	None O
Predominant Species:	floc, sedges algae	pondweed, flax	sedges, bog bean	

MIGRATORY OBSTRUCTIONS

Permanent	Seasonal	None
		(None)

POTENTIAL SIGNIFICANT HABITAT

Spawning (Potential for N. Pike instream vegetation)	Groundwater	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES

ADDITIONAL COMMENTS

- mature vegetation (spruce, tamarack) 20-25m from left bank
+ ~10-15m from right bank
- riparian zone dominated by sedges, some iris, bordered by willow + alder, some cattail
leatherleaf
sphagnum moss

Additional Notes Appended? Ø No O Yes Number of Pages _____

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):

PROJECT #:

MAPPER:

NAME OF WATERBODY:

CROSSING #:

STATION #:

DATE: DD-MMM-YY

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
⬭ Pool
▓ Island/Bar

▒ Fine Substrate
Gravel Substrate
oOooO Cobble /Boulder
* * * Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
/////// Eroded Bank

XXX Riprap / Other Stabilization

⊂⊃ Instream Log/Tree
^^^ Dam/Weir/Obstruction

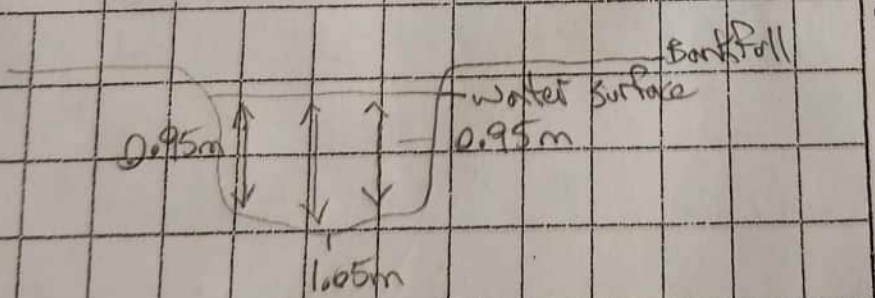
® Riparian Tree

├▸ Seep/Spring
------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
└┘ Culvert

PROFILE: Horz. Scale Vert. Scale



APPENDIX C1: WATERCOURSE FIELD COLLECTION FORM

GENERAL INFORMATION			
Project # OMEMA23045	Project Description: baseline - highway realignment		Date: 17/1/23
Is Stream Realignment required for this section: ○ Yes ○ No ⊘ Unknown			
Collectors: CM, MB		Time Started: 11:30	Time Finished: 12:00
Weather Conditions: overcast			
Air Temp (°C):	Water Temp (°C):	Conductivity (µS/cm):	Velocity (m/s):
Photos Numbers and Descriptions:			

LOCATION			
Name of Waterbody: RDAL-06 downstream	Drainage System: —	Crossing #: —	Station #: —
Location of Crossing: —			
GPS Coordinates: 17U 469688 5411706		MTO Chainage: —	
Township: Timmins		MNRF District: Timmins	

LAND USE AND POLLUTION	
Surrounding Land Use: Forest ~800m from highway	Sources of Pollution: NA

EXISTING STRUCTURE TYPE				
Bridge ○	Box Culvert ○	Open Foot Culvert ○	CSP ○	N/A ⊘
Other ○ (Describe) —		Size: (w x h) m^2 —		

SECTION TYPE AND MORPHOLOGY

Section (Reach) Identifier:	Section Location: (Include on Habitat Map)
Associated Wetland 405	

Stream/River	Channelized	Permanent	Intermittent	Ephemeral
O	O	✓	O	O

Total Section (Reach) Length (m): 50

Sub-Sections:	Run	Pool	Riffle	Flats	Culvert	Other
	O	O	O	O	O	O
Percentage of Area:		20%		80%		
Mean wetted depth (m)				1.1		
Mean wetted width (m)				1.59		
Mean bankfull depth (m)				1.4		
Mean bankfull width (m)				4.69		
Substrate (type & %)						100%

Bedrock (Br)	*Boulder (Bo)*	*Cobble (Co)*	*Gravel (Gr)*	*Sand (Sa)*	*Silt (Si)*	*Clay (Cl)*	*Muck (Mu)*	*Detritus (D)*

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Bank	✓	O	O	O
Right Bank	✓	O	O	O
	Deposition Zone	Protected Bank	Vulnerable Bank	Eroding Bank
Left Bank	O	✓	O	O
Right Bank	O	✓	O	O

HABITAT

In-Stream Cover (% surface area):

Undercut banks:	Boulders:	Cobbles:	Organic Debris:	None
55%			45%	O

Vascular Macrophytes:	Woody Debris:
Instream: smartweed, floc, detritus	Instream: trace
Overhanging: sedges	Overhanging: none

Shore Cover (% stream shaded):

100-90%	89-60%	59-30%	29-1%	None
O	⊘	O	O	O

Vegetation Type:

Vegetation Type (%)	Submergent 33%	Floating: 33%	Emergent: 33%	None O
Predominant Species:	floc, algae, sedges	pondweed, floc	smartweed, sedges, bogbean	

MIGRATORY OBSTRUCTIONS

Permanent	Seasonal	None
		(None)

POTENTIAL SIGNIFICANT HABITAT

Spawning (Potential for N. Pike (instream vegetation))	Groundwater	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES

ADDITIONAL COMMENTS

- same as upstream reach

Additional Notes Appended? ⊘ No O Yes Number of Pages _____

APPENDIX C1: WATERCOURSE FIELD COLLECTION FORM

GENERAL INFORMATION			
Project # OUEMA2304S	Project Description:		Date: 16 July 23
Is Stream Realignment required for this section: O Yes O No ⊘ Unknown			
Collectors: AD, CM		Time Started: 17:00	Time Finished: 17:30
Weather Conditions: sunny, hot			
Air Temp (°C): –	Water Temp (°C): 17.7	Conductivity (µS/cm): 0.171 mS/cm	Velocity (m/s): –
Photos Numbers and Descriptions: AD phone			

LOCATION			
Name of Waterbody: RDAL-02	Drainage System: –	Crossing #: –	Station #: –
Location of Crossing: –			
GPS Coordinates: AD GPS		MTO Chainage: –	
Township: Timmins		MNRF District: Timmins	

LAND USE AND POLLUTION	
Surrounding Land Use: Forest	Sources of Pollution: None

EXISTING STRUCTURE TYPE				
Bridge O	Box Culvert O	Open Foot Culvert O	CSP O	N/A ⊘
Other O (Describe)		Size: (w x h) m^2 –		

SECTION TYPE AND MORPHOLOGY

Section (Reach) Identifier:			Section Location: (Include on Habitat Map)	
Associated Wetland: Flood-plain				
Stream/River: O	Channelized: O	Permanent: ⊗	Intermittent: O	Ephemeral: O
Total Section (Reach) Length (m):				

Sub-Sections:	Run	Pool	Riffle	Flats	Culvert	Other
	O	O	O	O	O	O
Percentage of Area:	0	100%	0	0	0	
Mean wetted depth (m)		~0.75m throughout floodplain ~1.0 m in "active channel"				
Mean wetted width (m)		~~200~~ ~100m (floodplain)				
Mean bankfull depth (m)		N/A				
Mean bankfull width (m)		N/A				
Substrate (type & %)		100% organics				

Bedrock (Br)	*Boulder (Bo)*	*Cobble (Co)*	*Gravel (Gr)*	*Sand (Sa)*	*Silt (Si)*	*Clay (Cl)*	*Muck (Mu)*	*Detritus (D)*

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Bank N/A	O	O	O	O
Right Bank N/A	O	O	O	O
	Deposition Zone	Protected Bank	Vulnerable Bank	Eroding Bank
Left Bank N/A	O	O	O	O
Right Bank N/A	O	O	O	O

HABITAT

In-Stream Cover (% surface area):

Undercut banks:	Boulders:	Cobbles:	Organic Debris:	None: ⊗

Vascular Macrophytes:	Woody Debris:
Instream: all sedge/grasses which dominate wetted areas	Instream: 10% of historic tree debris
Overhanging:	Overhanging:

Shore Cover (% stream shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	O	O	⊘

Vegetation Type:

Vegetation Type (%)	Submergent:	Floating:	Emergent:	None
Predominant Species:			sedge/grasses 100%	O

MIGRATORY OBSTRUCTIONS

Permanent	Seasonal	None
		X

POTENTIAL SIGNIFICANT HABITAT

Spawning	Groundwater	Other
possibly minnow sp		

POTENTIAL ENHANCEMENT OPPORTUNITIES

–

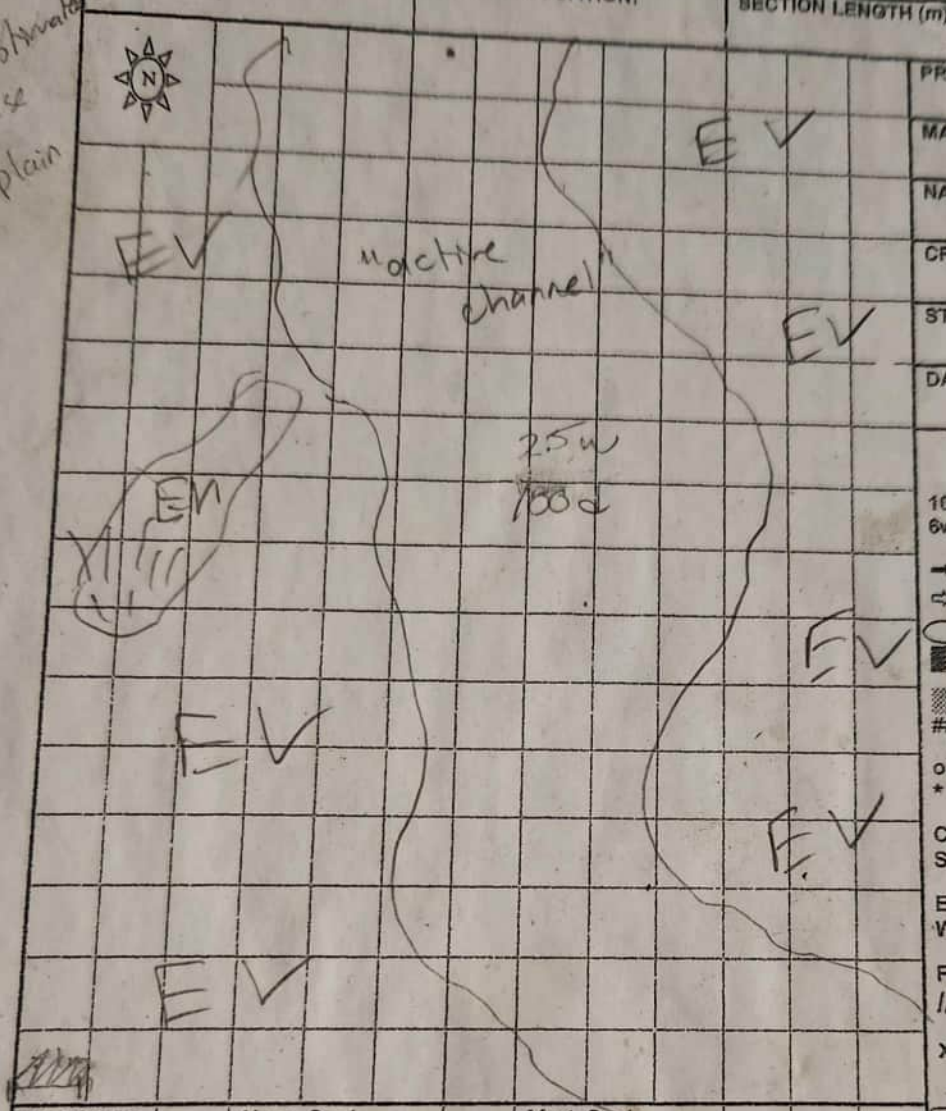
ADDITIONAL COMMENTS

- Completely flooded plain with some resemblance of an "active" channel. However there is very little flow if any (< 0.31 m/s) due to sedge/grass interuptions to flow. Potentially active channel for upstream/downstream of site location. Also potentially Fish hab, support species like NRBD, PRDC, FSDC

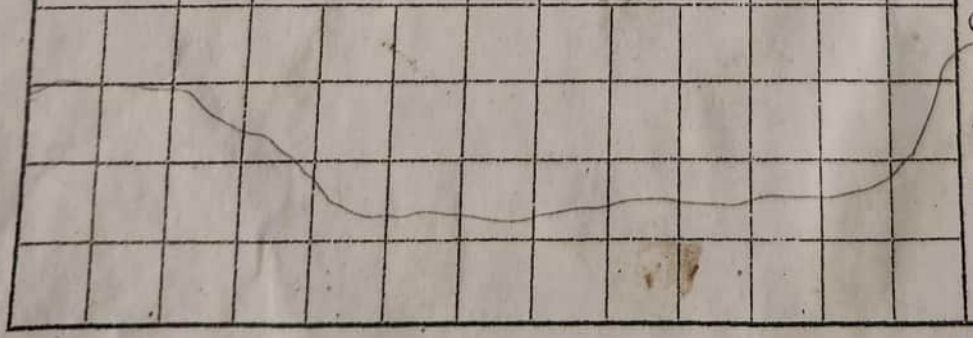
Additional Notes Appended? O No O Yes Number of Pages _____

Estimate because floodplain

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m): not to scale



PROFILE: Horz. Scale Vert. Scale



PROJECT #:

MAPPER:

NAME OF WATERBODY:

CROSSING #:

STATION #:

DATE: DD-MMM-YY

LEGEND

10d depth (cm)
6w width (m)

→ Riffle
⇨ Run/Glide
⬭ Pool
▓ Island/Bar

▒ Fine Substrate
Gravel Substrate
oOooO Cobble /Boulder
* * * Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
/////// Eroded Bank

XXX Riprap / Other Stabilization

⬭ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

⊢▸ Seep/Spring
------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
└┘ Culvert

FRD RDL 02

APPENDIX C1: WATERCOURSE FIELD COLLECTION FORM

GENERAL INFORMATION			
Project # ONEMA23045	Project Description:		Date: 16/07/23
Is Stream Realignment required for this section: ○ Yes ○ No ○ Unknown			
Collectors: KW/MB		Time Started: 13:15	Time Finished: 13:30
Weather Conditions:			
Air Temp (°C): 24	Water Temp (°C):	Conductivity (µS/cm):	Velocity (m/s):
Photos Numbers and Descriptions: See MB			

LOCATION			
Name of Waterbody:	Drainage System: Socio Creek	Crossing #:	Station #: RDAL-01
Location of Crossing:			
GPS Coordinates:		MTO Chainage:	
Township:		MNRF District:	

LAND USE AND POLLUTION	
Surrounding Land Use:	Sources of Pollution:

EXISTING STRUCTURE TYPE				
Bridge ○	Box Culvert ○	Open Foot Culvert ○	CSP ○	N/A ○
Other (Describe) Potential historic bridge, old timbers present but no existing structure		Size: (w x h) m² Estimated size ~4m wide x 15m long		

SECTION TYPE AND MORPHOLOGY

Section (Reach) Identifier:	Section Location: (Include on Habitat Map)
Associated Wetland	

Stream/River	Channelized	Permanent	Intermittent	Ephemeral
○	○	●	○	○

Total Section (Reach) Length (m): 20 up & 50 down = 70m

Sub-Sections:	Run ○	Pool ○	Riffle ○	Flats ○	Culvert ○	Other ○
Percentage of Area:	40	30	10	20		
Mean wetted depth (m)	700-800	~1000-1400	200-300	500-600		
Mean wetted width (m)	8	10-12	8	8		
Mean bankfull depth (m)	+1	+1	+1	+1		
Mean bankfull width (m)	14-15	14-15	14-15	14-15		
Substrate (type & %)	Cl+Si+Sa		(more gravel than rubble) occasional boulder			

Bedrock (Br)	Boulder (Bo)	Cobble (Co)	Gravel (Gr)	Sand (Sa)	Silt (Si)	Clay (Cl)	Muck (Mu)	Detritus (D)

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Bank	○	✗	○	○
Right Bank	○	✗	○	○
	Deposition Zone	Protected Bank	Vulnerable Bank	Eroding Bank
Left Bank	○	✗ ○ grass and large trees/shrubs	○	○
Right Bank	○	✗ ○	○	○

HABITAT

In-Stream Cover (% surface area): 15% overall

Undercut banks:	Boulders:	Cobbles:	Organic Debris:	None
			(algae) (submerged) 100%	○

Vascular Macrophytes: 20 % of total Instream: 10% Overhanging: 90%	Woody Debris: 60% (40 & 20s) of total Instream: 60% Overhanging: 40%

Shore Cover (% stream shaded):

100-90%	89-60%	59-30%	29-1%	None
O	O	X	O	O

Vegetation Type:

Vegetation Type (%)	Submergent 50	Floating:	Emergent: 50	None O
Predominant Species:	grasses			

MIGRATORY OBSTRUCTIONS

Permanent	Seasonal	None
		(None)

POTENTIAL SIGNIFICANT HABITAT N/O

Spawning	Groundwater	Other
Poor for broadcast spawners and no gravel/larger sub.		

POTENTIAL ENHANCEMENT OPPORTUNITIES

ADDITIONAL COMMENTS

Overall poor spawning habitat for broadcast/coarse substrate spawners (eg. walleye & white sucker) due to absence of coarse subs. ~~Mod poor~~ Entirely fine bed materials fill interstitial spaces. Poor for veg. spawners (eg. NRPK) due to very low abundance of instream veg. Some overhanging veg would be available during high flows early spring but subject to high velocity flow. Also or would rapidly become unavailable as receding water levels. Poor-moderate resting/staging/holding provided by LWD.

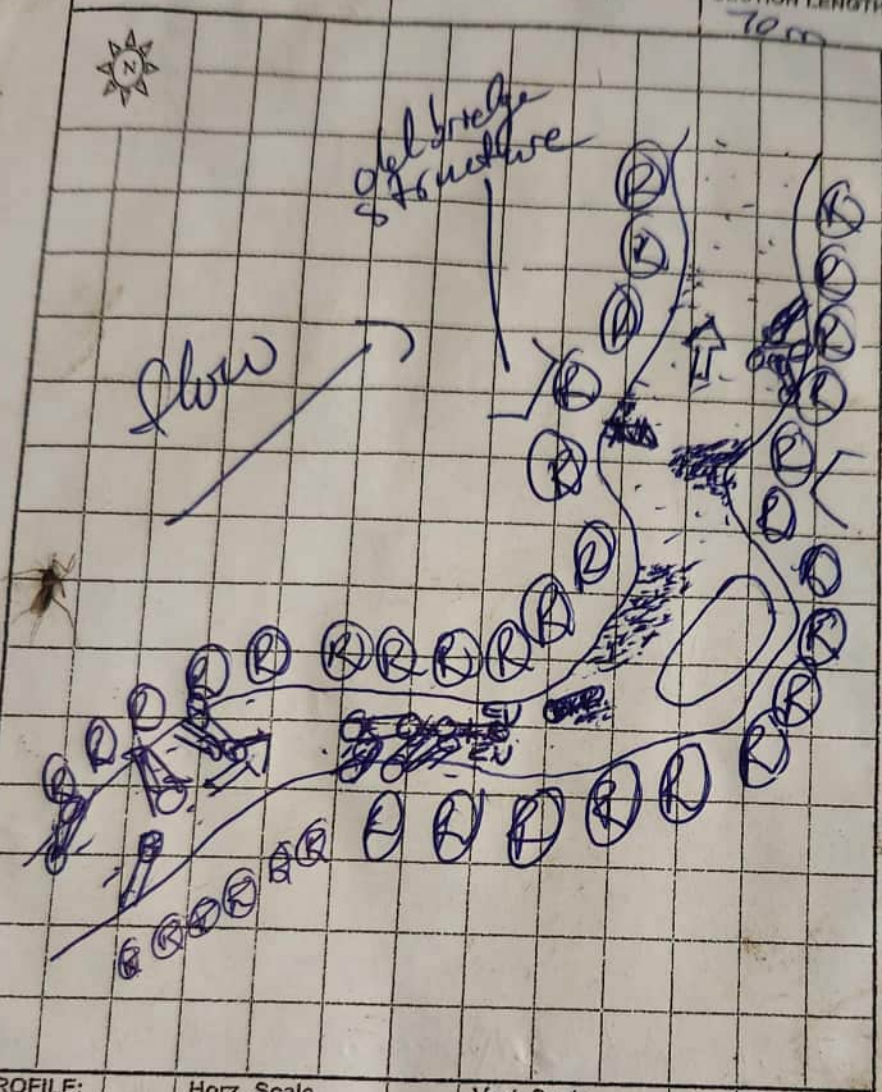
Additional Notes Appended? O No O Yes Number of Pages _____

100% fine sub (silt + clay) some sand

Ministry of Transportation
Environmental Guide for Fish and Fish Habitat

Section 4: Field Investigations
Appendix 4.C: Fish Habitat Mapping

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m): 70.00	SCALE (cm / m):

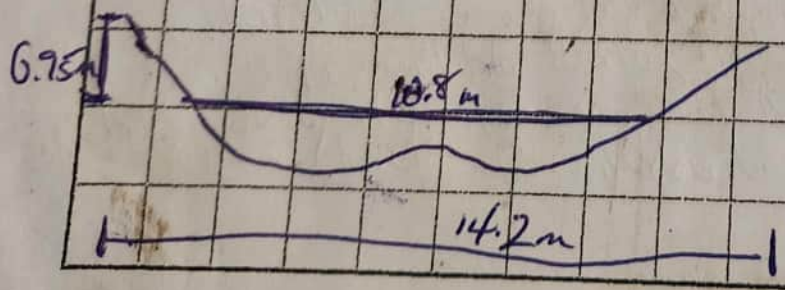


PROJECT #: OMEMA23013
MAPPER: KW / MB
NAME OF WATERBODY:
CROSSING #:
STATION #: RDAL-01
DATE: DD-MMM-YY: 16/07/23

LEGEND

10d depth (cm)
6w width
➡ Riffle
⇨ Run/Glide
⬭ Pool
▒ Island/Bar
▒ Fine Substrate
Gravel Substrate
oOooO Cobble /Boulder
* * * Debris
CT Cattail
SV/FV Submerg/Float Veg
EV Emergent Vegetation
W Watercress
Fe Iron Staining
//////// Eroded Bank
XXX Riprap / Other Stabilization
⬭ Instream Log/Tree
^^^ Dam/Weir/Obstruction
® Riparian Tree
⊢▸ Seep/Spring
------ Undercut Bank
— Barrier to Fish Movement
-S- Seasonal Barrier
-x--x- Fence line
└┘ Culvert

PROFILE: Horz. Scale Vert. Scale



LWB = 800mm C = 700mm RWB = 670mm
: over 1.4m deep at old bridge crossing

Wetted Width = 10.8m R bank H = 0.9m
Bankfull = 14.2m L bank H = 6.95m

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