

Addendum 1 to Quality Assurance Project Plan

Clearwater River (Idaho) Watershed Baseline Monitoring and Toxics Assessment – Phase I & II

**Columbia River Basin Restoration Funding Assistance Program -
Middle and Upper Columbia River Basin Grant**

Cooperative Agreement - Grant Number RB-01J72901-0



**Prepared by
Nez Perce Tribe
Water Resources Division
PO Box 365
Lapwai, ID 83540**

**Prepared for
EPA Region 10
1200 Sixth Avenue, Suite 155 (17-C04)
Seattle, WA 98101**

April 2022

This page intentionally left blank for correct double-sided printing.

Title and Approval Page

Addendum 1 to Quality Assurance Project Plan

Title: Clearwater River (Idaho) Watershed Baseline Monitoring & Toxics Assessment – Phase I & II

Tribe/Division: Nez Perce Tribe Water Resources Division

Revision Number: 1

Date: April 25, 2022

Approval Signatures

Note: This QAPP Addendum 1 becomes effective on the date of the last approval signature.

Division Administrator

Signature: _____

Name: Ken Clark, Director

Date

Project Manager

Signature: _____

Name: Sierra Higheagle, Water Quality Program Coordinator

Date

Project Quality Assurance Manager

Signature: _____

Name: Linda Nemeth, Planner/Writer-Technical Editor

Date

EPA Project Officer

Signature: _____

Name: Krista Mendelman

Date

EPA Quality Assurance Manager

Signature: _____

Name: Donald M. Brown

Date

This page intentionally left blank for correct double-sided printing.

Table of Contents

Title and Approval Page	3
Distribution List and Project/Task Organization	6
Problem Definition/Background	6
Project/Task Description.....	7
Sampling Process Design.....	9
Sampling Methods	10
Analytical Methods	12
Quality Control.....	19
Reconciliation with User Requirements	19
References	25
Appendix A Revisions	26
Appendix B Map.....	27

List of Tables

Table 1. Project QAPP distribution list.....	6
Table 2. Parameters and methods for Year 2 (2022).....	8
Table 3. Timeline and Milestones.	9
Table 4. Sampling sites for 2022.	10

List of Figures

Figure 1. Additional biotic tissue criterion (Lillian Herger, 2017).	23
Figure 2 Additional tissue criterion (Lillian Herger, 2017).	24

Distribution List and Project/Task Organization

At a minimum, the following personnel and analytical laboratory contacts will receive either an electronic or hard copy of the final signed version of this Addendum 1 to Quality Assurance Project Plan (QAPP) (Clearwater River (Idaho) Watershed Baseline Monitoring and Toxics Assessment- Phase I & Phase II Quality Assurance Project Plan, 2021). Key personnel and responsibilities remain the same as the QAPP with the only change being the laboratory being used and the laboratory personnel. ALS Global, Kelso, WA is the laboratory for Phase II analyses. They have the necessary expertise in sediment and tissue analyses for this phase. Kelley Lovejoy and Howard Boorse will serve as contacts at the laboratory for arranging sample bottles and analyses; reviewing the draft Addendum; and coordinating with WRD Project Manager and ALS QA Manager as needed.

Table 1. Project QAPP distribution list.

Name	Project Affiliation	Organization and Address/Location	Contact Info.
Ken Clark	Program Manager Division Director	Nez Perce Tribe Water Resources Division	208-843-7368 ext. 3903 Kenc@nezperce.org
Linda Nemeth	Project Quality Assurance Manager	Nez Perce Tribe Water Resources Division	208-621-3891 Lindan@nezperce.org
Sierra Higheagle	Project Manager	Nez Perce Tribe Water Resources Division	208-843-7368 ext. 3895 SierraH@nezperce.org
Krista Mendelman	EPA Project Officer	EPA	206-553-1571 Mendelman.Krista@epa.gov
Donald M. Brown	EPA Quality Assurance Manager	EPA	206-553-0717 Brown.donaldm@epa.gov
Howard Boorse / Kelley Lovejoy	Analytical Laboratory	ALS Environmental Kelso, Washington	360-557-7222 Howard.Boorse@alsglobal.com Kelley.Lovejoy@alsglobal.com

Problem Definition/Background

This Addendum 1 to the 2021 Clearwater River Watershed Baseline Monitoring and Toxics Assessment- Phase I & II Quality Assurance Project Plan (QAPP) provides details about Phase II sampling locations, parameters, laboratory, and sampling/analysis schedules for the planned 2022 Phase II monitoring. All other required quality assurance elements, including sampling methods, quality control, and data management, are described in the original Clearwater River Watershed Baseline Monitoring and Toxics Assessment- Phase I & Phase II QAPP and remain unchanged for the Clearwater River Watershed Baseline Monitoring and Toxics Assessment Phase II.

Problem Statement – Project Overview

The objective for Phase II is to monitor surface water, sediment, and biotic tissue (fish, mussel, and lamprey ammocoetes) from four sites in the Clearwater River. This document describes the Phase II (Year 2) work and defines the standards and methods used to ensure consistent sampling procedures and that data generated during field activities are accurate, complete and representative of actual riverine/stream conditions.

Surface water samples will be collected at four locations three times (spring, once accessible, summer, and fall) for total mercury, methyl mercury, metals (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, V, Zn), and nutrients. Sediment and tissue samples will be collected once at four locations (dependent on population densities found) for pesticides, PCBs, PDBEs, total mercury, methyl mercury, and metals (As, Cd, Cr, Cu, Pb, Ni, Se, Zn). In addition to these monitoring efforts, the WRD will work with the University of Idaho to conduct a microplastics study in fish tissue.

This QAPP addendum is meant to encompass and direct the monitoring requirements for Phase II monitoring and direct the method of laboratory analysis, manner of collection, data use and quality checks to ensure that data controls are in place and followed. The QAPP and this Addendum 1 are meant to supplement the Generic QAPP for WRD, and may supersede that document if there are differences.

Objectives and Intended Usage of Data

The objectives of the 2022 Phase II monitoring are to (1) supplement Clearwater River Watershed data; (2) fill data gaps for middle-upper Columbia River Basin; and (3) provide baseline data for the Clearwater River watershed to inform future monitoring and trend evaluation.

Data Usage

All data will be collected and consolidated into an Excel spreadsheet to provide baseline data for the Clearwater River watershed for availability and use by the Tribe's Natural Resources and Fisheries Departments, the Columbia River Toxics Reduction Working Group, and others.

Project/Task Description

This section summarizes how the work is performed, what data are obtained, where the data gathering activities occur, and the related projected schedule.

General Overview of Project

Performing ambient monitoring includes the following steps: 1) obtain landowner access agreement [if necessary], 2) conduct desktop research, 3) prepare a Field Sampling Plan, 4) conduct field work, including a pre-sampling site visit, and collect samples, 5) submit samples to analytical laboratory, 6) document effort on field sheets, and 7) process and assess data from the laboratory.

Project Schedule

In Phase II, WRD staff will collect surface water samples at four locations three times (spring, once accessible, summer, and fall) for total mercury, methyl mercury, metals (16), and nutrients. Sediment and tissue samples will be collected once, in late summer or early fall, at four locations (dependent on population densities found) for pesticides, PCBs, PBDEs, total mercury, methyl mercury, and metals (8). Sediments will also be analyzed for nutrients. Parameters and methods are listed below, followed by the Timeline and Milestones.

Table 2. Parameters and methods for Year 2 (2022).

Phase II (Year 2): Monitor surface water, sediment, and biotic tissue in the Clearwater River for pesticides, metals, PCBs, PBDEs, and nutrients.					
Surface Water		Sediment		Biotic Tissue: <i>Fish, Mussel, Lamprey Ammocoete</i>	
Parameter	Method	Parameter	Method	Parameter	Method
		Total solids	160.3M	Total solids	160.3M
				Lipids	NOAA lipid
Nutrients (NO ₃ +NO ₂ , TKN, NH ₃ , OP, and total phosphorus)	353.2 ASTM D1426-08B 350.1 365.3 365.3	Nutrients (NO ₃ +NO ₂ , NH ₃ , & Orthophosphorus)	352.3M 350.3 365.3		
Total Hg	1631	Total Hg	1631 app.	Total Hg	1631 app.
Methyl Hg	1630 mod.	Methyl Hg	1630 mod.	Methyl Hg	1630 mod.
Metals (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, V, Zn)	EPA 200.8	Metals (As, Cd, Cr, Cu, Pb, Ni, Se, Zn)	6020A	Metals (As, Cd, Cr, Cu, Pb, Ni, Se, Zn)	6020A
		PCBs	1668C - HRCG/HRMS	PCBs	1668C - HRCG/HRMS
		PBDEs	1614	PBDEs	1614
		Organochlorine Pesticides	1699 - HRCG/HRMS	Organochlorine Pesticides	1699 -HRCG/HRMS

Table 3. Timeline and Milestones.

Timeline/Milestones												
Objective: Responsibility	Year 2 - 2022											
General tasks throughout the project:	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1. QAPP Addendum prep and approval												
2. Data review												
3. Report writing												
Goal 1, Objective 2, Task 1: Monitor surface water in the Clearwater River for Tier 1 and Tier 2 toxics												
1. Raft assembly, prep, and testing: WRD												
2. Water sampling at 4 sites: WRD												
Goal 1, Objective 2, Task 2: Monitor river sediment and fish, mussel, and lamprey ammocoete tissue in the Clearwater River for Tier 1 and Tier 2 toxics												
1. Lamprey & mussel tissue collection at 4 sites: FWS & WRD												
2. Fish collection at 4 sites: WRD												
Goal 1, Objective 2, Task 3: Monitor for microplastics in fish tissue												
1. Fish collection at 4 sites: WRD and/or U of I												
2. Fish tissue analysis of microplastics: U of I												

Sampling Process Design

This section describes the project data collection activities, assumptions, sampling site selection, general descriptions of the number of samples to be taken, the number of sampling locations, if samples are to be individually handled or composited, and any other relevant project-specific information.

Sample Locations

A total of four sites will be sampled. All monitoring sites are geo-referenced using Global Positioning Systems. Surface water sampling site information for Phase II sample locations is provided in the table below. A map showing sampling locations for both Phase I and Phase II is in Appendix B. The locations of biotic tissue and sediment sampling will depend on the data obtained this spring and summer (2022) by the USFWS, but will be near the general area of the site names below, and GPS measurements will be taken.

Table 4. Sampling sites for 2022.

CRB 2022 Sampling sites			
Site Name	WRD Site ID	Latitude	Longitude
Clearwater River near mouth	11501A	46.4287279	-117.0308774
Clearwater River near Blue North Mill	11565A	46.24129	-116.0373263
North Fork Clearwater River near mouth	12501A	46.5035866	-116.3281735
Middle Fork Clearwater River	12623A	46.1408014	-115.6050892

Sampling Methods

Field safety and field work procedures are given in the original QAPP (Clearwater River (Idaho) Watershed Baseline Monitoring and Toxics Assessment- Phase I & Phase II Quality Assurance Project Plan, 2021).

Sampling Handling and Custody

All sample containers and preservatives will be obtained from the laboratory (ALS Global, Kelso, WA). Samples must be preserved and analyzed within the holding times. The laboratory will be notified prior to sample shipment or delivery to ensure the holding time is not exceeded. All other instructions provided by the analytical laboratory will be followed throughout the duration of the project. Procedures for receiving, storing, and handling of samples in the laboratory are provided in the ALS Lab Quality Assurance Manual.

Table 5. Sample Holding and Storage.

Parameter	Methods	Holding Time	Preservative	Sample Size	Container Size and Type
Surface Water					
Total Mercury	1631 mod.	28 Days	HCl <4°C	125 ml	FP
Methyl Mercury	1630 mod	6 Months	HCl <4°C	125 ml	FP
Metals (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, V, Zn)					
Antimony (Sb)	EPA 200.8	6 Months	HNO ₃ <4°C	125 ml	P
Arsenic (As)					
Barium (Ba)					
Beryllium (Be)					
Cadmium (Cd)					
Chromium (Cr)					
Cobalt (Co)					
Copper (Cu)					
Lead (Pb)					
Molybdenum (Mo)					

Nickel (Ni)					
Selenium (Se)					
Silver (Ag)					
Thallium (Tl)					
Vanadium (V)					
Zinc (Zn)					
Nutrients					
Nitrate+nitrite	353.2	28 Days	H2SO4 <6°C	(2x) 250 ml	P
Total Kjeldahl Nitrogen (TKN)	ASTM D1426-08B				
Ammonia- nitrogen	350.1				
Total phosphorus	365.3				
Orthophosphorus	365.3	48 Hrs	<6°C	125 ml	P
Sediment					
Organochlorine Pesticides*	1699-HRCG/HRMS	1 Year	-10°C	20 grams	G
Total Mercury	1631 app.		-10°C	5 grams	FP
Methyl Mercury	1630 mod.		-15°C	5 grams	FP
PCBs*	1668C-HRCG/HRMS		-10°C	20 grams	G
PBDEs*	1614		-10°C	20 grams	G
Metals (As, Cd, Cr, Cu, Pb, Ni, Se, Zn)					
Arsenic (As)	6020A	6 Months	<4°C	20 grams	P or G
Cadmium (Cd)					
Chromium (Cr)					
Copper (Cu)					
Lead (Pb)					
Nickle (Ni)					
Selenium (Se)					
Zinc (Zn)					
Nutrients					
Nitrate+nitrite	350.3M	28 Days	<6°C	20 grams	P or G
Ammonia- nitrogen	350.3				
Orthophosphorus	365.3	48 Hrs			
Biotic Tissue					
Organochlorine Pesticides*	1699	1 Year	-10°C	20 grams	G
Total Mercury	1631 app.		-10°C	5 grams	FP
Methyl Mercury	1630 mod.		-15°C	5 grams	FP
PCBs*	1668C-HRCG/HRMS		-10°C	20 grams	G
PBDEs*	1614		-10°C	20 grams	G
Metals (As, Cd, Cr, Cu, Pb, Ni, Se, Zn)					
Arsenic (As)	6020A	6 Months	-10°C	20 grams	P or G
Cadmium (Cd)					
Chromium (Cr)					

Copper (Cu)					
Lead (Pb)					
Nickle (Ni)					
Selenium (Se)					
Zinc (Zn)					

FP= fluoropolymer; P= Plastic; G=Glass

*Samples will be analyzed at ALS Burlington.

Analytical Methods

Table 6. Parameters, Methods, and Lab MDLs and Units.

Parameter	Method	MDL	MRL (PQL)	Units
<u>Surface Water</u>				
Total Mercury	EPA 1631e	0.06	0.5	ng/L
Methyl Mercury	1630 mod.	0.03	0.1	ng/L
Metals (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, V, Zn)				
Antimony (Sb)	EPA 200.8	0.02	0.05	µg/L
Arsenic (As)		0.09	0.5	µg/L
Barium (Ba)		0.002	0.05	µg/L
Beryllium (Be)		0.005	0.02	µg/L
Cadmium (Cd)		0.008	0.02	µg/L
Chromium (Cr)		0.03	0.2	µg/L
Cobalt (Co)		0.006	0.02	µg/L
Copper (Cu)		0.05	0.1	µg/L
Lead (Pb)		0.006	0.02	µg/L
Molybdenum (Mo)		0.008	0.05	µg/L
Nickel (Ni)		0.04	0.2	µg/L
Selenium (Se)		0.2	1	µg/L
Silver (Ag)		0.009	0.02	µg/L
Thallium (Tl)		0.008	0.02	µg/L
Vanadium (V)		0.05	0.2	µg/L
Zinc (Zn)	0.5	2	µg/L	
Nutrients				
Nitrate+nitrite	353.2	0.02	0.05	mg/L
Total Kjeldahl Nitrogen (TKN)	ASTM D1426-08B	0.04	0.2	mg/L
Ammonia- nitrogen	350.1	0.02	0.05	mg/L
Total phosphorus	365.3	0.005	0.02	mg/L
Orthophosphorus	365.3	0.009	0.02	mg/L
<u>Sediment</u>				
Total Mercury	1631 app	0.09	1	µg/kg
Methyl Mercury	1630 modified	0.04	0.4	µg/kg
Metals (As, Cd, Cr, Cu, Pb, Ni, Se, Zn)				
Arsenic (As)	EPA 6020A	0.06	0.5	mg/kg

Cadmium (Cd)		0.007	0.02	mg/kg
Chromium (Cr)		0.06	0.2	mg/kg
Copper (Cu)		0.04	0.1	mg/kg
Lead (Pb)		0.02	0.05	mg/kg
Nickle (Ni)		0.03	0.2	mg/kg
Selenium (Se)		0.09	1	mg/kg
Zinc (Zn)		0.2	0.5	mg/kg
Nutrients				
Nitrate+nitrite	353.2M	0.04	0.5	mg/kg
Ammonia- nitrogen	350.3	0.04	0.5	mg/kg
Orthophosphorus	365.3M	0.02	0.1	mg/kg
Biotic Tissue				
Total Mercury	1631 app	0.09	1	µg/kg
Methyl Mercury	1630 modified	3	10	µg/kg
Metals (As, Cd, Cr, Cu, Pb, Ni, Se, Zn)				
Arsenic (As)	EPA 6020A	0.02	0.5	mg/kg
Cadmium (Cd)		0.002	0.02	mg/kg
Chromium (Cr)		0.02	0.2	mg/kg
Copper (Cu)		0.02	0.1	mg/kg
Lead (Pb)		0.0005	0.02	mg/kg
Nickel (Ni)		0.02	0.2	mg/kg
Selenium (Se)		0.2	1	mg/kg
Zinc (Zn)		0.06	0.5	mg/kg

Table 7. Parameters, Methods, Units and Lab MDLs for Organochlorine Pesticides in sediment and tissue.

Organochlorine Pesticides	Method	Units	MDL	QL
Hexachlorobenzene	1699	ng/g	0.017	0.04
alpha-BHC	1699	ng/g	0.011	0.04
beta-BHC	1699	ng/g	0.070	0.04
gamma-BHC	1699	ng/g	0.017	0.04
delta-BHC	1699	ng/g	0.070	0.04
Heptachlor	1699	ng/g	0.0090	0.04
Aldrin	1699	ng/g	0.024	0.04
Heptachlor Epoxide	1699	ng/g	0.015	0.04
Oxychlordane	1699	ng/g	0.013	0.04
trans-Chlordane	1699	ng/g	0.021	0.04
cis-Chlordane	1699	ng/g	0.012	0.04
trans-Nonachlor	1699	ng/g	0.024	0.04
Dieldrin	1699	ng/g	0.018	0.04
cis-Nonachlor	1699	ng/g	0.013	0.04
Endrin	1699	ng/g	0.038	0.04
Endosulfan I	1699	ng/g	0.041	0.04
Endosulfan II	1699	ng/g	0.021	0.04

Endosulfan Sulfate	1699	ng/g	0.023	0.04
24'-DDE	1699	ng/g	0.032	0.04
44'-DDE	1699	ng/g	0.015	0.04
24'-DDD	1699	ng/g	0.070	0.04
44'-DDD	1699	ng/g	0.029	0.04
24'-DDT	1699	ng/g	0.085	0.04
44'-DDT	1699	ng/g	0.020	0.04
Endrin Aldehyde	1699	ng/g	0.047	0.04
Endrin Ketone	1699	ng/g	0.082	0.04
Methoxychlor	1699	ng/g	0.017	0.04
Mirex	1699	ng/g	0.030	0.04
Parlar-26	1699	ng/g	0.062	0.04
Parlar-50	1699	ng/g	0.062	0.04
Parlar-62	1699	ng/g	0.074	0.04

Table 8. Parameters, Methods, Units and Lab MDLs for PCBs in sediment and tissue.

Targets	Method	Units	MDL	QL
PCB-1	1668C	pg/g	0.06	0.5
PCB-2	1668C	pg/g	0.13	0.5
PCB-3	1668C	pg/g	0.10	0.5
PCB-4	1668C	pg/g	0.07	0.5
PCB-10	1668C	pg/g	0.05	0.5
PCB-9	1668C	pg/g	0.04	0.5
PCB-7	1668C	pg/g	0.08	0.5
PCB-6	1668C	pg/g	0.11	0.5
PCB-5	1668C	pg/g	0.04	0.5
PCB-8	1668C	pg/g	0.17	0.5
PCB-14	1668C	pg/g	0.08	0.5
PCB-11	1668C	pg/g	2.61	5
PCB-13/12	1668C	pg/g	0.09	1
PCB-15	1668C	pg/g	0.06	0.5
PCB-19	1668C	pg/g	0.04	0.5
PCB-30/18	1668C	pg/g	0.11	1
PCB-17	1668C	pg/g	0.08	0.5
PCB-27	1668C	pg/g	0.04	0.5
PCB-24	1668C	pg/g	0.07	0.5
PCB-16	1668C	pg/g	0.09	0.5
PCB-32	1668C	pg/g	0.03	0.5
PCB-34	1668C	pg/g	0.05	0.5
PCB-23	1668C	pg/g	0.04	0.5
PCB-29/26	1668C	pg/g	0.07	1
PCB-25	1668C	pg/g	0.06	0.5
PCB-31	1668C	pg/g	0.14	0.5
PCB-28/20	1668C	pg/g	0.13	1

PCB-21/33	1668C	pg/g	0.11	1
PCB-22	1668C	pg/g	0.10	0.5
PCB-36	1668C	pg/g	0.03	0.5
PCB-39	1668C	pg/g	0.07	0.5
PCB-38	1668C	pg/g	0.06	0.5
PCB-35	1668C	pg/g	0.08	0.5
PCB-37	1668C	pg/g	0.04	0.5
PCB-54	1668C	pg/g	0.05	0.5
PCB-50/53	1668C	pg/g	0.20	1
PCB-45/51	1668C	pg/g	0.07	1
PCB-46	1668C	pg/g	0.09	0.5
PCB-52	1668C	pg/g	0.25	0.5
PCB-73	1668C	pg/g	0.10	0.5
PCB-43	1668C	pg/g	0.17	1.5
PCB-69/49	1668C	pg/g	0.21	1.5
PCB-48	1668C	pg/g	0.11	0.5
PCB-44/47/65	1668C	pg/g	0.22	3
PCB-59/62/75	1668C	pg/g	0.22	3
PCB-42	1668C	pg/g	0.11	0.5
PCB-41/71/40	1668C	pg/g	0.17	1.5
PCB-64	1668C	pg/g	0.10	0.5
PCB-72	1668C	pg/g	0.06	0.5
PCB-68	1668C	pg/g	0.15	0.5
PCB-57	1668C	pg/g	0.08	0.5
PCB-58	1668C	pg/g	0.11	0.5
PCB-67	1668C	pg/g	0.11	0.5
PCB-63	1668C	pg/g	0.07	0.5
PCB-61/70/74/76	1668C	pg/g	0.24	2.5
PCB-66	1668C	pg/g	0.38	2.5
PCB-55	1668C	pg/g	0.13	0.5
PCB-56	1668C	pg/g	0.08	0.5
PCB-60	1668C	pg/g	0.11	0.5
PCB-80	1668C	pg/g	0.10	0.5
PCB-79	1668C	pg/g	0.10	0.5
PCB-78	1668C	pg/g	0.10	0.5
PCB-81	1668C	pg/g	0.20	0.5
PCB-77	1668C	pg/g	0.11	0.5
PCB-104	1668C	pg/g	0.08	0.5
PCB-96	1668C	pg/g	0.09	0.5
PCB-103	1668C	pg/g	0.08	0.5
PCB-94	1668C	pg/g	0.11	0.5
PCB-95	1668C	pg/g	0.10	0.5
PCB-100/93/102/98	1668C	pg/g	0.30	3
PCB-88/91	1668C	pg/g	0.43	3
PCB-84	1668C	pg/g	0.09	0.5
PCB-89	1668C	pg/g	0.12	0.5
PCB-121	1668C	pg/g	0.10	0.5
PCB-92	1668C	pg/g	0.13	0.5

PCB-113/90/101	1668C	pg/g	0.41	2.5
PCB-83/99	1668C	pg/g	0.47	2.5
PCB-112	1668C	pg/g	0.09	0.5
PCB-108/119/86/97/125/87	1668C	pg/g	0.20	5.5
PCB-117/116/85/110/115	1668C	pg/g	1.36	5.5
PCB-82	1668C	pg/g	0.04	0.5
PCB-111	1668C	pg/g	0.07	0.5
PCB-120	1668C	pg/g	0.11	0.5
PCB-107/124	1668C	pg/g	0.18	1
PCB-109	1668C	pg/g	0.11	0.5
PCB-123	1668C	pg/g	0.10	0.5
PCB-106	1668C	pg/g	0.07	0.5
PCB-118	1668C	pg/g	0.89	2
PCB-122	1668C	pg/g	0.11	0.5
PCB-114	1668C	pg/g	0.08	0.5
PCB-105	1668C	pg/g	0.36	0.5
PCB-127	1668C	pg/g	0.13	0.5
PCB-126	1668C	pg/g	0.06	0.5
PCB-155	1668C	pg/g	0.04	0.5
PCB-152	1668C	pg/g	0.13	0.5
PCB-150	1668C	pg/g	0.08	0.5
PCB-136	1668C	pg/g	0.13	0.5
PCB-145	1668C	pg/g	0.07	0.5
PCB-148	1668C	pg/g	0.05	0.5
PCB-151/135	1668C	pg/g	0.14	1
PCB-154	1668C	pg/g	0.08	0.5
PCB-144	1668C	pg/g	0.05	0.5
PCB-147/149	1668C	pg/g	1.38	3
PCB-134/143	1668C	pg/g	0.12	1
PCB-139/140	1668C	pg/g	0.15	1
PCB-131	1668C	pg/g	0.15	0.5
PCB-142	1668C	pg/g	0.05	0.5
PCB-132	1668C	pg/g	0.24	0.5
PCB-133	1668C	pg/g	0.07	0.5
PCB-165	1668C	pg/g	0.10	0.5
PCB-146	1668C	pg/g	0.17	0.5
PCB-161	1668C	pg/g	0.08	0.5
PCB-153/168	1668C	pg/g	0.28	1
PCB-141	1668C	pg/g	0.09	0.5
PCB-130	1668C	pg/g	0.04	0.5
PCB-137/164	1668C	pg/g	0.05	1
PCB-138/163/129	1668C	pg/g	0.53	1.5
PCB-160	1668C	pg/g	0.05	0.5
PCB-158	1668C	pg/g	0.23	0.5
PCB-128/166	1668C	pg/g	0.18	1
PCB-159	1668C	pg/g	0.10	0.5
PCB-162	1668C	pg/g	0.03	0.5
PCB-167	1668C	pg/g	0.05	0.5

PCB-156/157	1668C	pg/g	0.06	1
PCB-169	1668C	pg/g	0.11	0.5
PCB-188	1668C	pg/g	0.02	0.5
PCB-179	1668C	pg/g	0.15	0.5
PCB-184	1668C	pg/g	0.23	0.5
PCB-176	1668C	pg/g	0.19	0.5
PCB-186	1668C	pg/g	0.18	0.5
PCB-178	1668C	pg/g	0.06	0.5
PCB-175	1668C	pg/g	0.14	0.5
PCB-187	1668C	pg/g	0.17	0.5
PCB-182	1668C	pg/g	0.13	0.5
PCB-183	1668C	pg/g	0.12	0.5
PCB-185	1668C	pg/g	0.15	0.5
PCB-174	1668C	pg/g	0.22	0.5
PCB-177	1668C	pg/g	0.15	0.5
PCB-181	1668C	pg/g	0.21	0.5
PCB-171/173	1668C	pg/g	0.30	1
PCB-172	1668C	pg/g	0.17	0.5
PCB-192	1668C	pg/g	0.11	0.5
PCB-180/193	1668C	pg/g	0.37	1
PCB-191	1668C	pg/g	0.18	0.5
PCB-170	1668C	pg/g	0.12	0.5
PCB-190	1668C	pg/g	0.22	0.5
PCB-189	1668C	pg/g	0.13	0.5
PCB-202	1668C	pg/g	0.06	0.5
PCB-201	1668C	pg/g	0.19	0.5
PCB-204	1668C	pg/g	0.06	0.5
PCB-197	1668C	pg/g	0.08	0.5
PCB-200	1668C	pg/g	0.09	0.5
PCB-198/199	1668C	pg/g	0.24	1
PCB-196	1668C	pg/g	0.08	0.5
PCB-203	1668C	pg/g	0.08	0.5
PCB-195	1668C	pg/g	0.46	0.5
PCB-194	1668C	pg/g	0.12	0.5
PCB-205	1668C	pg/g	0.13	0.5
PCB-208	1668C	pg/g	0.14	0.5

Table 9. Parameters, Units and Lab MDLs for PBDEs, using Method 1614.

	Waters MDL ¹	Solids/Tissue MDL ²
Analyte	(pg/L)	(pg/g)
BDE-7	3	0.5
BDE-8/BDE-11	7	0.5
BDE-10	4	0.3
BDE-12/BDE-13	3	0.6
BDE-15	2	0.1
BDE-17/BDE-25	5	0.5
BDE-28/BDE-33	5	0.5
BDE-30	2	0.6
BDE-32	3	0.3
BDE-35	5	0.1
BDE-37	2	0.2
BDE-47	16	1.0
BDE-49	5	0.3
BDE-51	2	0.3
BDE-66	5	0.3
BDE-71	5	0.2
BDE-75	2	0.3
BDE-77	3	0.3
BDE-79	4	0.2
BDE-85	6	0.6
BDE-99	15	3.0
BDE-100	10	0.7
BDE-105	8	0.4
BDE-116	9	0.7
BDE-118	14	0.5
BDE-119/BDE-120	4	0.6
BDE-126	6	0.3
BDE-128	11	0.9
BDE-138/BDE-166	4	1.3
BDE-140	6	0.7
BDE-153	6	0.4
BDE-154	10	0.7
BDE-155	7	0.5
BDE-156	n/a	0.9
BDE-181	14	0.6
BDE-183	8	0.5
BDE-184	n/a	0.9
BDE-190	13	1.0
BDE-191	n/a	0.8
BDE-196	n/a	0.9
BDE-197	n/a	0.4
BDE-203	7	0.3
BDE-206	39	1.4
BDE-207	24	1.6
BDE-208	27	1.8
BDE-209	95	6.1

¹ Separatory Funnel Extraction; MDL based upon a 1L sample size and determined as per US 40CFR Pt 136 Appendix B

² Soxhlet Extraction; MDL based upon a 20g samples size and determined as per US 40CFR Pt 136 Appendix B

Quality Control

Tables 6-9 above provide parameters, methods, units, MDL, and PQL/QL for all analyses. Laboratory analyses will be conducted by ALS Global. The ALS Burlington laboratory will analyze PCBs, PBDEs, and organochlorine pesticides in sediment and tissue. The ALS Kelso laboratory will conduct all other analyses and provide appropriate samples to ALS Burlington.

A method blank, laboratory control sample, duplicate and matrix spike are run for metals and general chemistry (nutrients) analyses. A method blank, laboratory control samples, and duplicate are run with the isotope dilutions methods (PCBs, PBDEs, and organochlorine pesticides.) The ALS QA Manuals are on file at the Water Resources Division office.

Field QC will include duplicates and blanks for surface water samples, but not for sediment or tissue samples.

Reconciliation with User Requirements

This project is not a regulatory compliance project, but rather a presence/absence survey. The purpose of Phase II is to determine whether certain chemicals are detected in the surface water, sediment, and biotic tissues of aquatic organisms within Clearwater River, and whether these chemicals are at a level of concern. WRD requested lab analysis methods with the lowest detection levels for the matrix. The tables below give the criteria that will be used to compare against the project results.

Table 10. Aquatic Life and Human Health Criteria for Surface Water.

Pollutant	EPA Aquatic Life Criteria ¹ Freshwater Acute (ug/L)	EPA Aquatic Life Criteria ¹ Freshwater Chronic (ug/L)	Human Health Criteria ² Consumption of Water & Organism (ug/L)	Human Health Criteria ² Consumption of Organism only (ug/L)
DDT	1.1	0.001	0.000030	0.000030
DDD			0.00012	0.00012
DDE			0.000018	0.000018
Total Mercury	1.4	0.77		
Methyl Mercury				0.3 mg/kg (Methyl Hg)
Antimony (Sb)			5.6	640
Arsenic (As)	340	150	0.018	0.014
Barium (Ba)			1,000	--
Beryllium (Be)			--	--
Cadmium (Cd)	1.8	0.72	--	--
Chromium (Cr)	570	74	--	--
Cobalt (Co)				
Copper (Cu)*	--	--	1,300	--
Lead (Pb)	65	2.5		

Molybdenum (Mo)				
Nickel (Ni)	470	52	610	4,600
Selenium (Se)	--	--	170	4,200
Silver (Ag)	3.2	--		
Thallium (Tl)			0.24	0.47
Vanadium (V)				
Zinc (Zn)	120	120	7,400	26,000
Nitrate+nitrite			10,000	
Total Kjeldahl Nitrogen (TKN)				
Ammonia- nitrogen**	--	--		
Total phosphorus	--	10		
Orthophosphorus				

*Calculated using Biotic Ligand Model.

** Freshwater criteria are pH, temperature, and life stage dependent.

¹ <https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table>

² <https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table>

Table 11. Ecological Sediment Quality Guidelines for Freshwater Sediment.

Pollutant	Threshold Effects Criteria ¹ (TEC) ² Freshwater (mg/kg dw)	Probable Effects Criteria ¹ (PEC) ³ Freshwater (mg/kg dw)	Threshold Effects Criteria ¹ (TEC) Freshwater (ug/kg dw)	Probable Effects Criteria ¹ (PEC) Freshwater (ug/kg dw)
Metals				
Total Mercury	0.18	1.06		
Methyl Mercury	--	--		
Arsenic (As)	9.79	33		
Copper (Cu)	31.6	149		
Lead (Pb)	35.8	128		
Cadmium (Cd)	0.99	4.98		
Chromium (Cr)	43.4	111		
Nickel (Ni)	22.7	48.6		
Selenium (Se)	--	--		
Zinc (Zn)	121	459		
PCBs				
Total PCBs			59.8	676

Organochlorine Pesticides				
Dieldrin			1.90	61.8
Sum DDD			4.88	28.0
Sum DDE			3.16	31.3
Sum DDT			4.16	62.9
Total DDTs			5.28	572
Endrin			2.22	207
Heptachlor Epoxide			2.47	16.0
PBDEs				

¹TEC and PEC values are from (MacDonald, D.D., C.G. Ingersoll, and T.A. Berger, 2000).

²TECs (threshold effect concentrations) are those below which harmful effects are unlikely to be observed.

³PECs (probably effect concentrations) are those above which harmful effects are likely to be observed.

Table 12. Criteria for biotic tissue.

Pollutant	Fish Whole body or muscle	FDA Action Levels and Tolerances with EPA Screening Values ¹		
		FDA Action Level (ppm)	EPA SV for Recreational Fishers (ppm)	EPA SV for Subsistence Fishers (ppm)
Organochlorine Pesticides		5 ppm	0.114	0.014
		FDA Tolerance Level (ppm)		
PCBs		2	.02	0.00243
PBDEs				
Total Mercury		1.0	0.40	0.049
Methyl Mercury	0.3 mg/kg wet weight ²			
Arsenic (As)				
Cadmium (Cd)				
Chromium (Cr)				
Copper (Cu)				
Lead (Pb)				
Nickel (Ni)				
Selenium (Se)	8.5 mg/kg dry weight or 11.3 mg/kg dry weight muscle (skinless, boneless fillet) ³			
Zinc (Zn)				

1 (Environmental Protection Agency, 2000) <https://www.epa.gov/sites/default/files/2015-06/documents/volume1.pdf>

2 (Environmental Protection Agency, 2001) <https://www.epa.gov/sites/default/files/2019-02/documents/wqc-final-methylmercury-factsheet-2001.pdf>

3 (Environmental Protection Agency, 2021 Revisions to 2016) <https://www.epa.gov/system/files/documents/2021-08/selenium-freshwater2016-2021-revision.pdf>

Table 5. Human health SVs used to evaluate MCR fillet fish tissue results. SVs for two effects levels with two fish consumption rates. Units are all ng/g (ppb) fillet wet weight.

Analyte ¹	Cancer SV (ng/g ww)		Non-cancer SV (ng/g ww)	
	General population	High consumer	General population	High consumer
Mercury	--	--	120	40
4,4-DDD	4.886	1.667	--	--
4,4-DDE	3.449	1.177	--	--
4,4-DDT	3.449	1.177	--	--
DDT total	3.449	1.177	502.513	171.429
Aldrin	0.069	0.024	35.176	12.000
Chlordane total	3.350	1.143	586.265	200.000
Dieldrin	0.073	0.025	58.627	20.000
Heptachlor	0.261	0.089	586.265	200.000
Heptachlor Epoxide	0.129	0.044	15.243	5.200
Hexachlorobenzene	0.733	0.250	938.024	320.000
Endosulfan I	--	--	7035.176	2400.000
Endosulfan II	--	--	7035.176	2400.000
Endosulfan sulfate	--	--	7035.176	2400.000
Endrin	--	--	351.759	120.000
alpha-BHC	0.186	0.064	--	--
beta-BHC	0.651	0.222	--	--
Lindane (gamma-BHC)	--	--	351.759	120.000
Methoxychlor	--	--	5862.647	2000.000
Mirex	--	--	234.506	80.000
PCB total	0.586	0.200	--	--
PCB total-immun. effects	--	--	23.451	8.000
PCB total-develop. effects	--	--	30.151	10.286
PBDE-47	--	--	117.253	40.000
PBDE-99	--	--	117.253	40.000
PBDE-153	--	--	234.506	80.000
PBDE-209	1675.042	571.429	8207.705	2800.000
PBDE total	--	--	100.000	34.286

1. Dioxin/furan SVs not included as most results are non-detections for these analytes.

Figure 1. Additional biotic tissue criteria (Lillian Herger, Lorraine Edmond, and Gretchen Hayslip, 2017).

Table 6. Ecological endpoint SVs used to evaluate MCR whole body fish tissue results. Units are all ng/g (ppb) whole body wet weight (Source: Lazorchak et al. 2003, Dyer et al. 2000 as updated by B. Shephard).

Analyte	General aquatic	Kingfisher	Mink	Otter	General wildlife
Arsenic	227	--	--	--	--
Cadmium	113	--	--	--	--
Chromium	4800	--	--	--	--
Copper	173	--	--	--	--
Lead	189	--	--	--	--
Mercury	60	30	70	100	--
Nickel	390	--	--	--	--
Selenium	560	--	--	--	--
Zinc	5688	--	--	--	--
2,4 DDD	--	20	--	--	--
2,4 DDE	--	20	--	--	--
2,4 DDT	--	20	--	--	--
4,4 DDD	54	20	--	--	--
4,4 DDT	54	20	--	--	--
4,4 DDE	54	20	--	--	--
DDTs total	54	20	360	490	--
Chlordane total	56	5	830	1140	--
Dieldrin	9	360	20	30	--
Hexachlorobenzene	31979	--	--	--	330
PCB total	440	440	130	180	--
PBDE total	--	13(kestrel) ¹	32	--	--

1. Used kestrel as bird ecological endpoint for PBDEs (Source: Environment Canada 2013).

Figure 2. Additional tissue criteria (Lillian Herger, Lorraine Edmond, and Gretchen Hayslip, 2017).

References

- Environmental Protection Agency. (2000, November). Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. *Volume 1 Fish Sampling and Analysis*. Washington DC. Retrieved from <https://www.epa.gov/sites/default/files/2015-06/documents/volume1.pdf>
- Environmental Protection Agency. (2001, January). Water Quality Criterion for the Protection of Human Health: Methylmercury Factsheet. Washington, DC.
- Environmental Protection Agency. (2021 Revisions to 2016, August). Aquatic Life Ambient Water Quality Criterion for Selenium- Freshwater. Washington, DC.
- Lillian Herger, Lorraine Edmond, and Gretchen Hayslip. (2017). *Mid- Columbia River Fish Toxics Assessment*. EPA Region 10.
- MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. (2000). Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. *Arch Environ Contam Toxicol*, 39:20-31.
- Resources, N. P. (2021). *Clearwater River (Idaho) Watershed Baseline Monitoring and Toxics Assessment- Phase I & Phase II Quality Assurance Project Plan*.

Appendix A Revisions

This table needs to be updated as revisions and changes are made to the QAPP, or serve to document if/when reviewed. If no changes are made, in a new line retain Revision Number, but update the Date, Responsible Party, and in the Summary of Changes add in “Reviewed, no changes.” Text in this section/table should not be changed or modified, but new lines in the table may be added.

Revision	Date	Responsible Party	EPA Review	Section	Summary of Changes
0	April 2021 – final Signature	Sierra Higheagle			Initial Development
1.0	April 2022	Sierra Higheagle			QAPP Addendum to the Initial Development above.

Appendix B Map

