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**Addendum 1 to
Quality Assurance Project Plan**

**Freshwater Fish Contaminant
Monitoring Program**

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Addendum 1 to Quality Assurance Project Plan

Freshwater Fish Contaminant Monitoring Program

May 2013

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EAP: Environmental Assessment Program

EIM: Environmental Information Management database

TSU: Toxics Studies Unit

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Purpose

The purpose of this addendum is to describe work to be performed in the 2013 project year for the Freshwater Fish Contaminant Monitoring Program. The 2013 sampling effort will focus on two areas:

- Mid-Columbia River (Wanapum Dam to Grand Coulee Dam) for the Long Term Monitoring component. This area was scheduled for monitoring in 2013 as shown in Table 5 in the project plan (Seiders, 2013).
- McNary National Wildlife Refuge (NWR), at the confluence of the Columbia and Snake Rivers, for the Exploratory Monitoring Component. This component is a cooperative effort with the U.S. Fish and Wildlife Service (Kisor et al., 2011).

Background

Several fish tissue monitoring efforts have been conducted since the early 1990s that included the Columbia River from the Wallula Gap to Grand Coulee Dam. Table 1 shows the species and analytes that each study targeted.

When viewed collectively, these historical efforts reveal a patchwork of sites, species, tissue types, collection seasons, and analytical methods. The 2013 sampling effort will include sites, species, and analytes that were done historically in order to gain a temporal perspective where data are deemed comparable. The 2013 effort will produce a robust data set that serve as a benchmark for future sampling efforts.

Table 1. Summary of Historical Sampling Efforts for the Mid-Columbia River.

Study:		Serdar ¹	EPA ²	WSTMP ³	EPA ⁴	Energy ⁵
Sample Year:		1990	1996-98	2004	2008	2009
Species	CCP	x				x
	LSS		x		x	x
	LWF	x				
	MWF		x	x		
	NPM			x	x	
	PEA			x	x	
	SMB	x			x	x
	WAL	x		x	x	x
	YP			x	x	
	WST		x		x	x
other		x		x		
Target Analytes	CP		x	x	x	x
	Hg		x	x	x	x
	PBDE		x	x	x	
	PCB		x	x	x	x
	PCDD/F	x	x	x		
	other		x		x	x

1 - Serdar et al., 1991.

2 - EPA, 2002.

3 - Seiders et al., 2007.

4 - Herger, 2013 (EPA report in preparation).

5 - U.S. Department of Energy, 2012.

Species codes: CCP: Common carp; LSS: Largescale sucker; LWF: Lake whitefish; MWF: Mountain whitefish; NPM: Northern pikeminnow; PEA: Peamouth; SMB: Smallmouth bass; WAL: Walleye; WST: White sturgeon; YP: Yellow perch.

Target Analytes: CP: Chlorinated pesticides; Hg: mercury; PBDE: polybrominated diphenyl ethers; PCB: polychlorinated biphenyls; PCDD/F: poly-chlorinated dibenzo-p-dioxins and -furans.

Fish from the mid-Columbia River have some of the highest levels of DDT compounds in Washington (Figure 1). Levels of PCBs, PCDD/Fs, and mercury are also elevated in some species. Changes in contaminant concentrations in fish over time should be detectable as pollution reduction efforts are implemented. Examples of such efforts include the Okanogan Water Cleanup Plan for DDT (Peterschmidt, 2006) and the TMDL for PCDD/Fs in the Columbia and Snake Rivers (EPA, 1991). Figure 1 shows DDT levels in fish collected across the state under the Washington State Toxics Monitoring Program (WSTMP). The WSTMP was renamed the Freshwater Fish Contaminant Monitoring Program (FFCMP) in 2013 because of its focus on fish.

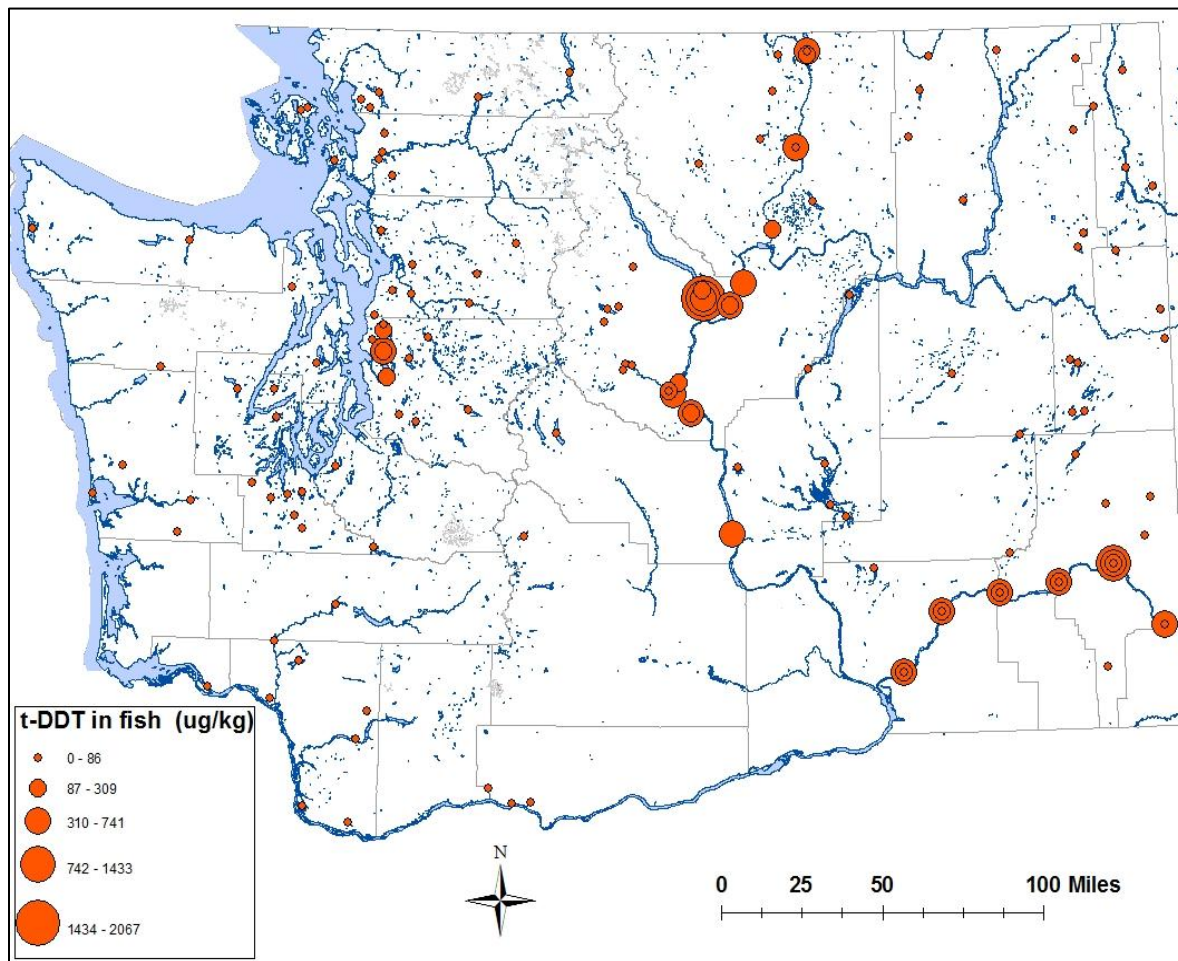


Figure 1. Total DDT in Fish from the WSTMP 2001-2010.

Sampling Design

The objectives for the 2013 monitoring effort are to:

- Develop a robust data set that characterizes contaminant levels in fish from the mid-Columbia River. This data set will serve as a benchmark for future monitoring efforts to determine change over time and will be used to compare results from historical efforts.
- Collaborate with USFWS in evaluating contaminant levels in the McNary NWR by analyzing fish tissue for various contaminants.

Figure 2 shows six sampling areas: five areas are lakes or reaches between major dams while the sixth is the McNary NWR at the confluence of the Columbia and Snake Rivers. Note that the dams are marked with square symbols.

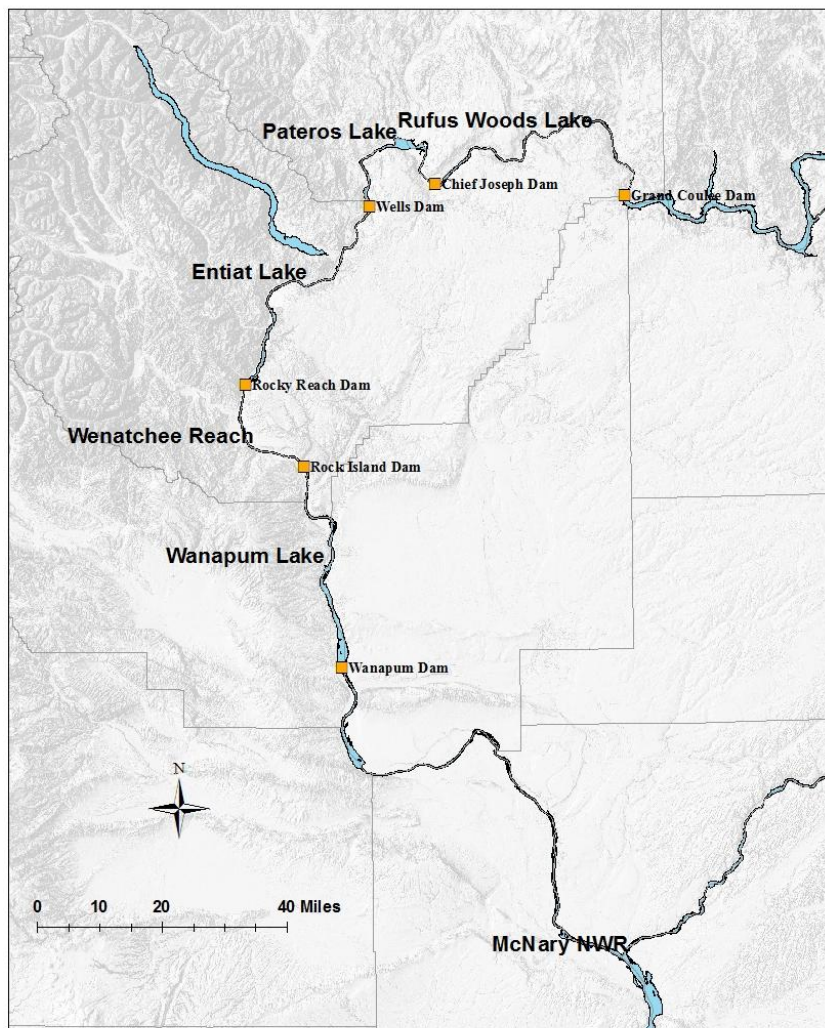


Figure 2. Sampling Areas for the FFCMP 2013.

Table 2 lists the sampling areas and their relation to the dams and reservoirs of the mid-Columbia River. The sampling areas between dams range in length from 20 to about 50 miles. Specific fish collection locations will be refined after reviewing historical data, access points for boats, and productive habitat for target species. Dam operators will be contacted prior to sampling and boat operations near dams to address security concerns.

Table 2. Sample Area Information, FFCMP 2013.

Area	Sample Site	Dam Down stream	Dam at River Mile	Length of Reach (miles)	Dam Operator or Contact	Contact Information
FD Roosevelt Lake	no	Grand Coulee Dam	597	-	BOR	www.usbr.gov/pn/grandcoulee/
Rufus Woods Lake	yes	Chief Joseph Dam	545	52	ACOE Seattle District	www.nws.usace.army.mil/Missions/CivilWorks/LocksandDams/ChiefJosephDam.aspx
Pateros Lake	yes	Wells Dam	516	30	Douglas County PUD	www.douglaspud.org/Environment/WellsDam.aspx
Entiat Lake	yes	Rocky Reach Dam	474	42	Chelan County PUD	www.chelanpud.org/rocky-reach-hydro-project.html
Wenatchee Reach	yes	Rock Island Dam	454	20	Chelan County PUD	www.chelanpud.org/rock-island-hydro-project.html
Wanapum Lake	yes	Wanapum Dam	416	38	Grant County PUD	www.grantpud.org/environment/fish-wildlife
McNary NWR	yes	Confluence Columbia - Snake R	325	10	USFWS: Julie Campbell	Julie_Campbell@fws.gov ; 509-893-8004

Table 3 shows the sampling plan and analytical costs. For the five areas upstream of McNary NWR, three species will be targeted and five composite samples of each target species will be collected. Each composite sample will consist of five fish of similar size from the same species. The primary target analytes for these samples will be three DDT compounds (4,4'-DDD, 4,4'-DDE, 4,4'-DDE), the three most frequently detected PCB Aroclors (Aroclor-1260, -1254, and -1248), and PCDD/Fs. Only two of the three species at each site will be analyzed for PCDD/Fs. For each site, one of the five composite samples for each species will be analyzed for a broader suite of CPs, PCB Aroclors, and PBDEs. All samples will have lipids determined.

For the McNary NWR area, two species will be collected from each of four locations within the refuge in order to meet the needs of this cooperative effort (Campbell, 2011). For each of the species per site, a single composite sample will consist of five fish of similar size. Target analytes for each sample are shown in Table 3.

Table 3. Sample Plan and Estimated Laboratory Costs, FFCMP 2013.

Sites	Target Species ^a	Hg	3 DDTs, 3 PCBa, lipids	CIpest, PCBa, PBDE, lipid	PCB congr, lipid	PCDD/F, lipid ^b	Total Costs
Middle Columbia River							
Rufus Woods L	NPM, MWF, LSS	15	12	3	-	10	
Pateros L		15	12	3	-	10	
Entiat L		15	12	3	-	10	
Wenatchee Reach		15	12	3	-	10	
Wanapum L		15	12	3	-	10	
Subtotal # Analyses:		75	60	15	0	50	
Subtotal Cost:		\$ 3,758	\$ 18,000	\$ 9,305	\$ -	\$ 33,125	\$ 64,189
McNary National Wildlife Refuge							
Peninsula Unit	LMB, SMB, CC, CCP	2	-	2	2	2	
Casey Pond		2	-	2	2	2	
Snake R conf		2	-	2	2	2	
Burbank Slough		2	-	2	2	2	
Subtotal # Analyses:		8	0	8	8	8	
Subtotal Cost:		\$ 401	\$ -	\$ 4,963	\$ 5,200	\$ 5,300	\$ 15,864
Total # Samples:		83	60	23	8	58	
QC Samples:		5	4	2	2	5	
Total # Analyses:		88	64	25	10	63	
Cost/Analysis		\$ 50	\$ 300	\$ 620	\$ 650	\$ 663	
Grand Total Cost:		\$ 4,410	\$ 19,200	\$ 15,509	\$ 6,500	\$ 41,738	\$ 87,356

a: Two species per site for McNary NWR, 5 composite samples per species for Columbia River sites.

b: Only two species per site for PCDD/F analyses.

Species codes: CC: Channel catfish; CCP: Common carp; LSS: Largescale sucker; LMB: Largemouth bass; MWF: Mountain whitefish; NPM: Northern pikeminnow; SMB: Smallmouth bass.

Methods

Laboratory analyses of most samples will be conducted by the Ecology Manchester Environmental Laboratory (MEL). Analyses for PCB congeners and PCDD/Fs will be done by an accredited laboratory through a contract managed by MEL. Both MEL and the contract laboratories are expected to meet the QC requirements of the analytical methods being used and any other requirements specified by MEL or the Project Officer.

Table 4 shows the parameters to be analyzed, analytical methods, desired reporting limits, and ranges of expected results. Table 5 shows Measurement Quality Objectives (MQOs). Table 6 shows laboratory quality control procedures.

Table 4. Laboratory Measurement Methods for Fish Tissue Samples, FFCMP 2013.

Parameter	Methods, RLs, Sample n			
	Number of Samples & Arrival Date ^a	Expected Range of Results ^b	Reporting Limits ^c	Analytical Method
Mercury	85, January, 2014	10 - 1000 ug/kg	17 ug/kg	EPA 245.6 (CVAA)
Chlorinated pesticides	85, January, 2014	0.1 - 1000 ug/kg for DDTs; 0.1 – 50 ug/kg for others	most 0.5-3.0 ug/kg	EPA 8081 (GC/ECD); MEL SOP
PCB Aroclors	85, January, 2014	0.5 - 500 ug/kg, depending on Aroclor	1.1 - 44 ug/kg	EPA 8082 (GC/ECD); MEL SOP
PCB congeners	10, January, 2014	0.005 - 100 ug/kg, depending on congener	0.003-0.01 ug/kg	EPA 1668 C (HiRes GC/MS)
PCDD/Fs	60, January, 2014	0.005 - 5.0 ng/kg, depending on congener and extraction method	EQL 0.017 - 0.5 ng/kg	EPA 1613B (HiRes GC/MS)
PBDEs	25, January, 2014	0.1 - 100 ug/kg	0.10-2.6 ug/kg; PBDE 209 1.9-4.3 ug/kg	EPA 8270 (SIM); MEL SOP 730104
Lipids	85, January, 2014	0.1 - 20%	0.10%	MEL SOP 730009

a: MEL will be informed of numbers and arrival dates when the sampling effort concludes.

b: Values reflect historical data from the study area.

c: Value reflects typical range.

Table 5. Measurement Quality Objective, FFCMP 2013.

Parameter	Analytical Method	Lab Duplicate (RPD)	Lab Control Sample (% recovery)	Surrogates (% recovery)	MS/MSD (% recovery)
Mercury	EPA 245.6 (CVAA)	0%-20% (for results > 5x RL)	85%-115%	NA	75%-125%; RPD limit 20%
Metals (one or more of: As, Cd, Cr, Cu, Pb, Ni, Se, Zn)	EPA 200.7 or 200.8	0%-20% (for results > 5x RL)	85%-115%	NA	75%-125%; RPD limit 20%
Chlorinated pesticides	EPA 8081 (GC/ECD); MEL SOP	0%-40%	50%-150%	20%-130% ^a	50%-150%; RPD limit 40%
PCB Aroclors	EPA 8082 (GC/ECD); MEL SOP	0%-40%	50%-150%	50%-150%	50%-150%; RPD limit 40%
PCB congeners	EPA 1668C (HiRes GC/MS)	0%-40%	per method for OPR, Internal Standards, and Labeled Compounds	NA	NA
PCDD/Fs	EPA 1613B (HiRes GC/MS)	0%-40%	per method for OPR, Internal Standards, and Labeled Compounds	NA	NA
PBDEs	EPA 8270 (SIM); SOP 730104	0%-40%	50%-150%	50%-150%	50%-150%; RPD limit 40%
Lipids	MEL SOP 730009	0%-20%	NS	NA	NA

a: Surrogate recovery limits were recently revised by MEL and are specific to surrogates used: some limits are 20%-120%, others are 30%-130%.

Table 6. Laboratory Quality Control Sample Types and Frequencies, FFCMP 2013.

Parameter	Analytical Method	Lab Duplicates	Lab Control Standards	Surrogates	MS/MSD	Method Blanks
Mercury	EPA 245.6 (CVAA)	1/ batch ^a	1/batch	NA	NA	1/batch
Metals (one or more of: As, Cd, Cr, Cu, Pb, Ni, Se, Zn)	EPA 200.7 or 200.8	1/batch	1/batch	NA	NA	1/batch
Chlorinated pesticides	EPA 8081 (GC/ECD); MEL SOP	1/batch	1/batch	each sample	1/batch	1/batch
PCB Aroclors	EPA 8082 (GC/ECD); MEL SOP	1/batch	1/batch	each sample	1/batch	1/batch
PCB congeners	EPA 1668A (HiRes GC/MS)	1/batch	each sample & 1/batch ^b	NA	NA	1/batch
PCDD/Fs	EPA 1613B (HiRes GC/MS)	1/batch	each sample & 1/batch ^b	NA	NA	1/batch
PBDEs	EPA 8270 (SIM); SOP 730104	1/batch	1/batch	each sample	1/batch	1/batch
Lipids	MEL SOP 730009	1/batch	1/batch	NA	NA	1/batch

a: “batch” is defined as up to 20 samples analyzed together.

b: Labeled compounds in each sample and Ongoing Precision and Recovery standards in each batch.

This project will use data collected through past monitoring efforts conducted by Ecology and other organizations. These data and associated documentation (e.g., project plans, project reports, and laboratory data reports) will be reviewed to assess their usability in this project.

Organization and Schedule

Table 7 lists the people involved in this project. All are employees of the Washington State Department of Ecology. Table 8 presents the proposed schedule for this project.

Table 7. Organization of Project Staff and Responsibilities, FFCMP 2013.

EAP Staff (except TMDL Leads)	Title	Responsibilities
Will Kendra SCS 360-407-6698	Client	Provides internal review of the QAPP, addendums, and reports. Approves the final QAPP and addendums.
Keith Seiders Toxics Studies Unit SCS 360-407-6689	Project Manager and Principal Investigator	Writes the QAPP, addendums, and reports. Reviews historical data and develops sample strategy for different sites on annual basis. Works with laboratories to obtain analytical services. Reviews, analyzes, and interprets data. Guides field assistants in various roles and tasks.
Casey Deligeannis Toxics Studies Unit SCS 360-407-7395	Field and EIM Lead, Project Assistant	Leads efforts for sample collection, processing, and transportation of samples to the laboratory. Ensures that field and processing information is recorded. Enters field and laboratory data into EIM. Compiles and summarizes historical and current-year data. Assists report effort.
Patti Sandvik Toxics Studies Unit SCS 360-407-7198	Project Assistant	Assists with field and office tasks as needed.
Dale Norton Toxics Studies Unit SCS 360-407-6765	Unit Supervisor for the Project Manager	Provides internal review of the QAPP, addendums, and reports. Approves the final QAPP and addendums. Manages budget and staffing needs.
Joel Bird Manchester Environmental Lab. 360-871-8801	Laboratory Director	Approves the final QAPP. Oversees all operations at MEL regarding in-house analyses and processes for contracting analyses to commercial labs.
William R. Kammin EAP 360-407-6964	Ecology Quality Assurance Officer	Reviews the draft QAPP and addendums. Approves the final QAPP and addendums.
Tom Mackie EAP-Eastern Ops 509-454-4244	Supervisor, EAP - Eastern Operations	Helps coordinate CRO and ERO inter-program and inter-office efforts as needed, especially public communications.
Chris Coffin WQP – CRO 509-575-2821**	Unit Supervisor, CRO Watershed Unit	Helps coordination and communication efforts with TMDL and Watershed Leads, and local groups about Ecology’s water quality improvement efforts.
David Knight WQP – ERO 509-575-2821**	Unit Supervisor, ERO Watershed Unit	Helps coordination and communication efforts with TMDL and Watershed Leads, and local groups about Ecology’s water quality improvement efforts.

** TMDL Contacts listed at: www.ecy.wa.gov/programs/wq/tmdl/contacts.html

EAP: Environmental Assessment Program
 SCS: Statewide Coordination Section
 EIM: Environmental Information Management database
 QAPP: Quality Assurance Project Plan
 CRO: Central Regional Office
 ERO: Eastern Regional Office
 WQP: Water Quality Program

Table 8. Schedule for Completing Field, Laboratory, and Report Tasks, FFCMP 2013.

Field and laboratory work	Due date	Lead staff
Field work completed	June for McNary NWR; October for other sites	Casey Deligeannis, Patti Sandvik
Sample processing completed	January 2014	Casey Deligeannis, Patti Sandvik
Laboratory analyses completed	May 2014	MEL
Environmental Information System (EIM) database		
EIM user study ID	FFCMP13	
Product	Due date	Lead staff
EIM data loaded	October 2014	Casey Deligeannis
EIM quality assurance	November 2014	Patti Sandvik
EIM complete	December 2014	Casey Deligeannis
Final report		
Author lead / Support staff	Keith Seiders / Casey Deligeannis, Patti Sandvik	
Schedule		
Draft due to supervisor	August 2014	
Draft due to client/peer reviewer	September 2014	
Draft due to external reviewer(s)	October 2014	
Final (all reviews done) due to publications coordinator	November 2014	
Final report due on web	December 2014	

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