Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Outreach Messaging Framework Memorandum

September 15, 2022

Introduction

This memorandum presents the Outreach Messaging Framework developed in Phase 1 of the Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program funded by the U.S. Environmental Protection Agency (EPA) Columbia River Basin Restoration Program (CRBRP). The Outreach Messaging Framework is a supplemental document included as an attachment to the 2022 Monitoring Framework for the Development of the Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program - Bonneville Dam to Canadian Border.

Background

In 2020, Yakama Nation was successful in securing EPA CRBRP funding to begin Phase 1 of a multi-phased, multi-year project to develop a fish tissue and water quality monitoring program (Monitoring Program) along the approximately 600-mile length of the Middle and Upper Columbia River mainstem to assess and track status and trends of contaminants in fish, water, sediments and invertebrates from the Canadian Border to Bonneville Dam (Figure 1). Yakama Nation is partnering with the Columbia River Intertribal Fisheries Commission (CRITFC), Washington Department of Ecology (Ecology), Oregon Department of Environmental Quality (ODEQ), and U.S. Geological Survey (USGS). Phase 1 work included engaging stakeholders, developing a Monitoring Framework to inform development of the overall Monitoring Program, and developing and conducting community engagement and outreach for an Outreach Messaging Framework.

In 2022, Yakama Nation submitted two additional EPA CRBRP grant proposals for a Phase 2 Pilot Study in the Bonneville Pool, an approximately 50-mile stretch of the Columbia River (Bonneville Dam to The Dalles Dam). The Pilot Study will sample for key toxics in fish (resident fish and adult/juvenile salmon), sediment, and potentially surface water (budget-dependent). In addition, this work will further inform and include planning, outreach and QAPP development for the long-term Monitoring Program, as well as continue efforts to identify a lead agency, program strategy, data management system and hosts of data.

Phase 3 will see implementation of the long-term Monitoring Program.

The overall goal of this project is implementation of a long-term Monitoring Program to track the status and trends of toxics in fish, water, sediments, and invertebrates in the Columbia River mainstem from Bonneville Dam to the Canadian border.

One of the primary drivers behind the development of the Monitoring Program is to produce information that will help to assess whether contamination of the Columbia River ecosystem is

getting better or worse. The goals and objectives of the Monitoring Program reflect the desire to assess the status and trends of contaminants in various media in the Columbia River in the context of human health as well as ongoing ecosystem recovery efforts. Furthermore, monitoring information collected by the Monitoring Program could be used to identify areas to conduct further investigation, cleanup, source control, restoration, and/or protection activities including assessing pre- and post- ecological conditions of ecosystem and salmon recovery actions. If major contamination issues in the mainstem Columbia River are identified and tracked, then cleanup, restoration, and protection activities can be activated fostering resilience and adaptation to environmental stressors including water quality issues, climate change, and other environmental conditions. This Monitoring Program would provide valuable information to the community and interested parties that can be used to inform decision-making and reduce toxicity to human health and the environment, including salmon, a treaty reserved resource.

Outreach Efforts

In Phase 1, outreach planning efforts overlapped and complemented technical and strategic planning by focusing on development of materials and identifying audiences for outreach efforts. Outreach efforts included collaboration with stakeholders within the Columbia River Basin and subject matter experts within and outside of the Columbia River Basin to gather input and suggestions. In addition, an Outreach Messaging Framework and associated materials were developed to facilitate efforts to identify a lead agency, program strategy, data management system and hosts of data as well as development of Strategy/Implementation/Business Plan for the Monitoring Program. In Phase 2 and Phase 3, continued coordination and collaboration with partners, stakeholders and affected citizens will support adaptive management of the Monitoring Program and community outreach and engagement over time.

Although this project is limited to the Columbia River mainstem upstream of the Bonneville Dam, collaboration with other entities that monitor contaminants in the Columbia River Basin, including the Columbia River estuary below Bonneville Dam, are also an important component of outreach. Our goals are to encourage efforts to ensure data comparability across programs and recognize that the growth and adaptive management of the Monitoring Program considers basin-wide monitoring developments.

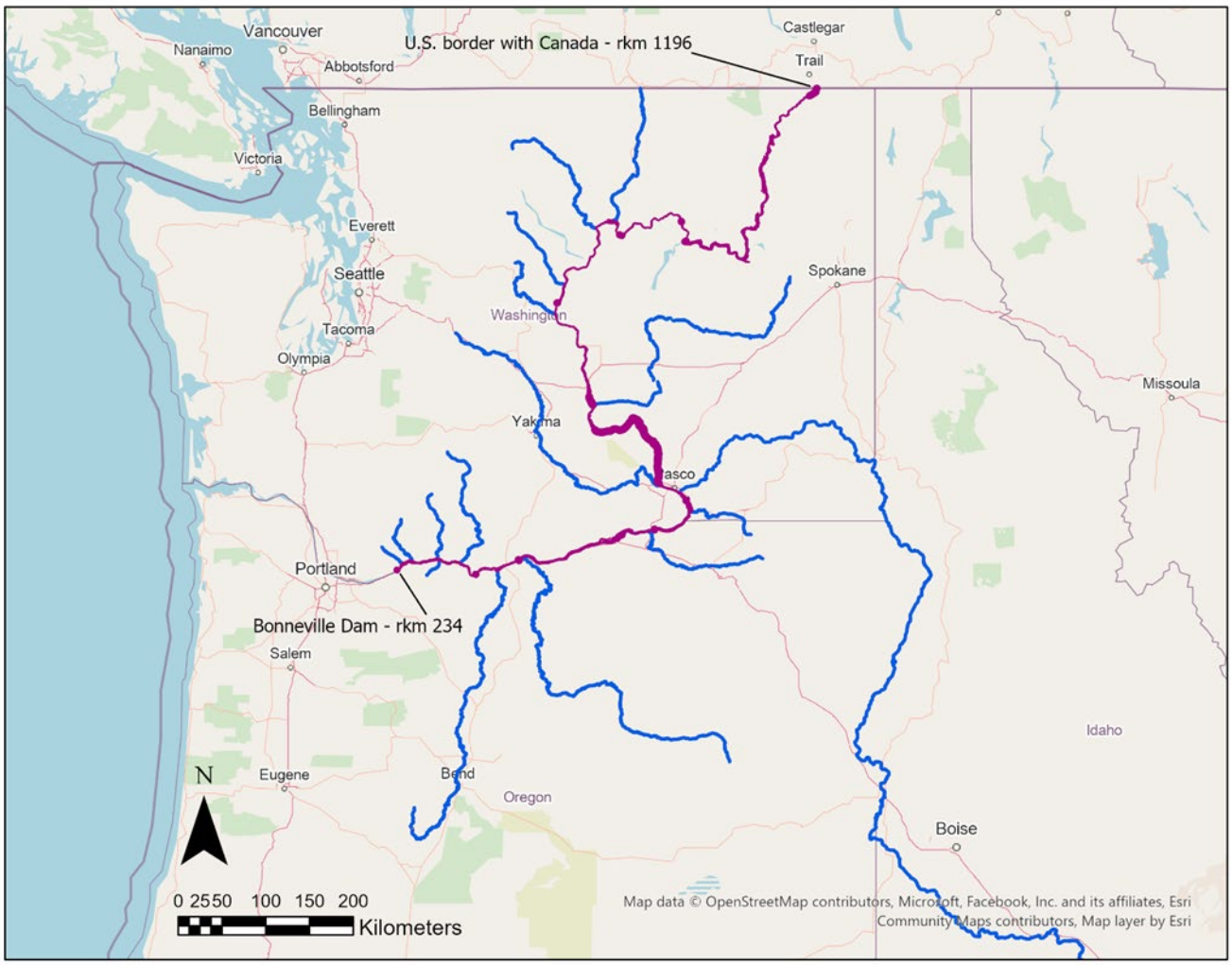


Figure 1. The study area for the Columbia River Fish Tissue and Water Quality Monitoring Program that encompasses the Columbia River (purple) from Bonneville Dam (rkm 234) to the U.S. border with Canada (rkm 1196). Major salmonid bearing tributaries are also depicted (blue).

Components of Outreach Messaging Framework Memorandum

1. Outreach Messaging Framework
2. Yakama Nation Talking Points
3. Goals and Objectives Development Power Point Presentation
4. Phase 1 Framework for a Long-Term, River-Wide, Contaminant Trend Monitoring Program Power Point Presentation
5. Multi-Entity Commitment Letter
6. High Level Agency Contact List
7. List of Outreach Activities to Date
8. PDF of Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program Website hosted by Yakama Nation Fisheries including link to website

"This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement RB 01J72601 to Yakama Nation. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document."

Attachment 1

Outreach Messaging Framework

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Columbia River Mainstem Long-Term Fish Tissue and Water Quality Monitoring Program

Outreach Messaging Framework

OVERVIEW

Mission	Tagline	Vision
Monitor toxic substances in the Columbia River Mainstem in perpetuity to establish trends and guide ecosystem recovery resulting in clean, healthy fish that are safe to eat.	Improved natural resource management through long-term monitoring.	A well designed, respected, trusted monitoring program that delivers technically sound, unbiased data to support tribes, agencies, NGOs and citizen groups in their efforts to restore the Columbia River. A clean, healthy Columbia River that supports natural resources, sustains cultural practices, and provides healthful foods.

VALUES AND GOALS

Values	Position Statement	Target Audience	Uses	End Products
Competency Stability Knowledge Trustworthiness Collaboration Respectability Credibility Compatibility Unbiased Scalable Meaningful work	A trusted source for unbiased scientific data that supports decision makers and communities in improving and protecting the Columbia River Basin ecosystem.	Those interested in or tasked with answering important questions regarding human and ecological health of the Columbia River. Tribal, Federal, state, local governments Universities Non-profits, community organizations Businesses and Industry Public	The monitoring program will provide unbiased, standardized data for evaluating questions associated with the following types of issues: – Identify river segments with higher and lower contaminant concentrations – Evaluate contaminant trends over time – Assess impacts to human health – Assess impacts to ecological health – Inform prevention, cleanup, protection and restoration efforts – Inform education and outreach efforts – Inform and provide data compatible with the larger Columbia River Basin efforts Note: This program is designed to collect and provide data. We will rely on outside scientists, decision-makers, and communities to evaluate many of these issues.	1) Data Management System to provide: – Raw data – Metadata, including sites and events and methods for data collection and analysis – Translation of complicated data (e.g., visuals, graphics, and basic stats) – Glossary – Summary narratives – Recommendations for adaptive management – This system will be designed to be user friendly and include: universal language, secure storage, accessible and efficient data input/retrieval, data mining and modeling capabilities/ease, and standard operating procedures. 2) Document Repository of historical or related studies, guidance, and information 3) Standardized Methods for sampling and data collection 4) Education and Outreach to engage target audience and facilitate data use and efforts to understand and improve the health of the Columbia River

KEY MESSAGES

Problem Statement	Collaboration and Partnerships / Knowledge	Commitment	Proposal / Solution
We are lacking data to understand how to answer the questions below.	Our implementation team consists of the Yakama Nation, CRITFC, USGS, Washington Department of Ecology, and the Oregon Department of Environmental Quality. We are collaborating with the Columbia River Basin Restoration Program Working Group (formerly Columbia River Toxics Reduction Working Group), which consists of numerous tribes, Federal/state/local agencies, and environmental groups, with a broad spectrum of interests and expertise to ensure the ultimate usefulness of this program. We welcome input of outside interested parties.	The organizations involved in the creation of this program have been working to understand and improve the health of the Columbia River Basin for decades and will continue to do so. We are committed to carrying this forward through implementation of a long-term monitoring program within the Columbia River Mainstem.	Monitor toxic substances in the Columbia River Mainstem to identify trends and problem areas.
Our goal is to design a program that will collect data compatible with the needs of those experts tasked with answering these questions. Where are the badly contaminated areas? What are the contaminant trends? How do conditions change or improve naturally? How can we help improve conditions? How do conditions affect ecological and human health (toxicology)? How can we produce a clean ecosystem and enhance ESA recovery?	https://www.epa.gov/columbiariver/columbia-river-basin-restoration-working-group#:~:text=EPA%20and%20other%20federal%20agencies,in%20the%20Columbia%20River%20Basin.	This work is in line with the mandates of: CWA Section 123 (33 U.S.C. § 1275) Establishment of the Columbia River Basin Restoration Program https://www.govinfo.gov/content/pkg/USCODE-2016-title33/pdf/USCODE-2016-title33-chap26-subchapI-sec1275.pdf	Evaluate the river-wide system: Location: mainstem Columbia River from the Canadian Border to the Bonneville Dam. Starting Contaminants: Hg, DDx, PCBs, PBDEs, PAHs. Media: fish tissue, surface water, sediments, biota. Adapt as necessary and as funding becomes available (ex. monitor additional contaminants, biota, or locations, adjust frequency).

Attachment 2

Yakama Nation Talking Points

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Yakama Nation Talking Points for EPA Press Release for Grant Recipients (9/16/2020)

EPA Assistance Program: Columbia River Basin Restoration Program (CRBRP)
Funding Recipient: Confederated Tribes and Bands of the Yakama Nation (Yakama Nation)
Project Title: Columbia River Mainstem Fish Tissue and Water Quality Monitoring Framework
Project Description:

The Confederated Tribes and Bands of the Yakama Nation (Yakama Nation) will use CRBRP funding to further our mission to honor, protect, and restore the Columbia River. The project is a partnership between the Yakama Nation, the U.S. Geological Survey (USGS), Columbia River Inter-Tribal Fish Commission (CRITFC), and Washington Department of Ecology (Ecology) to develop the *Columbia River Mainstem Fish Tissue and Water Quality Monitoring Framework (Monitoring Framework)* and a *Community Engagement and Outreach Plan.*

EPA is providing funding for Phase I of a multi-phased, multi-year project to ensure the establishment of a strong foundation for this large-scale novel study. While discrete studies have been completed in areas of the Columbia Basin, there is no overall program that monitors the spatial and temporal distribution of toxic contaminants throughout the mainstem of the Columbia River. The Monitoring Framework will inform the development of a new long-term program to track toxics found in fish, invertebrates, water and sediments along the approximately 600-mile length of the middle and upper mainstem Columbia River from the Canadian Border to Bonneville Dam. A Community Engagement and Outreach plan will facilitate meaningful outreach and education with affected citizens to inform them on toxics in the Columbia Basin and to promote pollution prevention.

At the onset of the project, Yakama Nation and its partners will review and summarize past studies on toxics in the mainstem Columbia River. Existing data will be combined and evaluated for potential use in estimating historic trends and toxic concentrations in fish tissue and other media. This initial review and summary of toxics will include an evaluation of core analytes, including (but not limited to): mercury, dichlorodiphenyltrichloroethane (DDT) and its metabolites (DDD and DDE), polychlorinated biphenyls (PCBs) polybrominated diphenyl ethers (PBDES), and polycyclic aromatic hydrocarbons (PAHs).

Through this funding, Yakama Nation will lead the development of the Monitoring Framework, which will be drafted by USGS with input from Ecology, CRITFC and other stakeholders on existing information, statistical design and costs. The Monitoring Framework will be presented in a final report and will be open to adaptive management to promote understanding and improve future decision making over the long-term, including updating with new and emerging science and community needs.

In the long term, this effort is expected to lead to the formation of a multi-stakeholder Columbia River Monitoring Program. The objective of the monitoring program, to track status and trends of toxics in the mainstem Columbia River, can only be achieved if sampling is repeated at regular frequencies over many years, decades and ideally in perpetuity. Our vision

is to use the information gathered to help make decisions that lead to clean, healthy fish that is safe to eat.

Grant Informational Video Overarching Talking Points:

- The Yakama Nation sought EPA funding to initiate a multiphased, multi-year project to establish long-term fish tissue monitoring in the Columbia River.

- The Yakama Nation is partnering with USGS, CRITFC, and Ecology.

- We are doing this because despite decades of hazardous waste cleanup work and environmental regulations to prevent pollution, the effects of toxic substances have contributed to:
    - declines in fish runs, and
    - fish consumption advisories covering 75% of the mainstem Columbia River
- And yet today, we still cannot answer the question of whether contaminants in fish tissue are getting better or worse.

- We need to answer this question and we need to communicate and share information with our community and our neighbors.

- Yakamas have an obligation to honor, protect and restore the Columbia River.

- And this work, will help get us to our vision… clean, healthy fish that is safe to eat.

Grant Kickoff Press Event Specific Talking Points:

- Yakamas have an obligation to honor, protect and restore the Columbia River.
- Funding will result in a Monitoring Framework to establish a long term fish tissue and water quality Monitoring Program for the Columbia River mainstem.
- Funding first phase of a multi-phased, multi-year project to develop a long term Monitoring Program:
    - **Phase 1 (Year 1 and 2): Engage Stakeholders and develop a Monitoring Framework**
    - *Phase 2 (Year 3 and 4):* Implement Monitoring Framework and Long-term Funding and Administration Planning
    - *Phase 3 (Year 5 and beyond):* Implement Monitoring Program and Adaptive Management
- Funding of Phase 1 will help us reach our goal to provide a framework for conducting and communicating a Monitoring Program, as well as identifying long-term funding, project housing, and a database that is publicly available.

- Funding will result in Community outreach and engagement plan to facilitate meaningful outreach and education with affected citizens to inform them on toxics in the Columbia Basin and to promote pollution prevention now and for future generations.
- Partnership between the Yakama Nation, the U.S. Geological Survey (USGS), Columbia River Inter-Tribal Fish Commission (CRITFC), and Washington Department of Ecology (Ecology) forms the Project Team. All parties will be providing a portion of cost share funds.
    - ***Yakama Nation:*** Grant lead entity that will coordinate contract management and stakeholder outreach, organize outreach meetings, provide technical assistance, and develop the Community Engagement and Outreach Plan.
    - ***USGS:*** Technical lead on the development of the Monitoring Framework; report development and completion. Yakama Nation plans to provide a subaward (pass-through funds) to USGS.
    - ***CRITFC:*** Technical assistance.
    - ***Ecology:*** Technical assistance.
- Collaborative effort engaging a diverse group of stakeholders, subject matter experts within and outside of the Columbia River Basin, Tribal members and affected citizens across the region.
- Project Team will continue to build on long standing coordination and collaboration efforts with the Columbia River Toxics Reduction Working Group to continue existing partnerships and build new ones to facilitate peer review of program development and materials, gain knowledge on new and emerging science, and promote outreach and education with appropriate community groups.
- Monitoring Framework will be open to adaptive management to promote understanding and improve future decision making over the long-term, including updating with new and emerging science and community needs.
- Project Team will review relevant, existing datasets; solicit feedback on research needs and priorities from key stakeholders; formulate a written conceptual design and distribute it for stakeholder review; respond to stakeholder comments and produce a draft and final Monitoring Framework and preliminary budget for initial sampling efforts; and develop a Community Engagement and Outreach Plan.
- Project Team will consider multiple design options to address project goals and priorities as provided from the outreach efforts.
- Project will facilitate estimating historic trends and toxic concentrations in fish tissue and other media.
- Initial review and summary of toxics will include an evaluation of core analytes, including (but not limited to): mercury, dichlorodiphenyltrichloroethane (DDT) and its metabolites (DDD and DDE), polychlorinated biphenyls (PCBs) polybrominated diphenyl ethers (PBDES), and polycyclic aromatic hydrocarbons (PAHs).
- Monitoring design will be structured so that the large geography of the study area can be separated into manageable units – river reaches and finer sub-segments.

- Monitoring Framework can be used to easily generate sampling and monitoring plans for the Monitoring Program.
- Future Monitoring Program will track status and trends toxic substances 600 mile stretch of the Columbia River mainstem from the Canadian border to the Bonneville Dam.
- Future Monitoring Program will obtain estimates of changes in persistent toxic substances in fish over time and among locations.
- Along the US portion of the Columbia River, effects of pollution have contributed to:
    - Declines in fish runs
    - Fish consumption advisories on 75% of the Columbia River
    - Multiple CWA 303(d) listings throughout basin
- Future Monitoring Program will provide estimates of risks to consumers of fish from the Columbia River.
- Future Monitoring Program will help get us to our vision… clean, healthy fish that is safe to eat.

Yakama Nation Talking Points for Identifying Matching Funds (May 26, 2022)

Project Title: Columbia River Mainstem Fish Tissue and Water Quality Monitoring

Project Description: The Yakama Nation in collaboration with the U.S. Geological Survey (USGS), CRITFC, and Washington Department of Ecology (Ecology) are developing a *Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program.*

YN secured EPA funding for Phase I of this multi-phased, multi-year project to monitor the spatial and temporal distribution of toxic contaminants throughout the mainstem of the Columbia River. Phase I focuses on the development of a Monitoring Framework for a long-term program to track toxics found in fish, invertebrates, water and sediments along the approximately 600-mile length of the middle and upper mainstem Columbia River from the Canadian Border to Bonneville Dam.

Phase I includes:

- review and summarization of past studies on toxics in the mainstem Columbia River
- existing data evaluated for potential use in estimating historic trends
- evaluation of core analytes, including: mercury, dichlorodiphenyltrichloroethane (DDT) and its metabolites (DDD and DDE), polychlorinated biphenyls (PCBs) polybrominated diphenyl ethers (PBDES), and polycyclic aromatic hydrocarbons (PAHs)
- development of the Monitoring Framework, which will be lead by YN, drafted by USGS with input from Ecology, CRITFC and others

Phase 2 includes:

- develop a work plan and summary report to guide all elements of Phase 2
- the summary report will focus on the development of QAPPs, SOPs, budget refinement, GIS analyses for study designs, identification of database housing and management and identification of long-term funding

The objective of the monitoring program, to track status and trends of toxics in the mainstem Columbia River, can only be achieved if sampling is repeated at regular frequencies over many years, decades and ideally in perpetuity. Our vision is to use the information gathered to help make decisions that lead to **clean, healthy fish that is safe to eat.**

Background and Project Talking Points:

- The Yakama Nation sought EPA funding to initiate a multiphased, multi-year project to establish long-term fish tissue monitoring in the Columbia River.

- The Yakama Nation is partnering with USGS, CRITFC, and Ecology.

- We are doing this because despite decades of hazardous waste cleanup work and environmental regulations to prevent pollution, the effects of toxic substances have contributed to:
    - declines in fish runs, and
    - fish consumption advisories covering 75% of the mainstem Columbia River
- And yet today, we still cannot answer the question of whether contaminants in fish tissue are getting better or worse.

- We need to answer this question and we need to communicate and share information with our community and our neighbors.

- This work, will help get us to our vision… clean, healthy fish that is safe to eat.

Goal: Funding will result in a Monitoring Framework to establish a long term fish tissue and water quality Monitoring Program for the Columbia River mainstem.

Location: 600 mile stretch of the Columbia River mainstem

- Canadian border to the Bonneville Dam.
- Monitoring design - study area can be separated into manageable units – river reaches and finer sub-segments.

Contaminants: Initial review and summary of toxics will include an evaluation of core analytes, including (but not limited to):

- mercury
- dichlorodiphenyltrichloroethane (DDT) and its metabolites (DDD and DDE)
- polychlorinated biphenyls (PCBs)
- polybrominated diphenyl ethers (PBDES)
- polycyclic aromatic hydrocarbons (PAHs)

Phasing of a multi-phased, multi-year project to develop a long term Monitoring Program:

- **Phase 1 - Engage Stakeholders and develop a Monitoring Framework**
- **Phase 2 - Implement Monitoring Framework and Long-term Funding and Administration Planning**
- **Phase 3 - Implement Monitoring Program and Adaptive Management**

Project team:

- ***Yakama Nation:*** Project lead entity that will coordinate contract and funding management, stakeholder outreach, organize outreach meetings, provide technical assistance, and develop the Community Engagement and Outreach Plan.
- **U.S. Geological Survey (USGS)*:*** Technical lead on the development of the Monitoring Framework; report development and completion.
- **Columbia River Inter-Tribal Fish Commission (CRITFC)*:*** Technical assistance.
- **Washington Department of Ecology (Ecology)*:*** Technical assistance.

Future Monitoring Program will:

- facilitate estimating **historic trends** and toxic concentrations in fish tissue and other media.
- **track status and future trends** of toxic substances.
- obtain estimates of **changes** in persistent toxic substances in fish **over time and among locations**.
- provide data for estimating **risks** to consumers of fish from the Columbia River.
- result in **Community outreach** to facilitate meaningful engagement with affected citizens to inform them on toxics in the Columbia Basin and to promote pollution prevention now and for future generations.
- help get us to **our vision**… clean, healthy fish that is safe to eat.

Yakama Nation Talking Points for Communicating Financial Needs (5/26/2022)

Columbia River Mainstem Long-Term Fish Tissue and Water Quality Monitoring Program

Now is the time for the tribes to advocate for science to improve natural resource management through funding of a long-term monitoring program within the Columbia River basin to *improve and protect the Columbia River ecosystem.*

Goal: Seek and establish congressional appropriations for USGS to do monitoring on the Columbia River mainstem and act as program lead.

Team: YN, CRITFC, Ecology, ODEQ, USGS. Collaboration with other Basin-Wide efforts is a priority. Collaboration with the Lower Columbia River is planned (LCR funded separately per CWA Section 123).

About: Program designed to conduct long-term monitoring of toxic substances in the mainstem Columbia River, in perpetuity. Intended to establish spatial / temporal trends to guide ecosystem recovery resulting in clean, healthy fish that are safe to eat. Serve as a trusted source for unbiased scientific data that supports decision makers and communities in.

Details:

- **Media**: fish (resident and salmon), sediment, water quality, and other media as budget allows
- **Contaminants**: PCBs, arsenic, mercury, PBDE, PFAS/PFOS, and DDE, and others as budget allows.
- **Project Location**: 600 mile stretch of the mainstem Columbia River –(Bonneville Dam to Canadian Border).

Annual Cost Estimate: $6 million/year

- Mainstem Monitoring Program: $5 million/year
- Outreach: $0.5 million/year
- Database/Website: $0.5 million/year

Background:

- Several federally listed and tribally important species and their designated critical habitat (and essential fish habitat) supported by the Columbia River.
- Exposure of fish, wildlife, and people to contaminants is concerning. Migrating fish expose ocean food chains, such as the orca.
- Columbia River mainstem from the Bonneville Dam to the Canadian border has Fish Consumption Advisories covering 100% of Project Area resulting in a reduction of access to healthy food and treaty reserved resources.
- Many reaches of the Columbia River do not meet WA and OR's water quality standards.

Path forward:

1. Now (next 7 years) – EPA has $79 million from BIL (Bipartisan Infrastructure Law) plus annual CRBRP appropriations, which they need to ramp up and spend (EPA can only use 5%).
    a. Currently funded through grants, but need to transition to other funding source(s) such as legislative/bill appropriation.

Attachment 3

Goal and Objectives Discussion Presentation

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Development of a Columbia River Mainstem Fish Tissue and Water Quality Monitoring Framework

March 2021

Goals and objectives discussion

Project Team

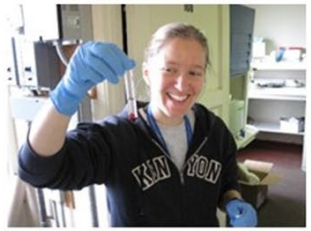
Puget Sound Environmental Monitoring Program

WDFW's Toxics Biological Observation System (TBiOS)

Our Team……

Jim West

Sandie O'Neill



Louisa Harding

Andrea Carey

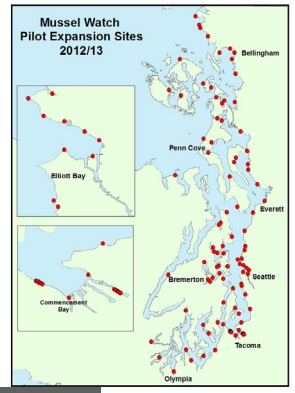
Rob Fisk

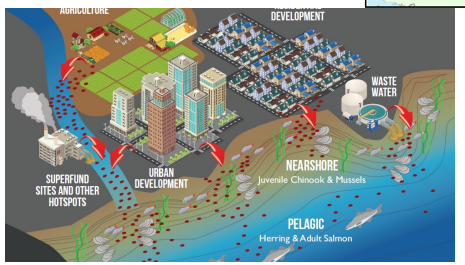
Mariko Langness

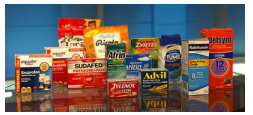
Danielle Nordstrom

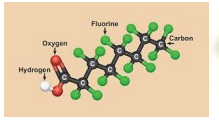
The TBiOS Challenge

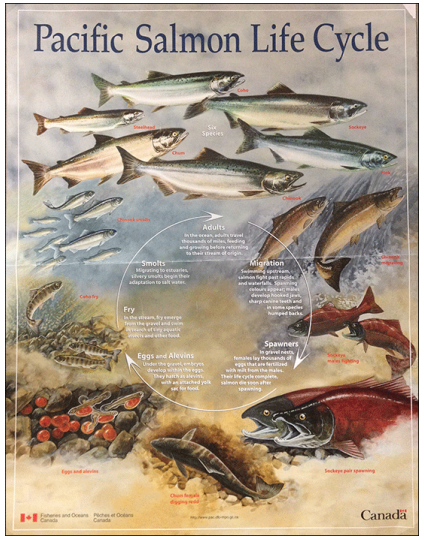
- identify ***which chemicals*** are
- ***causing harm***,
- ***where*** in the ecosystem,
- ***when*** (lifestages, seasons)
- ***time trends***: are conditions improving or worsening
- ***communicate*** results to ***inspire action***!

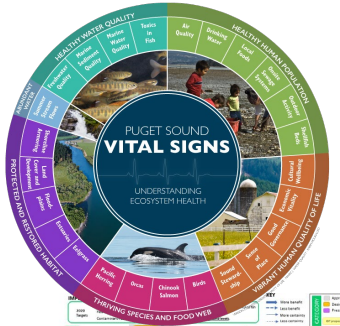


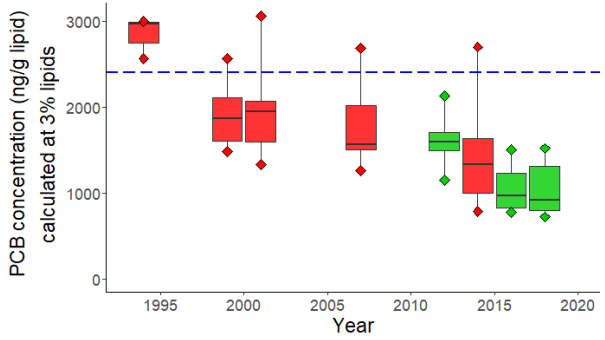












Puget Sound Environmental Monitoring Program

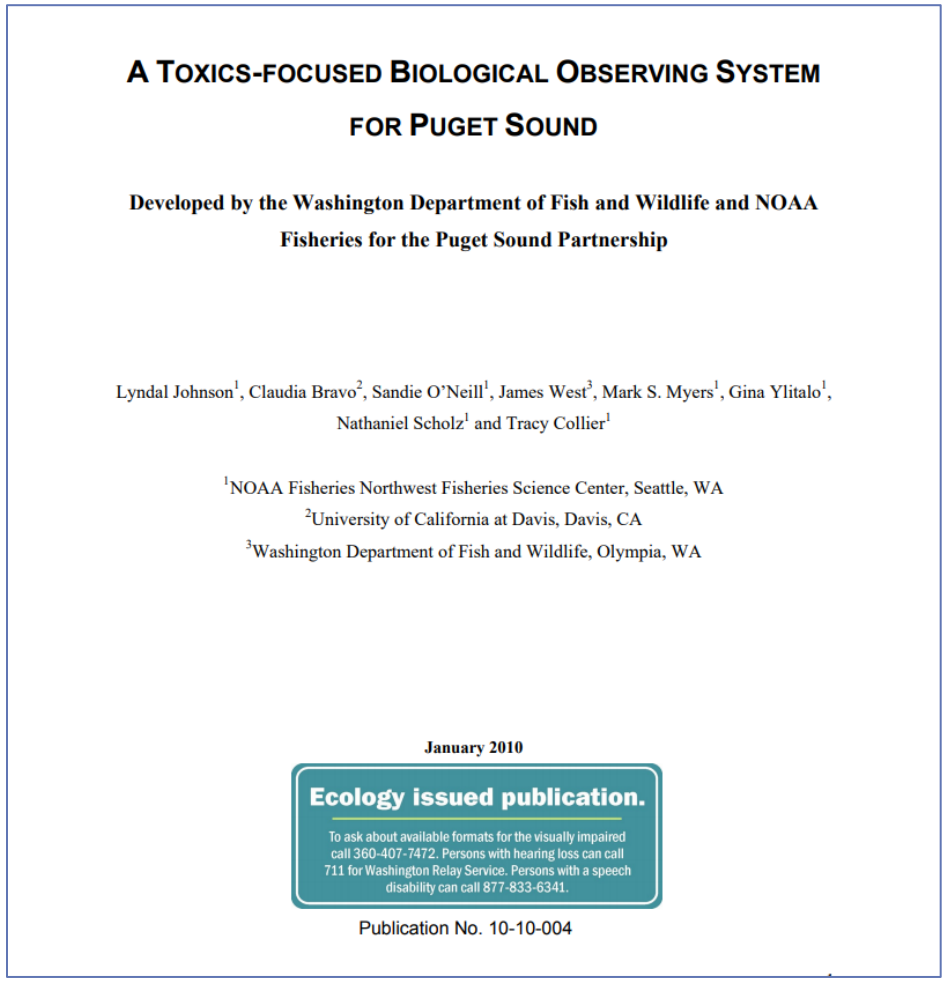
WDFW's Toxics Biological Observation System (TBiOS)

TBiOS mission statement:

Assess the effects of toxic contaminants on marine and anadromous species to help guide efforts to protect fish and shellfish health, ensure seafood safety, and promote ecosystem recovery.

Puget Sound Environmental Monitoring Program

WDFW's Toxics Biological Observation System (TBiOS)



A TOXICS-FOCUSED BIOLOGICAL OBSERVING SYSTEM FOR PUGET SOUND

Developed by the Washington Department of Fish and Wildlife and NOAA Fisheries for the Puget Sound Partnership

Lyndal Johnson[1], Claudia Bravo[2], Sandie O'Neill[1], James West[3], Mark S. Myers[1], Gina Ylitalo[1], Nathaniel Scholz[1] and Tracy Collier[1]

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January 2010

Ecology issued publication.

To ask about available formats for the visually impaired call 360-407-7472. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Publication No. 10-10-004

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Puget Sound Environmental Monitoring Program

WDFW's Toxics Biological Observation System (TBiOS) Goals

1. Region-wide monitoring to document large-scale geographical and long-term temporal trends in contaminants in the Sound;
   - Discovery – Where is it?
   - Status – How much of it is where?
   - Trends – Are things getting better, staying the same, or getting worse?

Puget Sound Environmental Monitoring Program

WDFW's Toxics Biological Observation System (TBiOS)

2. Localized effectiveness monitoring in areas where toxics reduction efforts have occurred.
   - Following discovery phase, areas that need mitigation are identified, mitigation measures are proposed and enacted, and monitoring is conducted to see whether the actions are having their intended effects.

Puget Sound Environmental Monitoring Program

WDFW's Toxics Biological Observation System (TBiOS)

3. Diagnostic research studies assessing exposure and effects of chemical contaminants in biota.
   - "So what"?

Puget Sound Environmental Monitoring Program

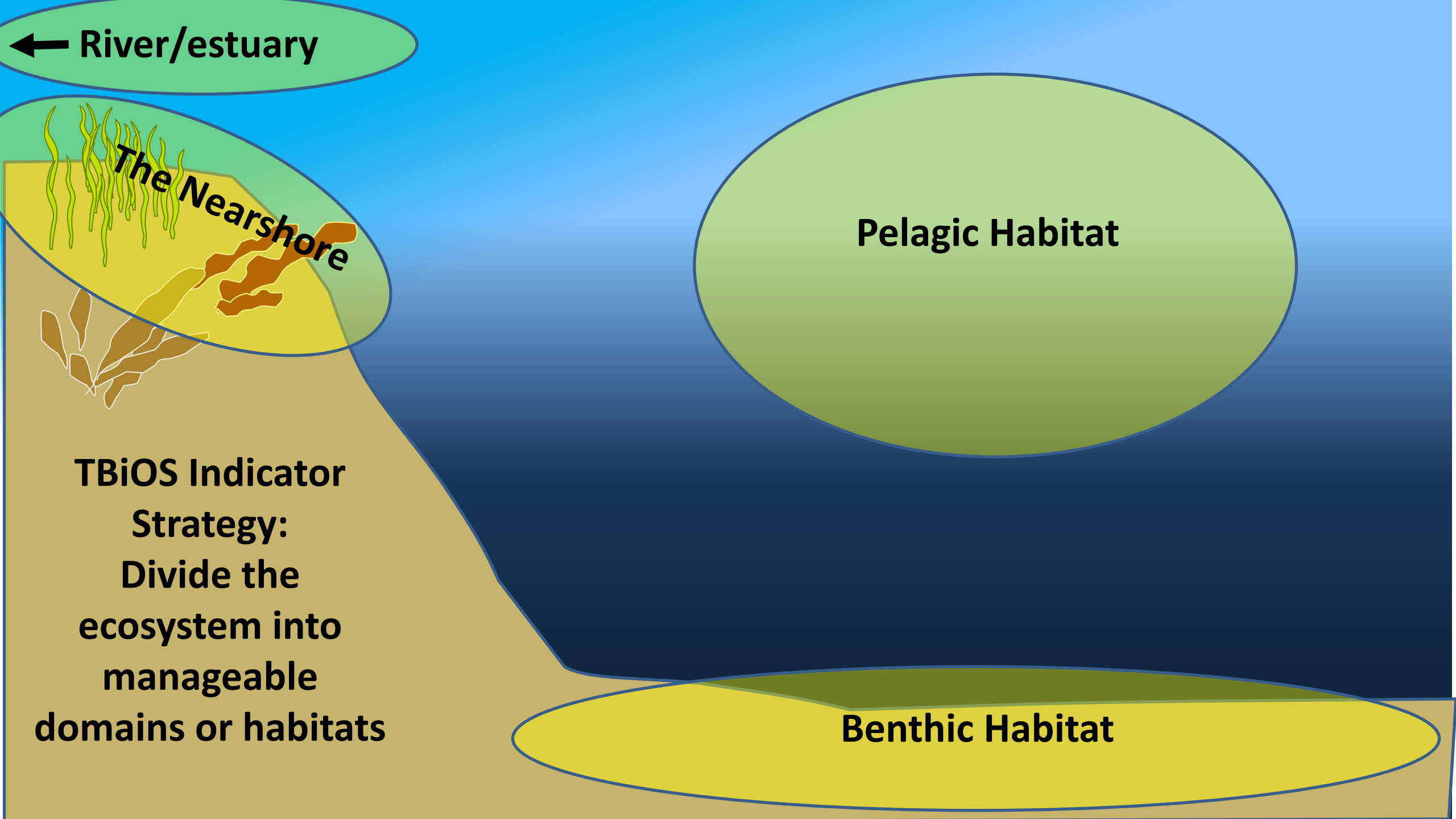
WDFW's Toxics Biological Observation System (TBiOS) Objectives:

1. The TBiOS will identify toxics-associated injury to the Puget Sound ecosystem, and provide information on the geographic range, extent, and severity of the problem.
   - Maps to Goal 1 – range and extent

Puget Sound Environmental Monitoring Program

WDFW's Toxics Biological Observation System (TBiOS) Objectives:

2. The TBiOS will expand and refine our understanding of how toxics move through the Puget Sound ecosystem and accumulate in wildlife and, ultimately, through fish and shellfish consumption, in humans. .
   - Maps to Goal 1 – separation of monitoring by habitat


River/estuary
The Nearshore
Pelagic Habitat
TBiOS Indicator Strategy: Divide the ecosystem into manageable domains or habitats
Benthic Habitat

Puget Sound Environmental Monitoring Program

WDFW's Toxics Biological Observation System (TBiOS) Objectives:

3. The TBiOS will guide our toxics reduction strategy efforts by helping to identify those watersheds where contaminants are the greatest problem, and where detailed evaluations of loadings, diagnostic studies, toxics reduction activities, and monitoring are most needed. Specific reference to implementation strategy action strategy.
   - Maps to Goals 1 and 2

Puget Sound Environmental Monitoring Program

WDFW's Toxics Biological Observation System (TBiOS) Objectives:

4. By tracking spatial and temporal trends for toxics, as well as trends in biological indicators that measure contaminant effects, TBiOS will provide a basis for evaluating the effectiveness of toxics reductions strategies as they are implemented throughout the region. It will also provide for localized effectiveness monitoring as needed.
    - Maps to Goals 1, 2, and 3

Puget Sound Environmental Monitoring Program

WDFW's Toxics Biological Observation System (TBiOS) Objectives:

- The diagnostic studies will establish cause-and-effect linkages between toxicant exposure and biological impacts that will allow us to predict pollution-effects and serve as a basis for further management actions.
    - Maps to Goal 3. Noted that this objective may not necessarily be the sole responsibility of the Project Team.

Upper Mississippi- Background

“The Upper Mississippi River Restoration (UMRR) Program for the UMRS is first comprehensive program for ecosystem restoration, scientific research, and monitoring on a large river system in the Nation and the world.”

“The UMRR was first authorized in Section 1103 of the Water Resources Development Act of 1986. UMRR has made significant contributions to advancing Congress' vision of the Upper Mississippi River System as "a nationally significant ecosystem and a nationally significant commercial navigation system,”…”

-During our interview, reported that Originally $33M budget shrunk to $21M in late 1990s.

2/3 to Restoration and 1/3 to Monitoring.

-Monitoring conducted by 6 different ‘Field Stations’- mostly various State DNR employees

-USGS manages training, sampling design, database management and analysis

-Subsequently- Restoration Part managed differently (with communication between) from the Monitoring Part

Upper Mississippi Strategic Plan

10-year Strategic Plan 2015-2025

Vision Statement

A HEALTHIER AND MORE RESILIENT UPPER MISSISSIPPI RIVER ECOSYSTEM THAT SUSTAINS THE RIVER'S MULTIPLE USES

TO WORK WITHIN A PARTNERSHIP AMONG FEDERAL AND STATE AGENCIES AND OTHER ORGANIZATIONS; TO CONSTRUCT HIGH-PERFORMING HABITAT RESTORATION, REHABILITATION, AND ENHANCEMENT PROJECTS; TO PRODUCE STATE-OF-THE-ART KNOWLEDGE THROUGH MONITORING, RESEARCH, AND ASSESSMENT; TO ENGAGE OTHER ORGANIZATIONS TO ACCOMPLISH THE

UPPER MISSISSIPPI RIVER RESTORATION PROGRAM'S VISION

Goals

- 1. Enhance habitat for restoring and maintaining a healthier and more resilient Upper Mississippi River ecosystem
- 2. Advance knowledge for restoring and maintaining a healthier and more resilient Upper Mississippi River ecosystem
- 3. Engage and collaborate with other organizations and individuals to help accomplish the Upper Mississippi River Restoration vision
- 4. Utilize a strong, integrated partnership to accomplish the Upper Mississippi River Restoration vision

-Assumptions Statements-

-Core principles to guide implementation of this Strategic Plan:

-Defining Success

-Series of 3 Goals and more detailed objectives to support those Goals.

Upper Mississippi River Restoration- LTRM

The mission of the Long Term Resource Monitoring element is to support decision makers with the information and understanding needed to maintain the Upper Mississippi River System as a viable multiple-use large river ecosystem.

Goals of the Long Term Resource Monitoring element:

-Develop a better understanding of the ecology of the Upper Mississippi River System and its resource problems.
-Monitor resource change.
-Develop alternatives to better manage the Upper Mississippi River System.
-Provide for the proper management of monitoring information.

Upper Mississippi River Restoration Program

Long Term Resource Monitoring

Who We Are | Components | Data and Tools | Reports | UMESC

LTRM Sampling Design and Statistics

Components
Fish
Aquatic Vegetation
Water Quality
Macroinvertebrates

The Long Term Resource Monitoring (LTRM) sampling design and statistics web pages describe LTRM sampling designs and present design-based methods for estimating status and trends from LTRM monitoring data. Design-based estimation methods rely on properties of the sampling design, and therefore are typically viewed as less subjective than estimates from statistical models. The following link leads to web pages that provide technical guidance for estimating means and temporal trends using LTRM data:

- Estimating means and temporal trends using LTRM data: application new

The following links provide background information on LTRM sampling designs and analyses that may be helpful when estimating means and temporal trends:

- Sampling Designs: background
- Estimating Means and Standard Errors from LTRM Survey Data: background
- Estimating temporal trends using LTRM data: background

The following links cover statistical topics not strictly associated with design-based estimation:

- Estimating Power to Detect Temporal Trends in LTRM Metrics
- Estimating Variance Components using LTRM Survey Data
- Statistical Models and LTRM Data
- Using Data from LTRM Nonrandom ("Fixed-Site") Locations

Quick links
USGS contacts
Field Stations
Field Station contacts
Reports and Publications
Strategic Plan 2010-2014
Status and Trends Report 2008

Chesapeake Bay Toxics Program

II. Goal, Outcome and Baseline

This management strategy identifies approaches for achieving the following goal and outcome:

Toxic Contaminants Goal

Ensure that the Bay and its rivers are free of effects of toxic contaminants on living resources and human health.

Research Outcome

Continually increase our understanding of the impacts and mitigation options for toxic contaminants. Develop a research agenda and further characterize the occurrence, concentrations, sources and effects of mercury, polychlorinated biphenyls (PCBs) and other contaminants of emerging and widespread concern. In addition, identify which best management practices might provide multiple benefits of reducing nutrient and sediment pollution as well as toxic contaminants in waterways.

Baseline and Current Condition

The TCW originally worked with stakeholders in 2015 to identify the five priority issues to be addressed for this strategy. Aspects of these issues were updated during CBP review process in 2018 and issues remained the same in the 2020 update. They include:

- Synthesize information to make fish and shellfish safer for human consumption.
- Understand the influence of contaminants degrading the health, and contributing to mortality, of fish and wildlife.
- Document the sources, occurrence, and transport of contaminants in different landscape settings.
- Provide science to help mitigate contaminants and emphasize the co-benefits with nutrients and sediment reductions.
- Gather information on issues of emerging concern.

The baseline information for different contaminant groups being addressed by these issues originally came from the report "Extent and Severity of Toxic Contaminants in the Chesapeake Bay Watershed" (Chesapeake Bay Program, 2013), and are summarized in table 1. A qualitative assessment of the baseline understanding for the sources, occurrence, and effects for these contaminant groups was prepared by the TCW for the original strategy (figure 1). The contaminant groups with the greatest uncertainty are the primary emphasis of the research efforts; however, the remaining science needs related to PCBs and mercury are included in the strategy.

SOUTHERN CALIFORNIA
COASTAL WATER
RESEARCH PROJECT

Applying next-generation science to aquatic ecosystems management

A PUBLIC AGENCY

Research Areas

Bioassessment Ecohydrology Eutrophication
Climate Change Sediment Quality Emerging Contaminants
Microbial Water Quality Regional Monitoring

Vision, Goals and Strategies

Mission Statement
To enhance the scientific foundation for management of Southern California's ocean and coastal watersheds.

Vision Statement
SCCWRP's effective transfer of science to member agencies and other stakeholders **leads to implementation of appropriate, viable management strategies that protect** the ocean and coastal watersheds for this and future generations.

Goals and Strategies
Goal 1 *(What work SCCWRP should do)*
Undertake and participate in scientific investigations to understand ecological systems in the coastal waters and associated watersheds, in order to document relationships between these systems and human activities relevant to SCCWRP member agencies.

Strategies

Goal 2 *(SCCWRP should do the work well)*
Serve as a respected source of unbiased coastal water quality science.

Strategies

Goal 3 *(SCCWRP should build consensus)*
Develop scientific consensus on issues relevant to management decisions and application of science by member agencies.

Strategies

Goal 4 *(SCCWRP's work should be put to use)*
Stimulate conversion of science to action.

SOUTHERN CALIFORNIA
COASTAL WATER
RESEARCH PROJECT

Applying next-generation science to aquatic ecosystems management

A PUBLIC AGENCY

Research Areas

Bioassessment Ecohydrology Eutrophication
Climate Change Sediment Quality Emerging Contaminants
Microbial Water Quality Regional Monitoring

Research Plan

SCCWRP works in partnership with its scientific advisory board, the Commission's Technical Advisory Group (CTAG), to develop and continuously update a forward-looking, 10-year Research Plan for each of SCCWRP's major thematic research areas. Written for knowledgeable scientists working in each particular field, these comprehensive technical documents provide an overview of how SCCWRP conceptually approaches each research theme, how various individual projects and studies fit into SCCWRP's long-term research strategy, and broadly supported priorities for SCCWRP's future research directions.

Research Plan 2020-21 Executive Summary (PDF)

Bioassessment Research Plan
Ecohydrology Research Plan
Eutrophication Research Plan
Climate Change Research Plan
Sediment Quality Research Plan
Emerging Contaminants Research Plan
Microbial Water Quality Research Plan
Stormwater BMPs Research Plan
Regional Monitoring Research Plan

SF Bay Estuary Regional Monitoring Program

Level 1 Questions:

- Are chemical conc at levels of concern and are impacts likely?
- What are the concentrations and masses of contaminants and it's segments (fish, invertebrates, primary producers, sediment, water

Level 2 Questions:

- What contaminants are responsible for impacts?
- Are there particular regions of concern?

Attachment 4

Phase 1 Framework for a Long-Term, River-Wide, Contaminant Trend Monitoring Program
Power Point Presentation

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Future Monitoring Needs in the Columbia River

Phase 1 Framework for a Long-Term, River-Wide, Contaminant Trend Monitoring Program

January 26, 2021 ATNI
Laura Shira & Davis Washines, Yakama Nation Fisheries

Overview

- Background
- Opportunities - legal & grant funding
- Our team
- Monitoring vision
- Seeking your input

Background

Along the US portion of the Columbia River, effects of pollution have contributed to

- declines in fish runs
- ≥70% of mainstem Columbia has fish consumption advisories
- Multiple CWA 303(d) listings throughout basin

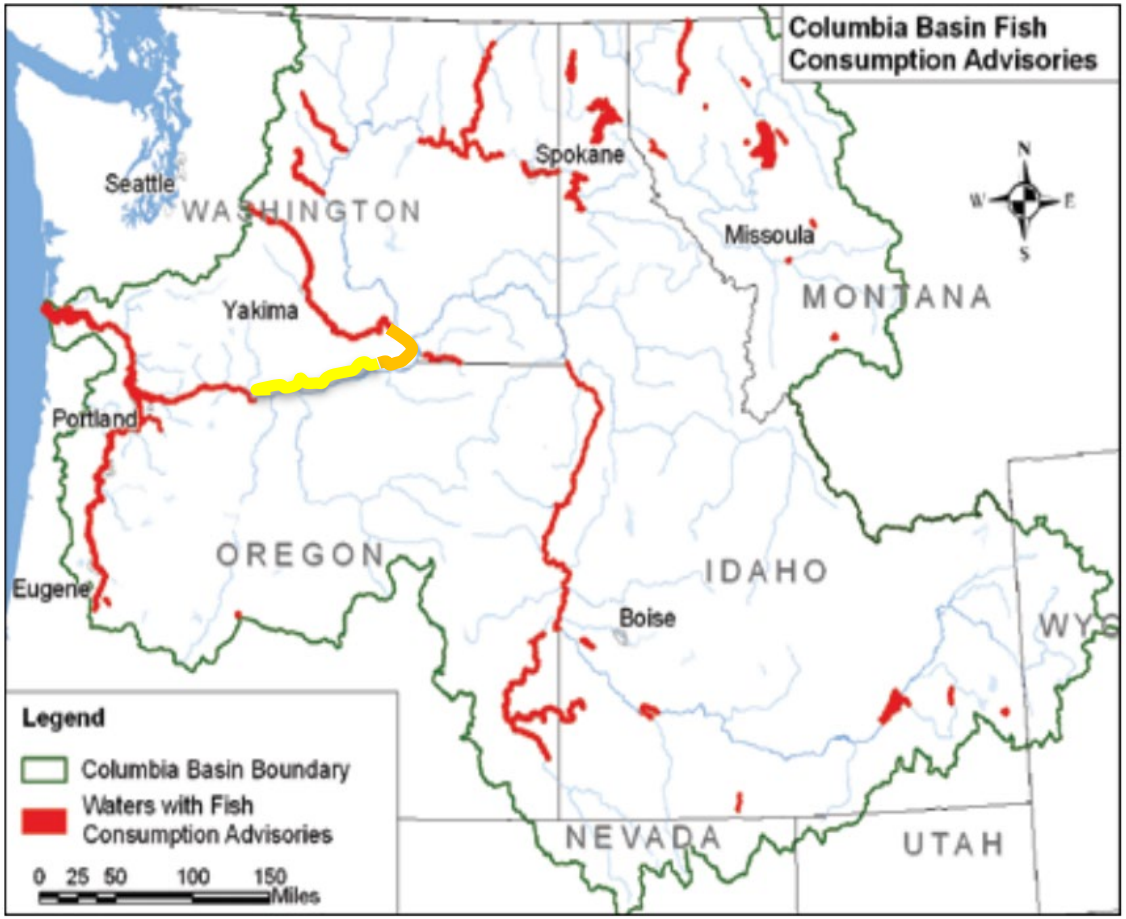


Figure 3.4: State-issued fish consumption advisories are in effect throughout the Columbia River Basin for certain contaminants and species. Not all waters have been tested, so the absence of an advisory does not necessarily mean it is safe to consume unlimited quantities of fish from untested waters.

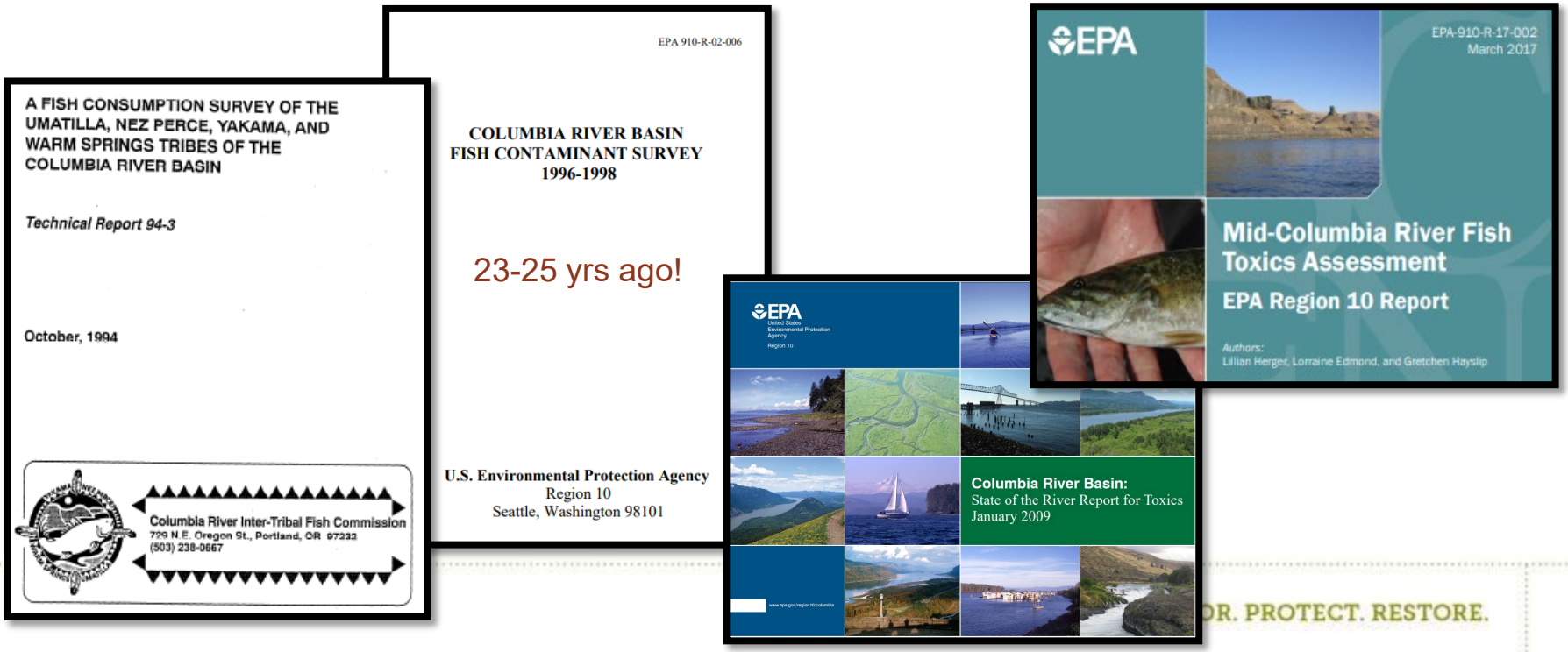
2009 State of the River, EPA – with updates in yellow & orange

Background

"Is it better or worse?" - Yakama Leadership

Despite decades of effort, we still cannot fully answer this question.

- Significant investment in:
  - monitoring and toxicity studies
  - cleanup and prevention
- Yet the data is not widely comparable because of different analytical methods, spatial and temporal issues, study purpose/bias



Opportunities

LEGAL

- 2016 Clean Water Act, Section 123 (33 USC 1275) - required EPA to establish Columbia River Basin Restoration Program

GRANT FUNDING

- FY2020 - $2,053,903 & 14 recipients
- Future - additional grant opportunities expected

Our Team - Roles

- Yakama Nation – Grant Lead
- United States Geological Survey (USGS) – Technical Lead
- Washington Department of Ecology – Technical Assistance
- Columbia River Inter-Tribal Fish Commission (CRITFC) – Technical Assistance

Monitoring Vision - GOAL

- Develop a long-term monitoring program to assess the status and trends of contamination
  - in fish, water, sediment, invertebrates and other potential media
  - over time and among locations
  - in the Columbia River mainstem.

Monitoring Vision

CURRENT PHASE (largely decoupled from funding)

- PHASE 1 - FY2021 - 2022
  - Collaboration
  - MONITORING DESIGN FRAMEWORK
    - Research lessons learned from large watersheds
    - Evaluate historical data
    - Provide recommendations - sampling methods, alternatives, cost estimates, priorities
  - OUTREACH – draft plan

Monitoring Vision

NEXT STEPS (highly dependent on funding)

- PHASE 2 - 2023 to 2025
  - Planning - long-term funding, program housing, permits, site reconnaissance
  - WORK PLAN
  - PILOT SCALE IMPLEMENTATION
  - OUTREACH

- PHASE 3 - 2026
  - Planning – funding, staffing, equipment procurement
  - LONG-TERM MONITORING PLAN IMPLEMENTATION
    - Assess the status and trends of contamination
    - Provide estimates of risks to receptors (human and ecological)
  - OUTREACH

Monitoring Vision

- **Spatial**
  - Columbia River Mainstem
  - Canadian Border to Bonneville Dam (~1,050 river km)
- **Media**
  - Fish tissue
  - Water Quality
  - Sediment
  - Biota
- **Temporal** - TBD (ex. repeat every 5-10 yrs)
- **Contaminants** - TBD (ex. mercury, DDx, PCBs, PBDEs, PAHs)

Summary - Davis Washines

Questions

- Suggestions?
- Funding sources?
- Strategy?
- Other data needs?
- Priorities?

HONOR. PROTECT. RESTORE.

Yakama Nation

Attachment 5

Multi-Entity Commitment Letter

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Date

To EPA, legislators?

Dear Mx. Xxxxx:

The purpose of this letter is to communicate our ongoing concerns regarding the lack of information available to address continued contaminant issues throughout the Columbia River watershed. Understanding, restoring, and protecting the Columbia River is an important regional priority for all those responsible for this resource. We are committed to developing a program to monitor toxic substances in the Columbia River Mainstem in perpetuity to establish trends and guide ecosystem recovery resulting in clean, healthy fish that are safe to eat. This program is intended to serve as a trusted source for unbiased scientific data that supports decision makers and communities in improving and protecting the Columbia River Basin ecosystem. Our intention is to work collaboratively with partners throughout the Columbia River Basin, beginning our efforts on the Columbia River Mainstem and adaptively managing as priorities evolve and information and funding become available.

Attachment 6

High Level Agency Contact List

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Columbia River Mainstem Long-Term Fish Tissue and Water Quality Monitoring Program

High Level Agency Contact List

Agency	Contact 1	Contact 2	Contact 3
EPA	Dan Opalski Water Division **opalski.dan@epa.gov** **206.553.1855**	TBD Science Division	May Lou Soscia OR Operations Office Soscia.Marylou@epa.gov 503.326.5873
USGS	Jill Rolland Regional Director, Portland jrolland@usgs.gov 206.225.6643 Note - start w/ Jill	Lief Horwitz Tribal Liaison lief_horwitz@usgs.gov 206.450.1471	
Western Fisheries Research Center, USGS	Michael Schmidt Center Director mwschmidt@usgs.gov 206.526.6654		
OR Water Science Center, USGS	Dar Crammond Center Director crammond@usgs.gov 503.251.3204		
WA Water Science Center, USGS	Cynthia Barton Center Director cbarton@usgs.gov 253.552.1602		
OR DEQ	Richard Whitman Director whitman.richard@deq.state.or.us	Annalisa Bhatia Tribal Liaison annalisa.bhatia@deq.oregon.gov 503.734.4080	Roxy Nayar Roxy.Nayar@deq.oregon.gov 503.229.6414
WA Ecology	Sage Park CRO Regional Director sueb461@ecy.wa.gov 509.480.1753	Laura Watson Ecology Director **laura.watson@ecy**.wa.gov	Brook Beeler ERO Regional Director brook.beeler@ecy.wa.gov 509.202.5674
CRITFC	Aja DeCoteau Executive Director deca@critfc.org 503.731.1252		
Upper Columbia United Tribes (UCUT)	DR Michel Executive Director dr@ucut-nsn.org 509.248.3334		

Attachment 7

List of Outreach Activities

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Outreach Activities

October 1, 2020 to September 30, 2022

Columbia River Inter-Tribal Fish Commission by Dianne Barton

- October 23, 2020, Columbia River Mainstem Monitoring Grant Presentation to Columbia River Inter-Tribal Fish Commission
- January 25, 2021, Columbia River Monitoring Presentation, Affiliated Tribes of Northwest Indians Environmental Session

U.S. Environmental Protection Agency Activities provided by Nicole Taylor

- 2020 Success Story
    - Link to PDF: https://www.epa.gov/system/files/documents/2021-10/crbrp-success-story-yakama-nation-oct2021.pdf
    - Available on website (scroll down to 2020 Awards): https://www.epa.gov/columbiariver/columbia-river-basin-restoration-funding-assistance-program
- U.S. Environmental Protection Agency's Columbia River Basin Restoration Program Story Map
    - Link: https://storymaps.arcgis.com/stories/24979f1fd3124cc7bb4c85147d38eedc
- 2022 Columbia River Basin Restoration Program Report
    - Link to PDF: https://www.epa.gov/system/files/documents/2022-03/crbrp-update-2022.pdf
    - Available on website: https://www.epa.gov/columbiariver/columbia-river-basin-restoration-program-report
- September 16, 2020, Press Release
    - Available on website: https://www.epa.gov/newsreleases/epa-awards-2-million-grants-reduce-toxics-throughout-columbia-river-basin

Yakama Nation Fisheries Activities provided by Laura Shira

- Monitoring Program interim website hosted by Yakama Nation Fisheries
    - Link to website: https://yakamafish-nsn.gov/restore/projects/columbia-river-mainstem-water-quality-monitoring-program
- Monthly Team Meetings to plan Columbia River Mainstem Monitoring technical framework and outreach messaging for grant deliverables
    - Core team members (grant application team) – Yakama Nation, United States Geological Survey, Columbia River Inter-Tribal Fish Commission, Washington Department of Ecology, Oregon Department of Environmental Quality
    - Collaborators – Environmental Protection Agency, Oregon Health Authority, Washington State Department of Health, Colville Tribe, Spokane Tribe, Upper Columbia United Tribes
    - Additional collaboration/meetings as needed
- Environmental Protection Agency Columbia River Basin Restoration Working Group and Toxics Subgroup participation
- October 23, 2020, Columbia River Mainstem Monitoring Grant Presentation to CRITFC Commission
- October 26, 2020, Columbia River basin outreach goals and tribal interests' discussion with Roy Iwai, Multnomah County
- January 25, 2021, Columbia River Monitoring Presentation, Affiliated Tribes of Northwest Indians Environmental Session
- June 10, 2021, participation in Environmental Protection Agency's Columbia River Monitoring Strategy Development Webinar
- October 26, 2021, Columbia River Monitoring Presentation to the Columbia River Basin Restoration Program Working Group
- November 2, 2021, Columbia River Monitoring Presentation to Upper Columbia United Tribes Environmental Committee
- January 4, 2022, Columbia River Monitoring Presentation to Environmental Protection Agency management
- May 11, 2022, Columbia River Monitoring Presentation to the Columbia River Basin Restoration Program Working Group
- August 10, 2022, Environmental Protection Agency Columbia River Basin Restoration Working Group press event participation

Washington Department of Ecology Activities provided by Will Hobbs

- Washington Department of Ecology has convened an internal group of staff to collaborate and coordinate efforts within the on Columbia River Basin issues such as including this long-term monitoring program.

Attachment 8

PDF of Project Website Hosted by Yakama Nation

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Website can be accessed here:
https://yakamafish-nsn.gov/restore/projects/columbia-river-mainstem-water-quality-monitoring-program

Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

Project abstract:

In 2020, Yakama Nation was successful in securing the U.S. Environmental Protection Agency (EPA) Columbia River Basin Restoration Program (CRBRP) funding to begin Phase 1 of a multi-phased, multi-year project to develop a Fish Tissue and Water Quality Monitoring Program (Monitoring Program) along the approximately 600-mile length of the Middle and Upper Columbia River mainstem to assess and track status and trends of contaminants in fish, water, sediments and invertebrates from the Canadian Border to Bonneville Dam. Yakama Nation is partnering with the Columbia River Intertribal Fisheries Commission (CRITFC), Washington Department of Ecology (Ecology), Oregon Department of Environmental Quality (ODEQ), and U.S. Geological Survey (USGS). Phase 1 work included engaging stakeholders, developing a Monitoring Framework to inform development of the overall Monitoring Program, and developing and conducting community engagement and outreach for an Outreach Messaging Framework.

In 2022, Yakama Nation submitted two additional EPA CRBRP grant proposals for a Phase 2 Pilot Study in the Bonneville Pool, an approximately 50-mile stretch of the Columbia River (Bonneville Dam to The Dalles Dam). The Pilot Study will sample for key toxics in fish (resident fish and adult/juvenile salmon), sediment, and potentially surface water (budget-dependent). In addition, this work will include planning, outreach and QAPP development for the long-term Columbia River Mainstem Monitoring Program (Bonneville Dam to Canadian Border), as well as continue efforts to identify a lead agency, program strategy, data management system and hosts of data.

Phase 3 will see implementation of the Long-Term Monitoring Program.

Project goals:

Implementation of a Long-Term Monitoring Program to track the status and trends of toxics in fish, water, sediments, and invertebrates in the Columbia River mainstem from Bonneville Dam to the Canada border.

More Projects of Columbia River Mainstem Monitoring Program:

https://www.epa.gov/columbiariver/columbia-river-basin-restoration-program-report

Related Announcements:

EPA, 2022: https://www.epa.gov/columbiariver/columbia-river-basin-restoration-fundi...

EPA, 2020: https://storymaps.arcgis.com/stories/24979f1fd3124cc7bb4c85147d38eedc

Project Photos:

Status: Active
01/01/2019 - Present

Lead Project:

Columbia Basin Toxics Cleanup

Activity:

Outreach and Education
Monitoring

Targeted Populations:

All Salmonids
Lamprey
Other Tribally important species

Location Area (Basin, Sub-Basin):

Columbia Mainstem

In partnership with:

U.S. Geologic Survey
Washington Department of Ecology
Columbia River Inter-Tribal Fish Commission
Oregon Department of Environmental Quality

Ecological Concerns:

Water Quality

Team:

Project Manager

Additional Project Staff
Rose Longoria
Laura Klasner Shira, P.E.
Natalie Swan