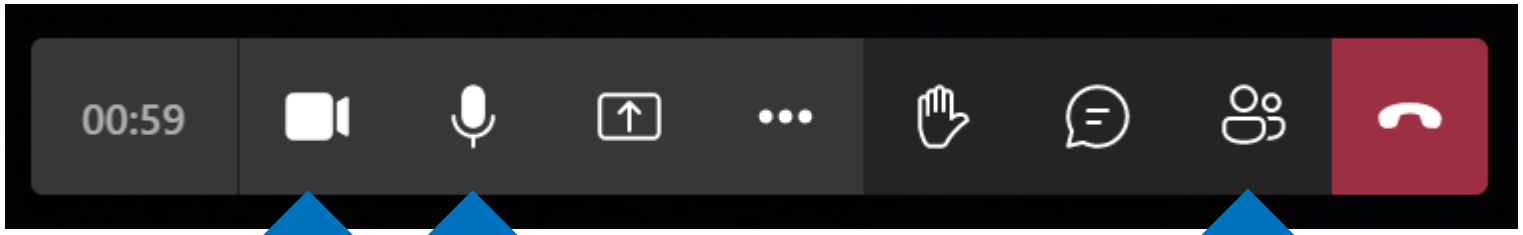
COLUMBIA RIVER BASIN
RESTORATION PROGRAM

EPA

Columbia River Basin Restoration Program Toxics Monitoring Subgroup Meeting

MARCH 23, 2023 | 1:30 – 3:00 PM PACIFIC

MS TEAMS TIPS



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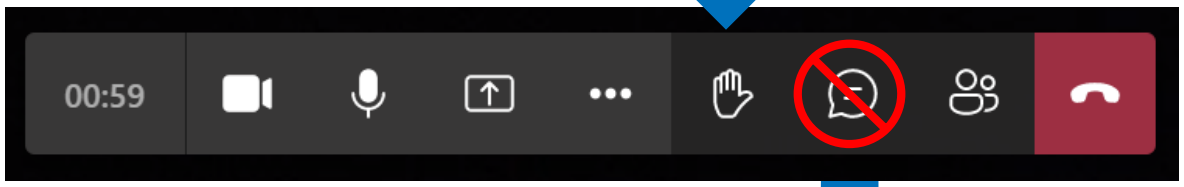
Click to turn microphone off/on

Click to see meeting participants

*please turn camera and mic off when not speaking

QUESTIONS?

Raise your hand in Teams to ask a question aloud



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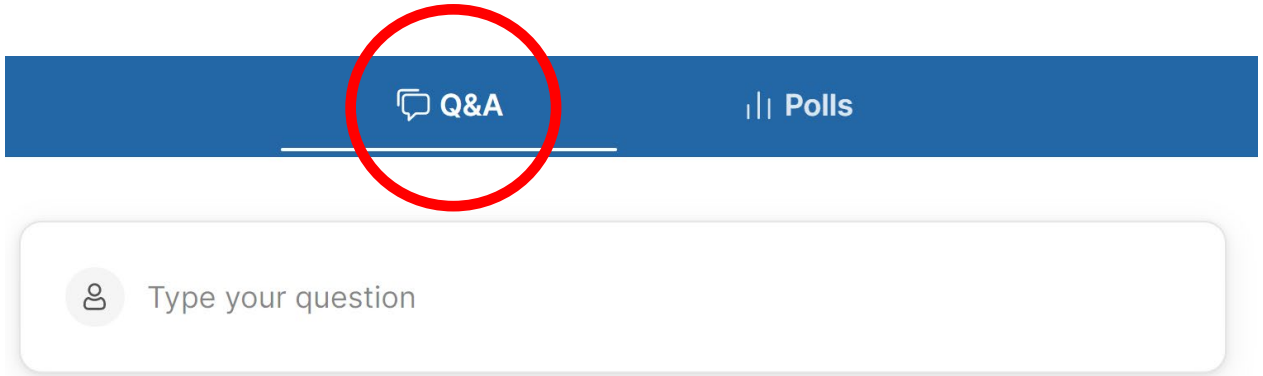


AGENDA

1:30—1:50 PM WELCOME & UPDATES

- Introductions
- Toxics Monitoring Subgroup meeting schedule
- Tasks for the next year

1:50—2:40 PM LIGHTNING TALKS

- 5 presentations, Q&A after each

2:40—3:00 PM QAPP Q&A WITH MEGHAN DUNN, EPA

Our role

- Support towards the coordination of a basin-wide network of toxics monitoring projects
- Support for participants in collecting, publishing, and synthesizing data

Core Team Members

- Jen Bayer, USGS/PNAMP (jbayer@usgs.gov)
- Mark Jankowski, EPA (jankowski.mark@epa.gov)
- Lisa Kusnierz, EPA (kusnierz.lisa@epa.gov)
- Patrick Moran, USGS (pwmoran@usgs.gov)
- Amy Puls, USGS/PNAMP (apuls@usgs.gov)
- Ashley Zanolli, EPA (zanolli.ashley@epa.gov)

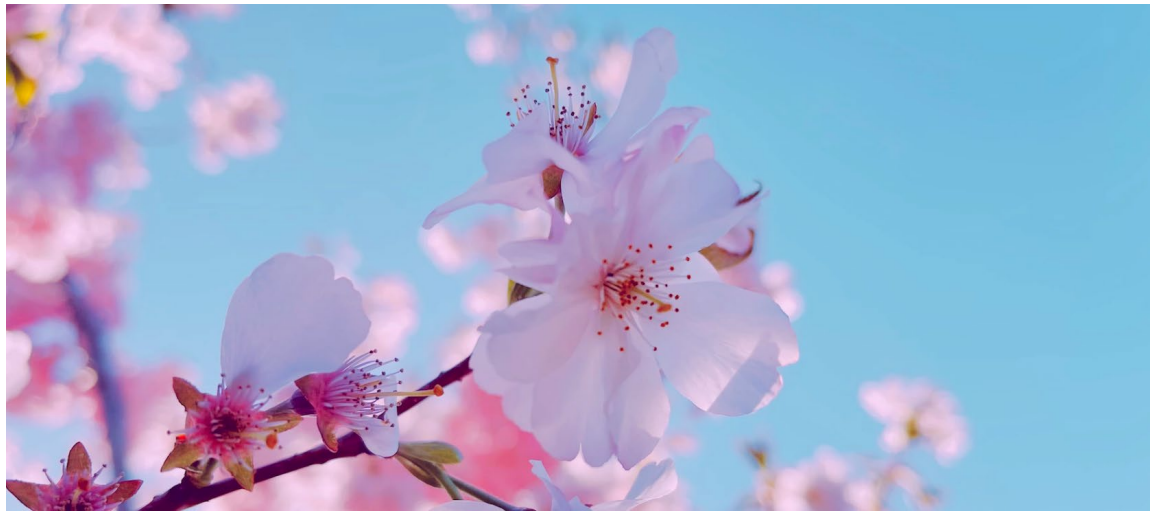
slido

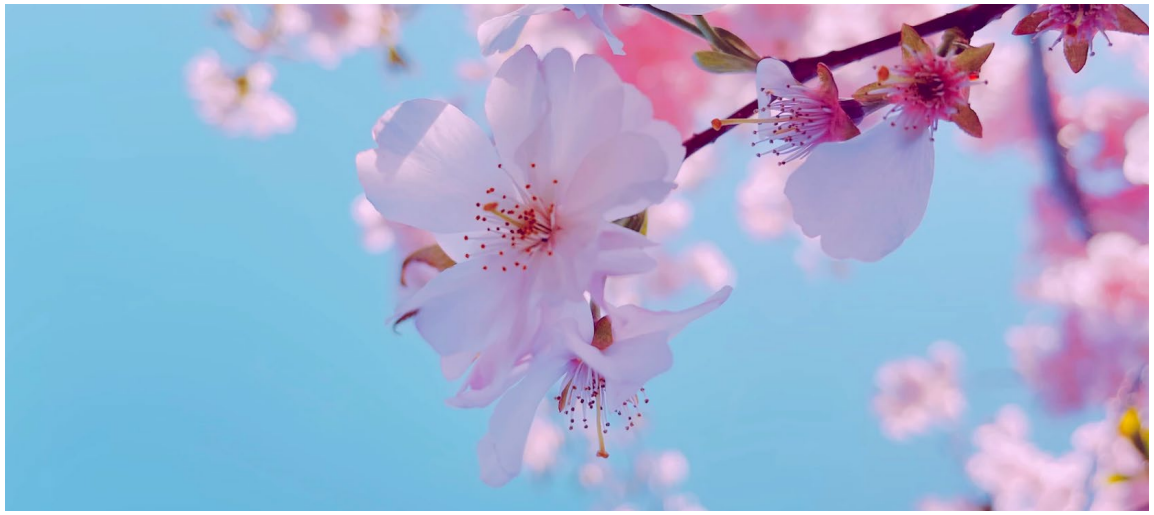
Introduce yourself - name, affiliation, and (optional) what you're reading for fun.

ⓘ Start presenting to display the poll results on this slide.

TOXICS MONITORING SUBGROUP

Develop a community of practice to share information on monitoring, and leverage activities within and outside of EPA funded grants.





3 virtual meetings in 2023

- March 23, 1:30-3 pm Pacific
- June 14, 1-3 pm Pacific
- September – date TDB

Workshop in January 2024

COLLABORATIVE TASKS

- Identify data gaps and areas of synergy for sampling and data management
- Develop recommendations for common collection and analytical methods to enable cross-project data comparisons
- Discuss and agree on screening values/thresholds for specific constituents to be monitored

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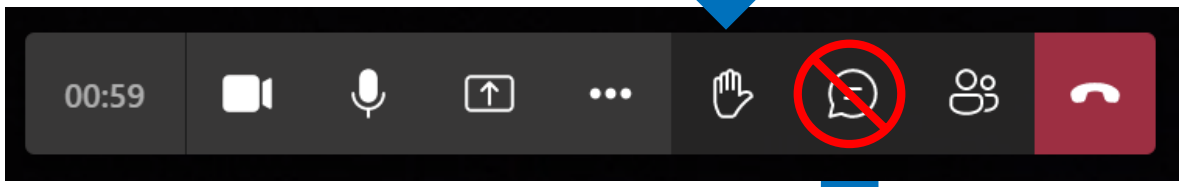

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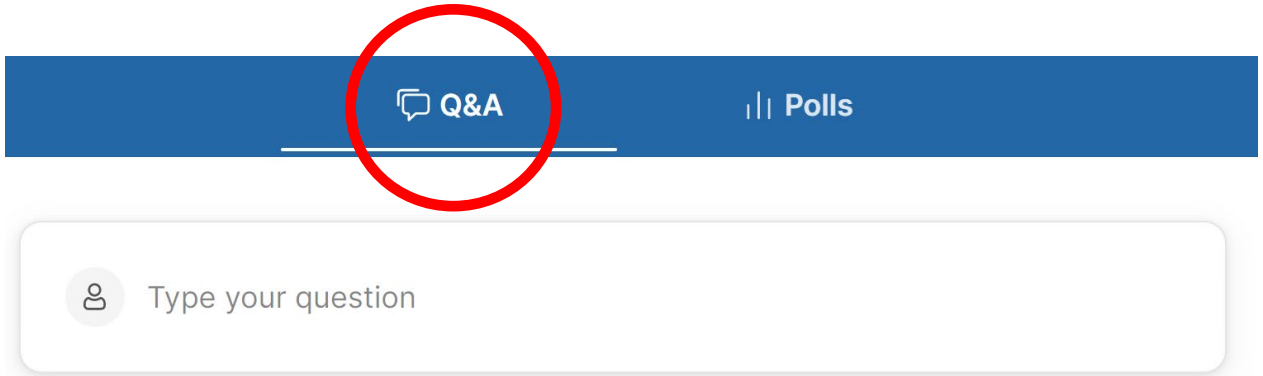


LIGHTNING TALKS

1. The Crayfish Mercury Project, Alan Kolok (University of Idaho)

2. Soil Matters: Testing Biochar Composition in a Green Stormwater Installation, Sarah Whitney (Long Tom Watershed Council)

3. Quantifying Toxins in Fish Consumption and Identifying Sources of Pollutants in the Upper Columbia, David Brooks (Montana Trout Unlimited)

4. Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program, Sherrie Duncan (Sky Environmental)

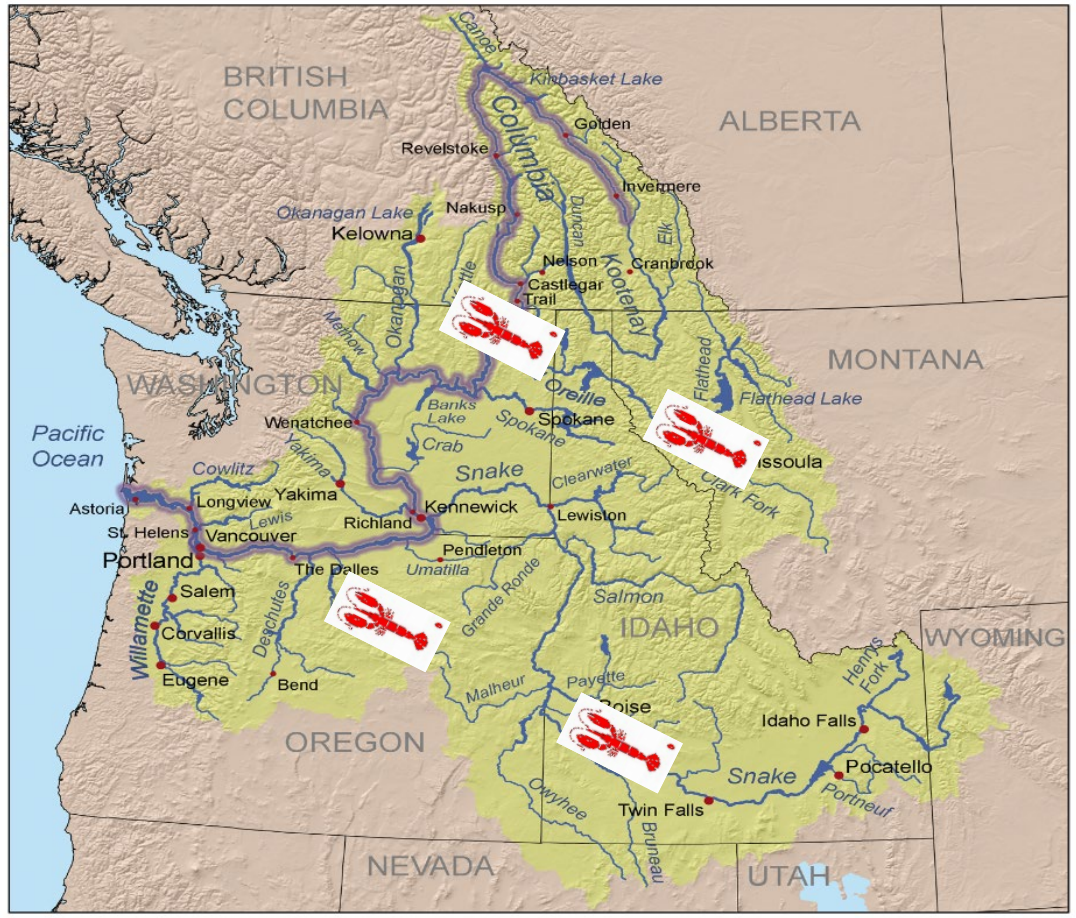
5. Non-target and Suspect Screening of Contaminants of Emerging Concern in lower Columbia River, Andy James (University of Washington, Tacoma)

University of Idaho

THE CRAYFISH MERCURY PROJECT

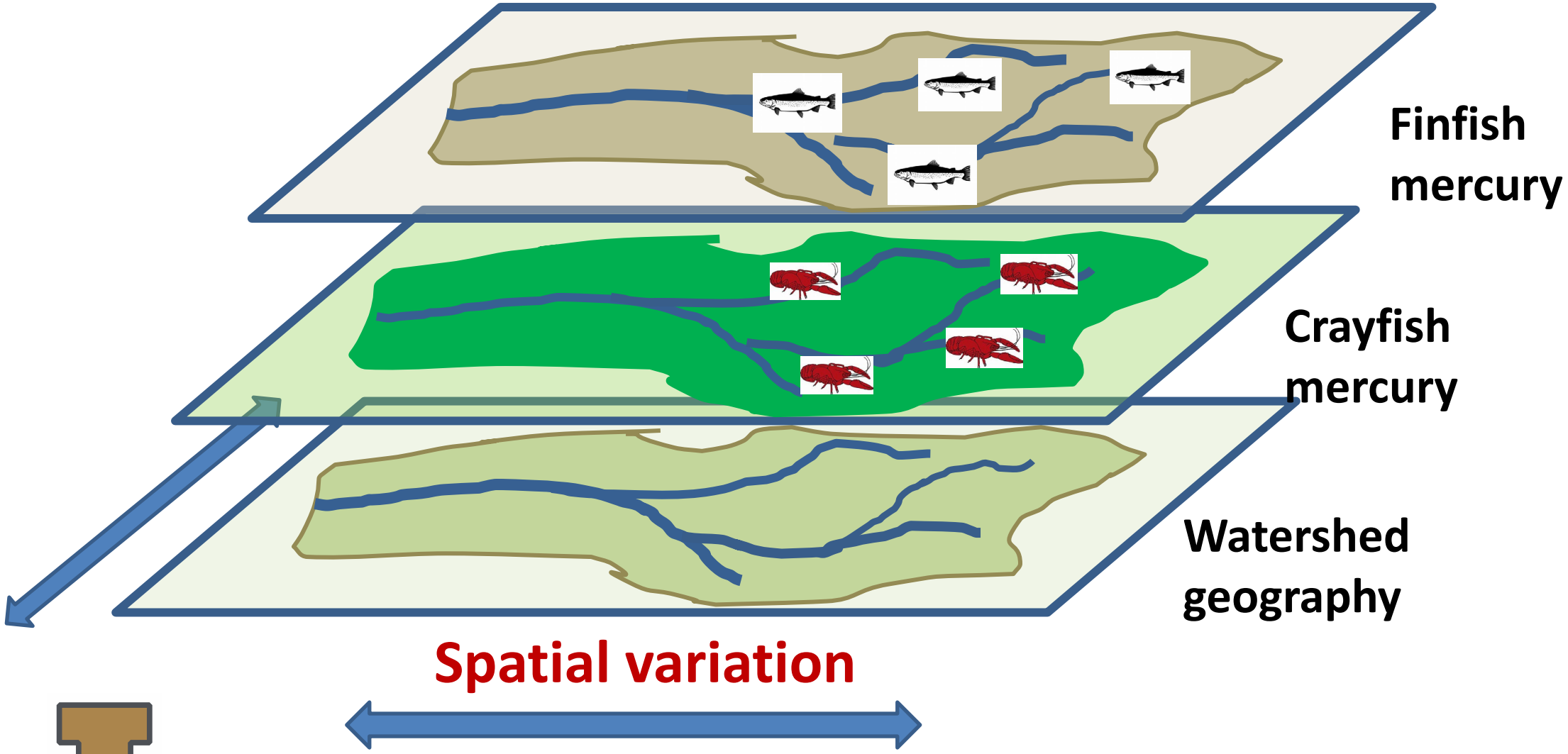
CRBRP Toxics Monitoring Subgroup
March 23, 2023

Dr. Alan S. Kolok
Tate E. Libunao, PhD student



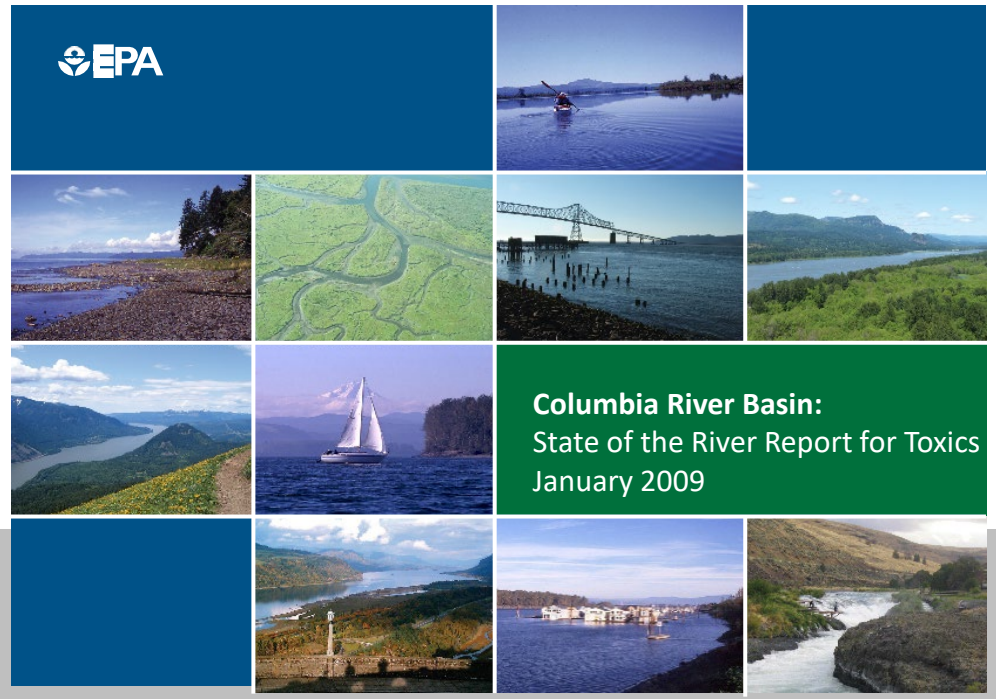
Crayfish Mercury Project
Long term Objective

Our long-term goal is to be able to add data from any species of crayfish collected across the basin, standardize the Hg concentration, then quantitatively add that information to a basin-wide map.



Evaluating hotspots of mercury through GIS layering.

Why crayfish? -



It is not feasible for citizen scientists to monitor the sentinel organisms listed in the 2009 State of the River Report.

Crayfish collections are accomplished in partnership with community organizations.

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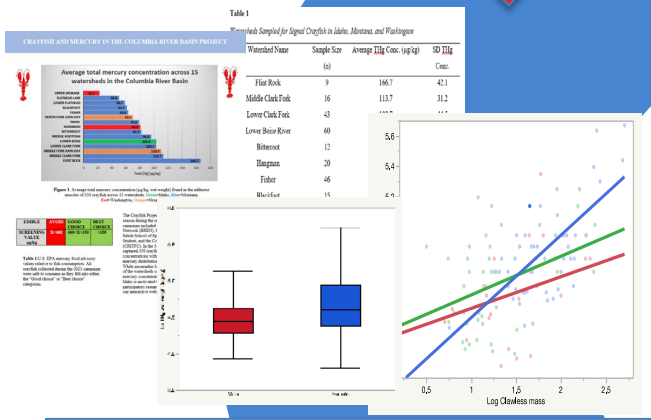
HOW WE ACTIVATE THE COMMUNITY

Develop the tool

Empower the crowd

Collect the data

Provide feedback



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If you want to catch some crayfish…

…CONTACT US!

akolok@uidaho.edu

tlibunao@uidaho.edu

The Crayfish Mercury Project

Project Website:
https://citsci.nkn.uidaho.edu

This Crayfish Mercury Project is funded in part by the US Environmental Protection Agency assistance agreements (RB 01J73101-0 and 44-02J15801-0).

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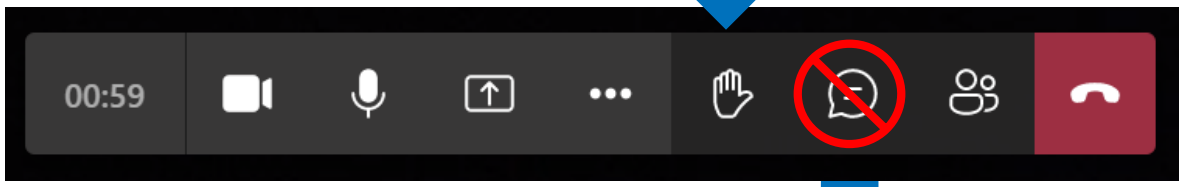

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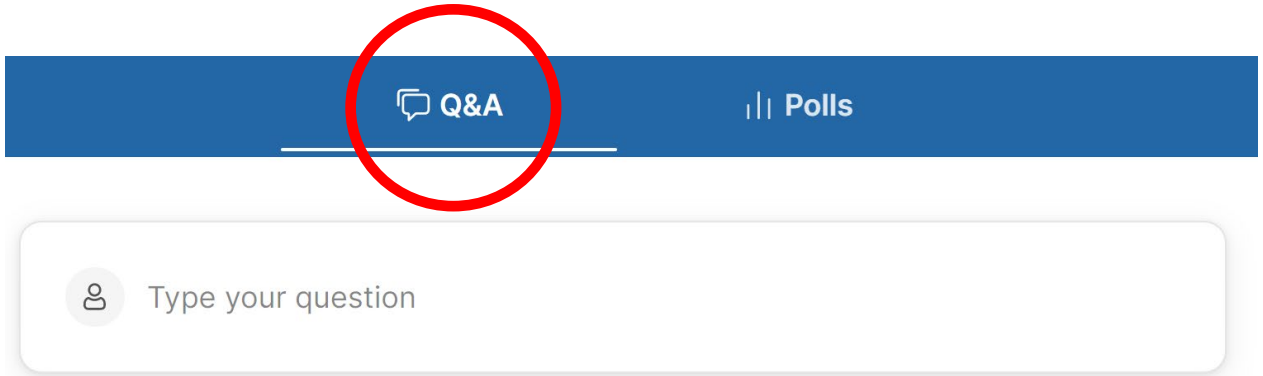


Urban Waters & Wildlife Partnership

Trout Friendly Landscaping for Improved Water Quality

UWWP Mission: To improve and protect water quality and wildlife habitat in our urban waterways and aquifers for healthy, livable communities

Soil Matters: Testing Biochar Composition Impacts in Green Stormwater Infrastructure in Eugene, Oregon

Sarah Whitney, RLA, Urban Waters & Wildlife Program Manager
urbanwaters@longtom.org

LONG TOM
WATERSHED COUNCIL

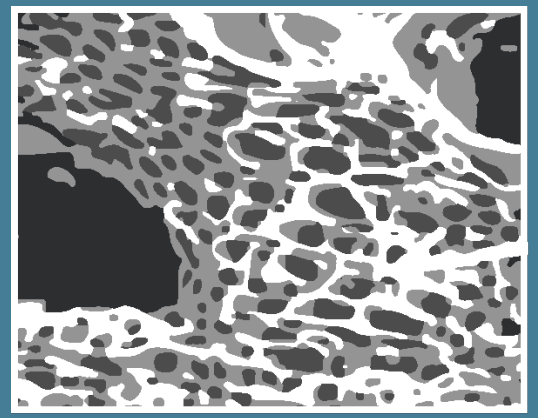
Urban Runoff is a Leading Threat to Water Quality

GREEN STORMWATER INFRASTRUCTURE:

- Captures rainfall, surface runoff, and roof water
- Holds stormwater, providing flood attenuation and temperature reduction
- Uses porous soils and specific plants to remove pollutants
- Provides pollinator and wildlife habitat
- Allows groundwater recharge
- Is highly effective at filtering most urban stormwater pollutants before runoff enters receiving streams

GSI is key to improving water quality

Biochar is an ingredient to improve GSI efficacy

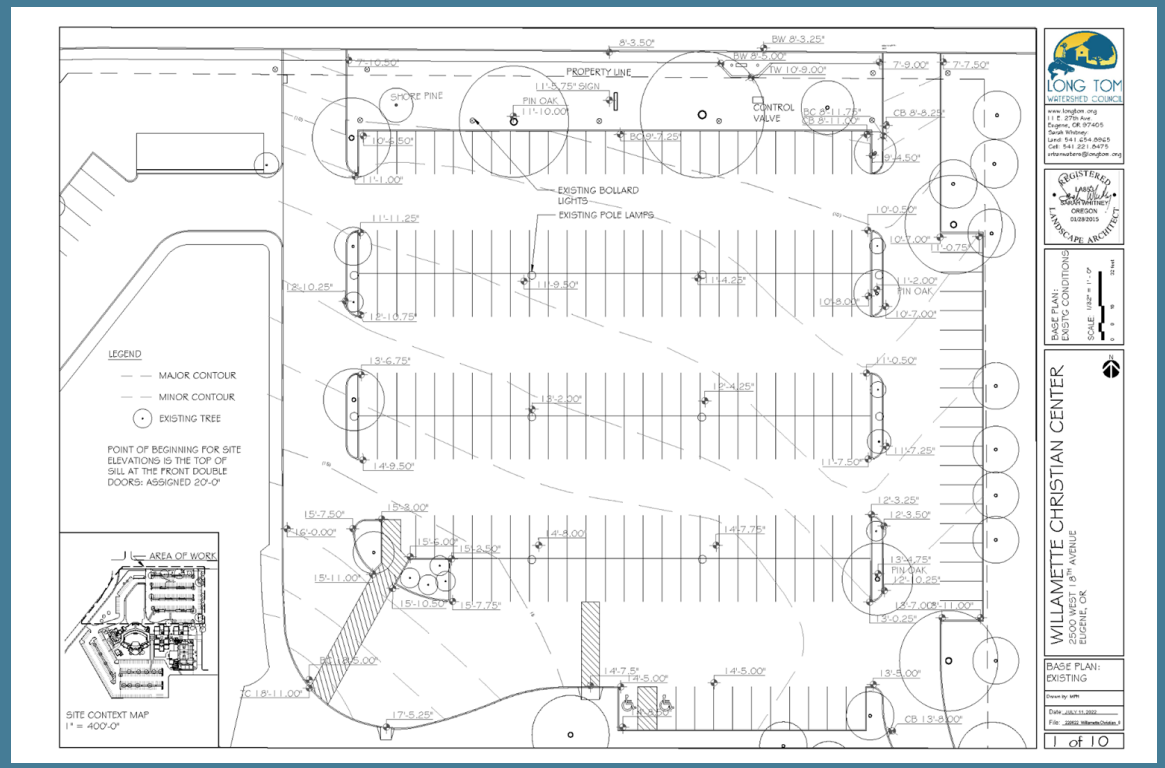


BIOCHAR:

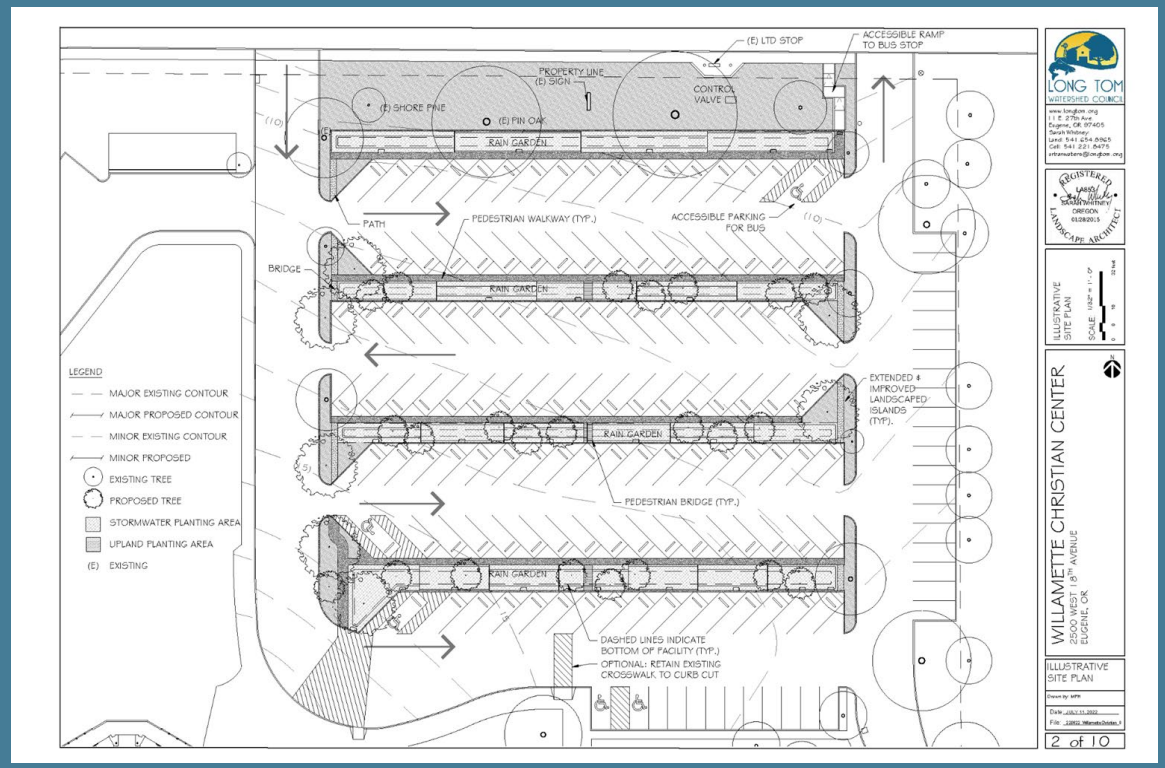
- Has pores which create habitat for soil biota, which break down pollutants
- Increases infiltration/retention
- Increases microbial activity
- Balances soil pH
- Improves aeration
- Sequesters carbon

SOIL COMPOSITION AND FACILITY EFFICACY

Case Study @ Willamette Christian Center, Eugene OR



BEFORE: Underutilized asphalt parking lot



AFTER: 4 large rain gardens separate parking bays & treat runoff

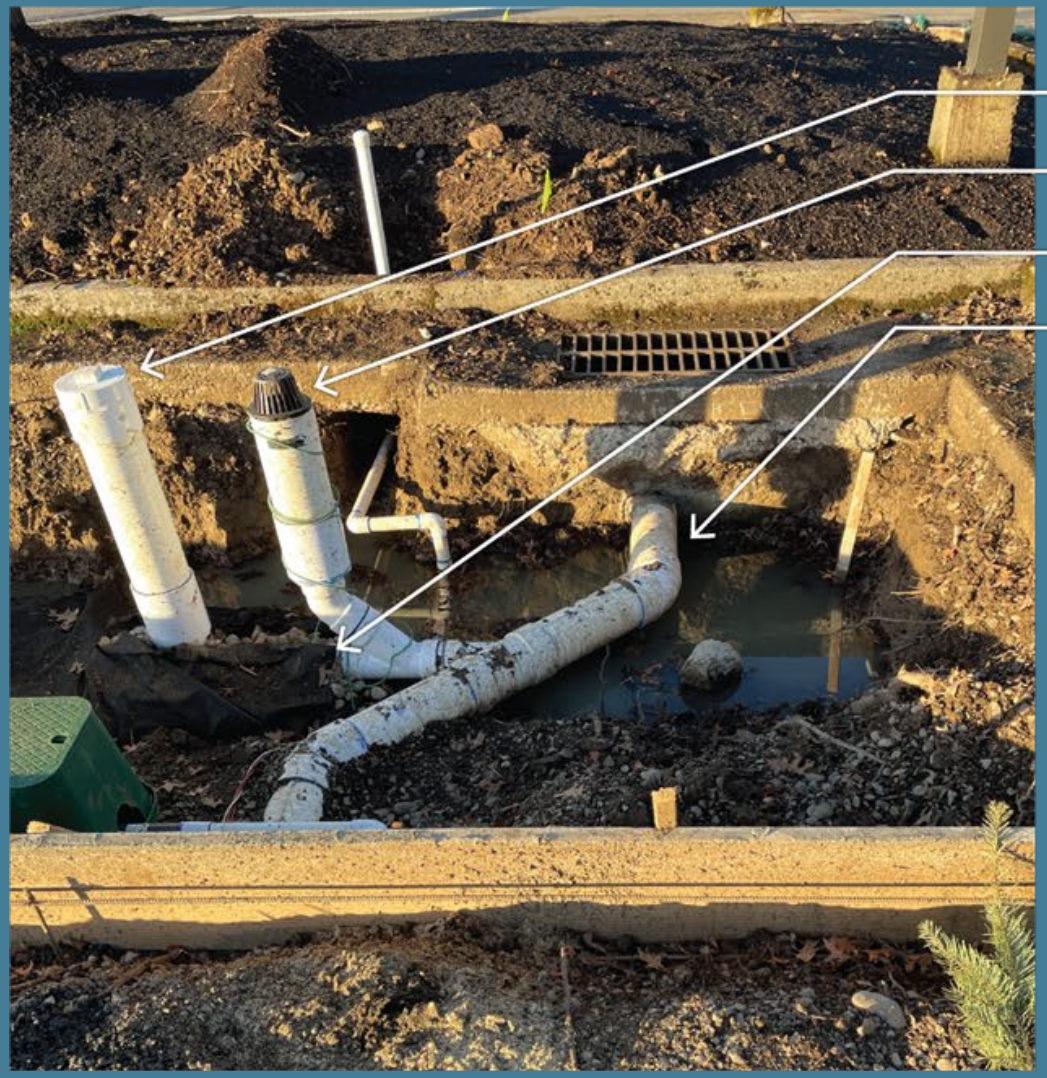
Project Data:

Site size: 436,907 s.f. | Percent Impervious: 75% | Total Facility Site: 15,860 s.f. | Area Treated: 93,940 s.f. asphalt parking lot
Cost: $280, 143 | Currently under construction

Funded by: Special Environmental Projects funds via DEQ; Donated installation funds and materials; Faith-based planting funds; City of Eugene installation and construction oversight funding; Oregon Watershed Enhancement Board grant; Landowner match

SOIL COMPOSITION AND FACILITY EFFICACY

Case Study @ Willamette Christian Center



SOIL COMPOSITION AND FACILITY EFFICACY

Case Study @ Willamette Christian Center

Using **4 soil mixes** 46% compost 40% frugal mix, 10% river sand, and adjust 4% Biochar makeup

- Commercially available, fine particle biochar
- Commercially available, large particle biochar
- Partner-provided biochar from biosolid treatment
- No biochar (increase frugal mix)

Test Influent and Effluent: Observe Plant Health and Longevity

Monitoring will compare impact of biochar in the soil on water quality and plant health over time

Water quality testing will analyze the following constituents: Hardness, E Coli, TSS, Cu, Pb, Zn, Phosphorus, Total Kjeldahl Nitrogen, Glyphosate, AMPA, Imidacloprid, Diuron, Propiconazole, 2,4-D, Sulfometuron methyl, Flame retardants, PAHs, PCB congeners, PFAS, PAHs, and 6PPD-Quinone.

QUESTIONS?

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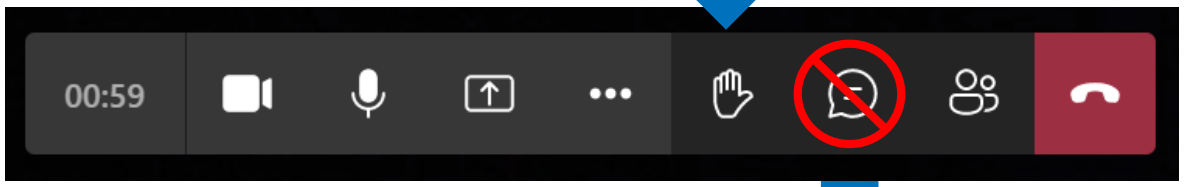

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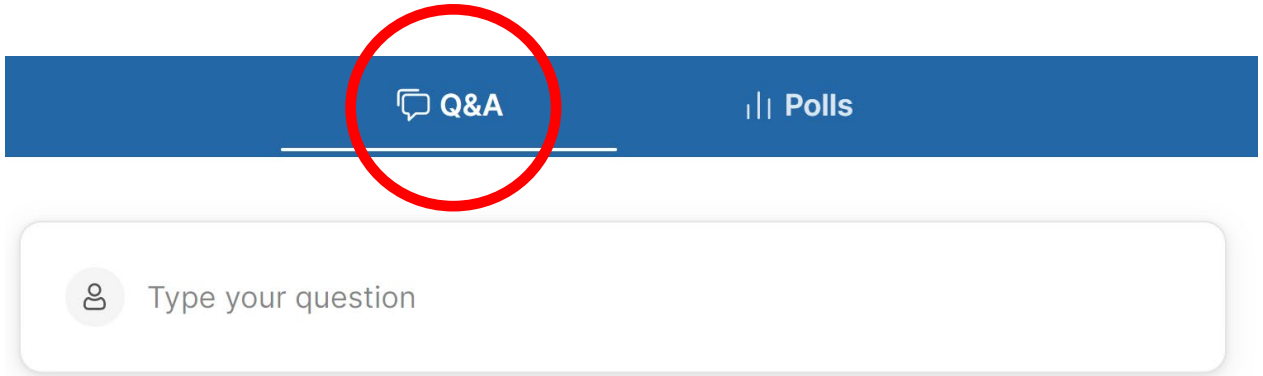
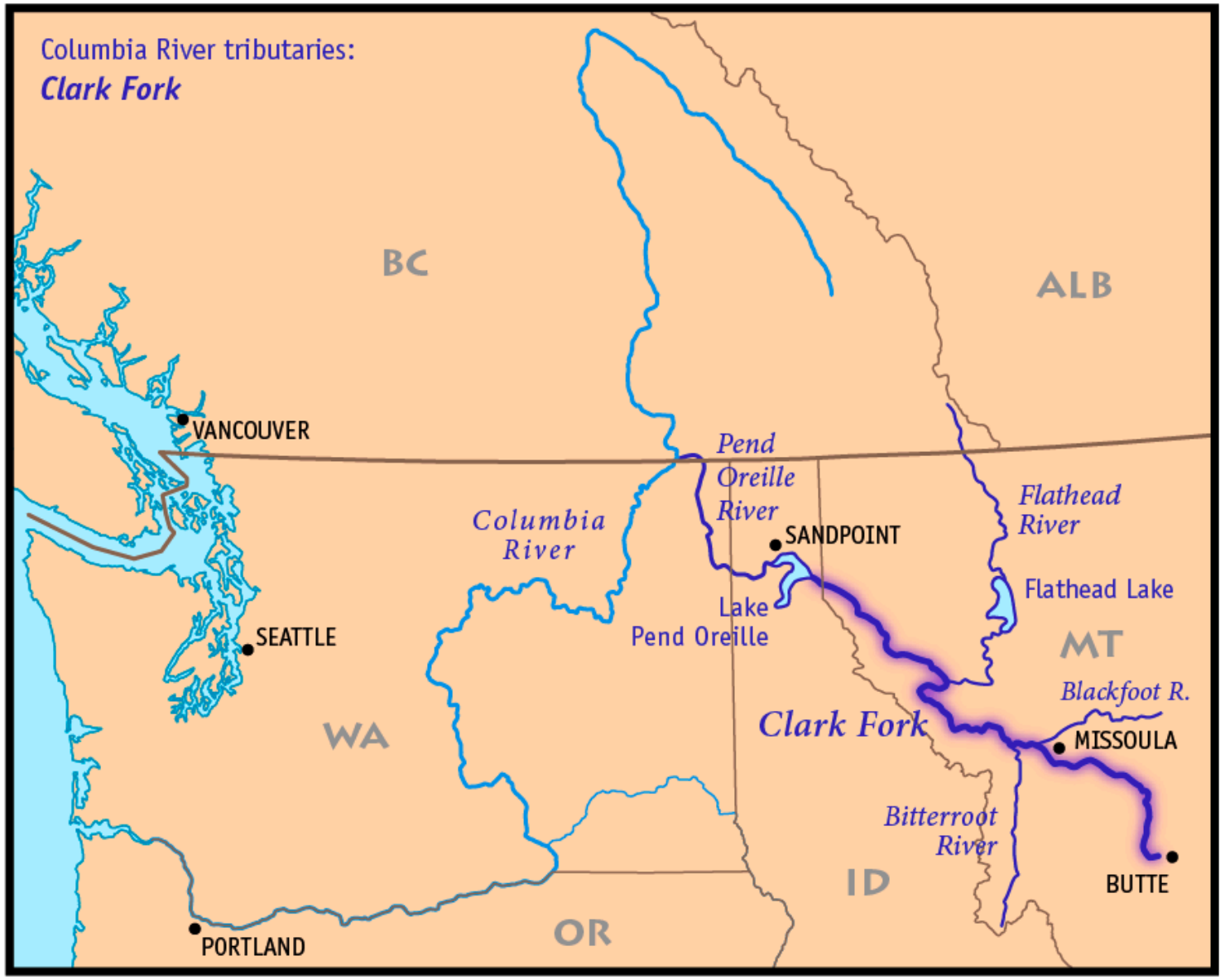


Sampling for Toxic Trout in the Clark Fork River

Quantifying Toxins to inform Fish Consumption and Identifying Sources of Pollutants in the Upper Columbia River Basin of Montana

Project in Partnership with:

Montana Trout Unlimited
MT Fish, Wildlife & Parks
MT Department of Environmental Quality
MT Natural Resource Damage Program
Missoula County Health Department
Confederated Salish & Kootenai Tribes
Clark Fork Coalition

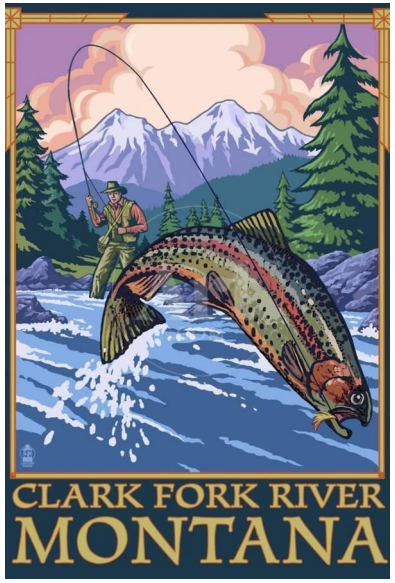


For more than a Century, the Clark Fork has been an industrialized river.

- By 1900, the headwaters of the Clark Fork flowed through the largest copper mining district in the U.S. in Butte, MT.
- In 1955, open-pit mining began in Butte, creating the largest such pit in the country.
- One of the largest pulp mills in the West operated alongside the Clark Fork River below Missoula from 1957-2010.
- Since the early 1900s, the Clark Fork Valley has also been home to large-scale agriculture, ranching and industrial timber harvest.

Clark Fork River Fish Consumption Advisory for iconic rainbow trout:

- PCBs
- Dioxins
- Furans



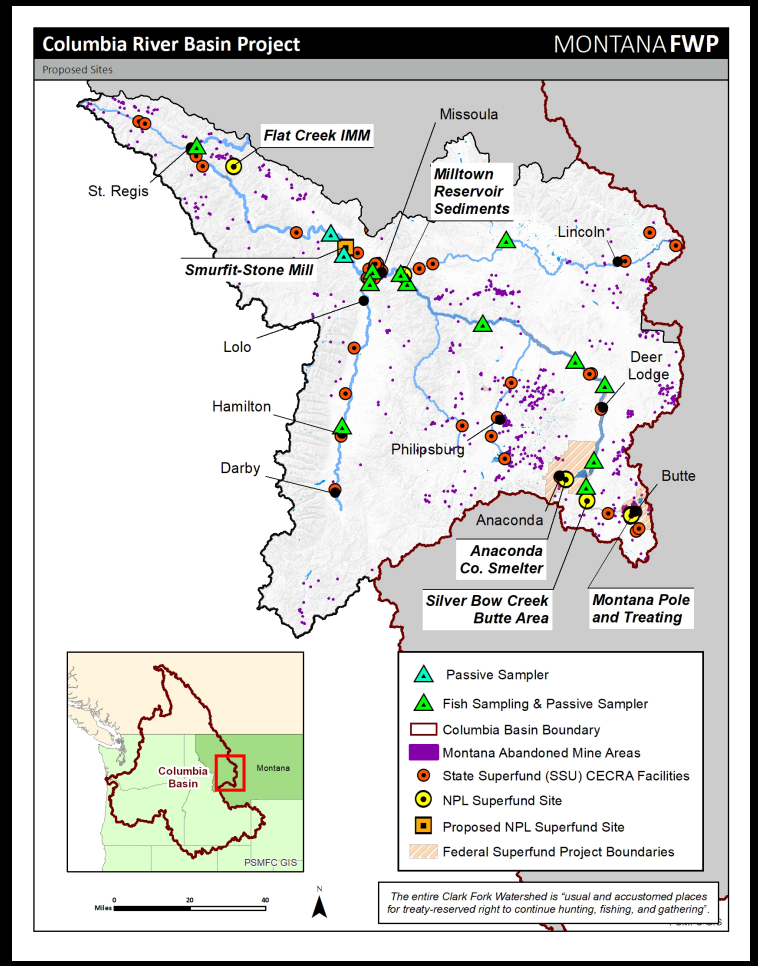
2021 Montana Sport Fish Consumption Guidelines

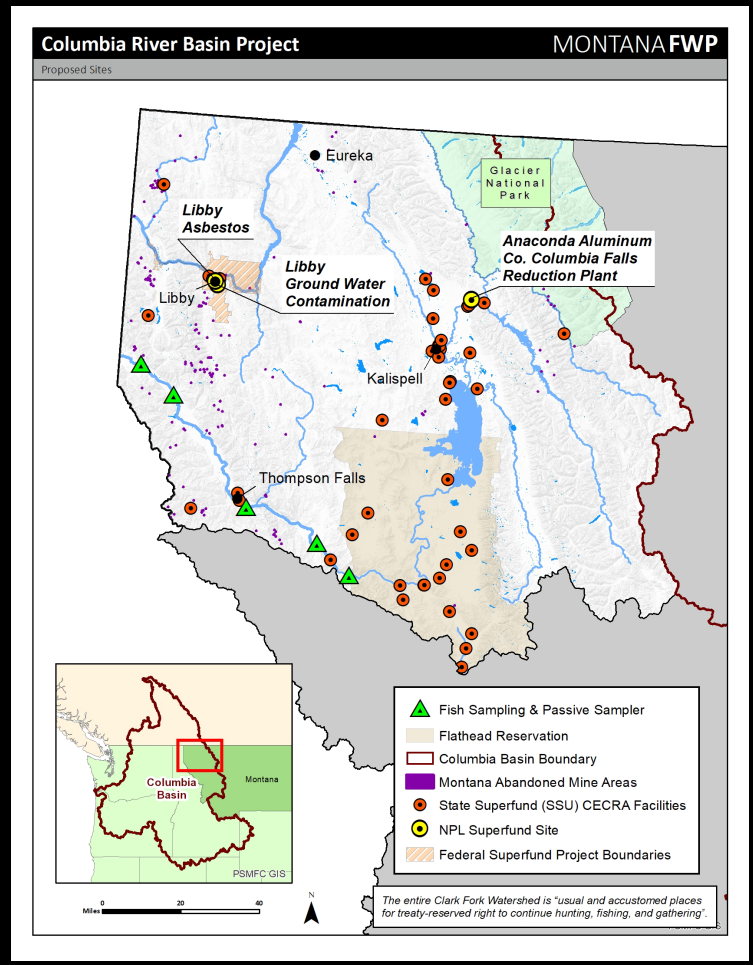
Updated May 26, 2021 — Page 8

Location	Species	Person	Size (*Length in inches*) 6-10	10-14	14-18	18-22	22-26	26-30	30+	Contaminant
Clark Fork River *continued*... Blackfoot River to Bitterroot River	Northern pike	M						10		D/F, PCBs
		WC						5		D/F, PCBs
	Rainbow trout	M		1	2					D/F, PCBs
		WC			1					D/F, PCBs

17 Sampling Sites

- Analyze whole body fish
- Analyze fillets
- Analyze water quality sample





Summer 2023 – Summer 2024

- Collect and analyze fish tissue and water sample
- Reevaluate CFR Fish Consumption Advisory for geographic scope and severity of toxins
- Better identify sources and pathways of toxins for future cleanup
- Increase public awareness of CFR pollution issues

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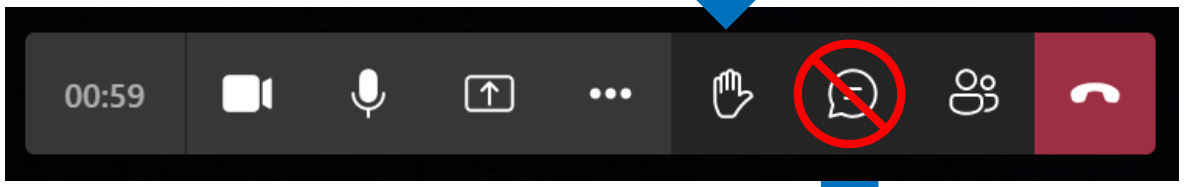

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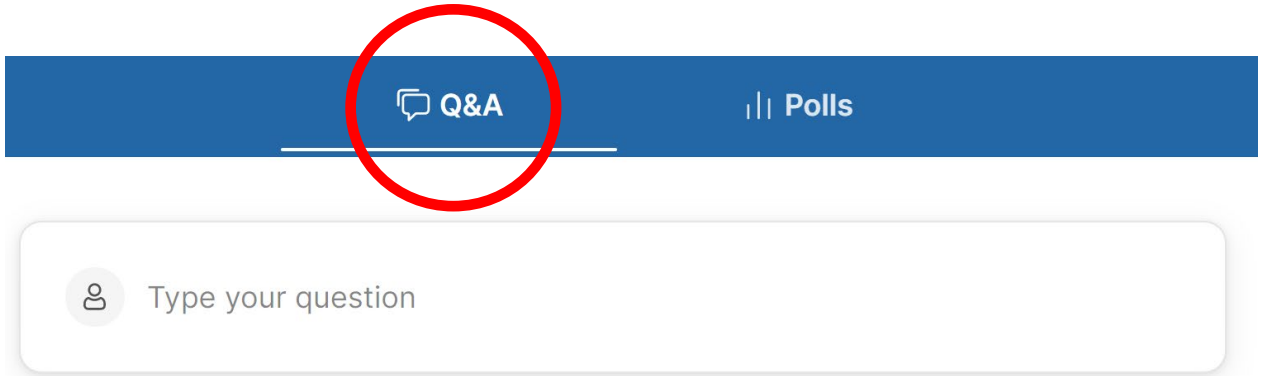


Yakama Nation

Phase 2 Pilot Implementation of the Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

CRBRP Toxics Monitoring Subgroup Meeting
March 23, 2023

Phase 2 Pilot Implementation of the Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

MONITORING PROGRAM MISSION

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.

PHASE 2 PURPOSE

Test the Monitoring Framework and methods and continue outreach efforts to gain support for a Monitoring Program.

TEAM:

Yakama Nation – Grant lead

USGS– Technical lead

CRITFC – Technical assistance

WDFW – Field assistance

Phase 2 Pilot Implementation of the Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

PHASED APPROACH

- **PHASE 1** - Completed!!!

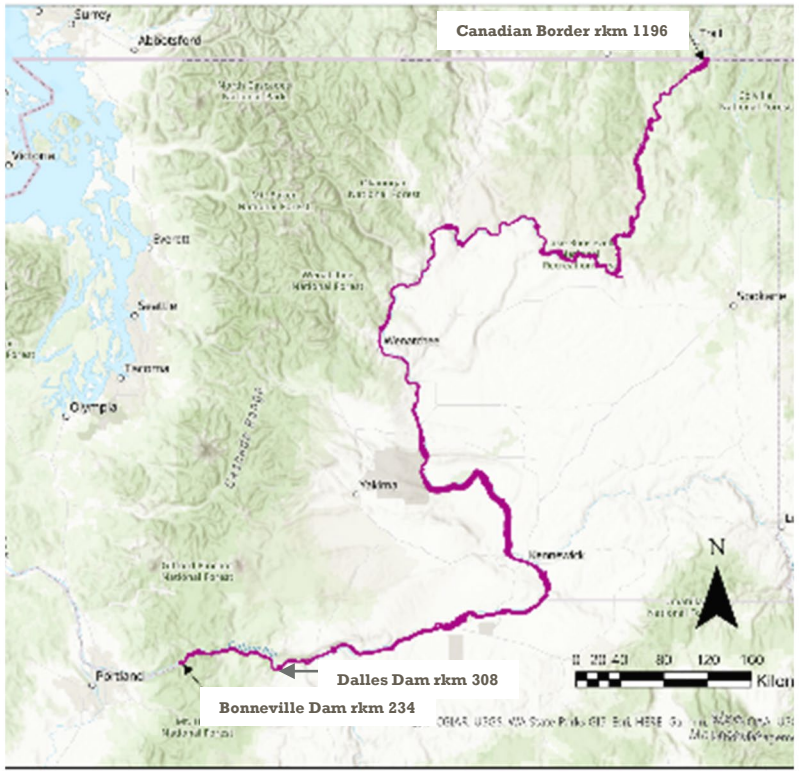
The Monitoring Framework provides expert guidance for assessing the status and trends of contaminants in fish, sediment, water, and other media.

- **PHASE 2 – Current Phase.**

Planning, Outreach and Bonneville Pool Pilot Study.

- **PHASE 3** - Next Phase.

Funding and Implementation of Program.



Phase 2 Pilot Implementation of the Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

PHASE 2A - Planning, Outreach and QAPP Development

- Develop a Quality Assurance Project Plan (QAPP), including Standard Operating Procedures (SOPs) and permits.
- Conduct outreach – technical and strategic.

PHASE 2B - Field Data Collection, Analytical, and Reporting

- Sample fish tissue and sediment.
  - ≤33 fish (resident and adult/juvenile salmonids)
  - ≤ 12 sediment samples
  - 10 locations
  - PCBs, DDx, Hg, and PBDEs analysis
- Develop database & reports

Phase 2 Pilot Implementation of the Columbia River Mainstem Fish Tissue and Water Quality Monitoring Program

PHASE 2 Final Deliverables

- Pilot Study QAPP (including SOPs & permits)
- Database and data reports
- Document repository
- Outreach efforts and reports
- Publicly available website
- Final Program QAPP – for implementation of Monitoring Program implementation (Phase 3)

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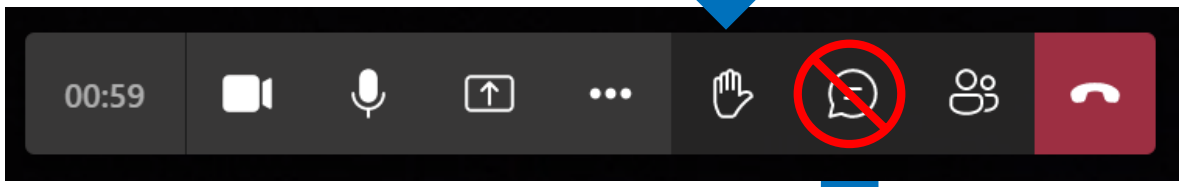

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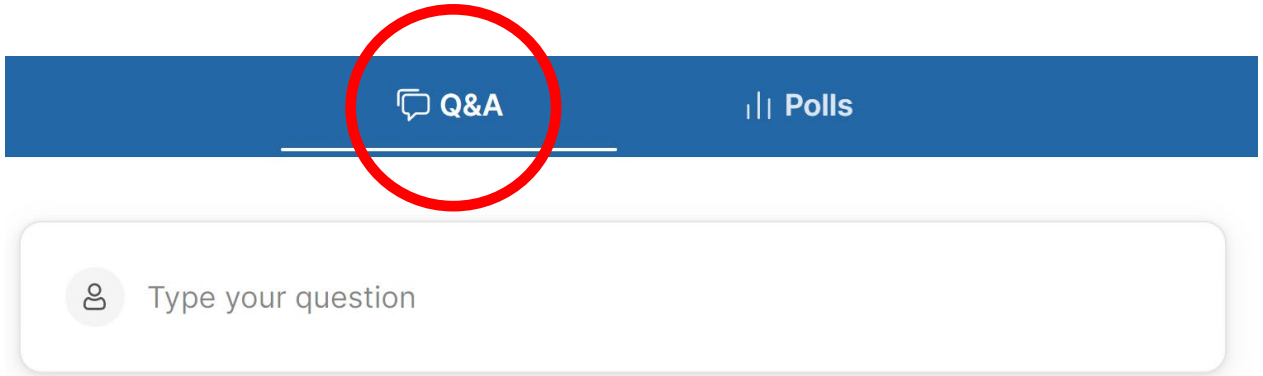


Non-target and Suspect Screening of Contaminants of Emerging Concern in lower Columbia River

Columbia River Basin Restoration Program (CRBRP) Grant Program
March 23, 2023

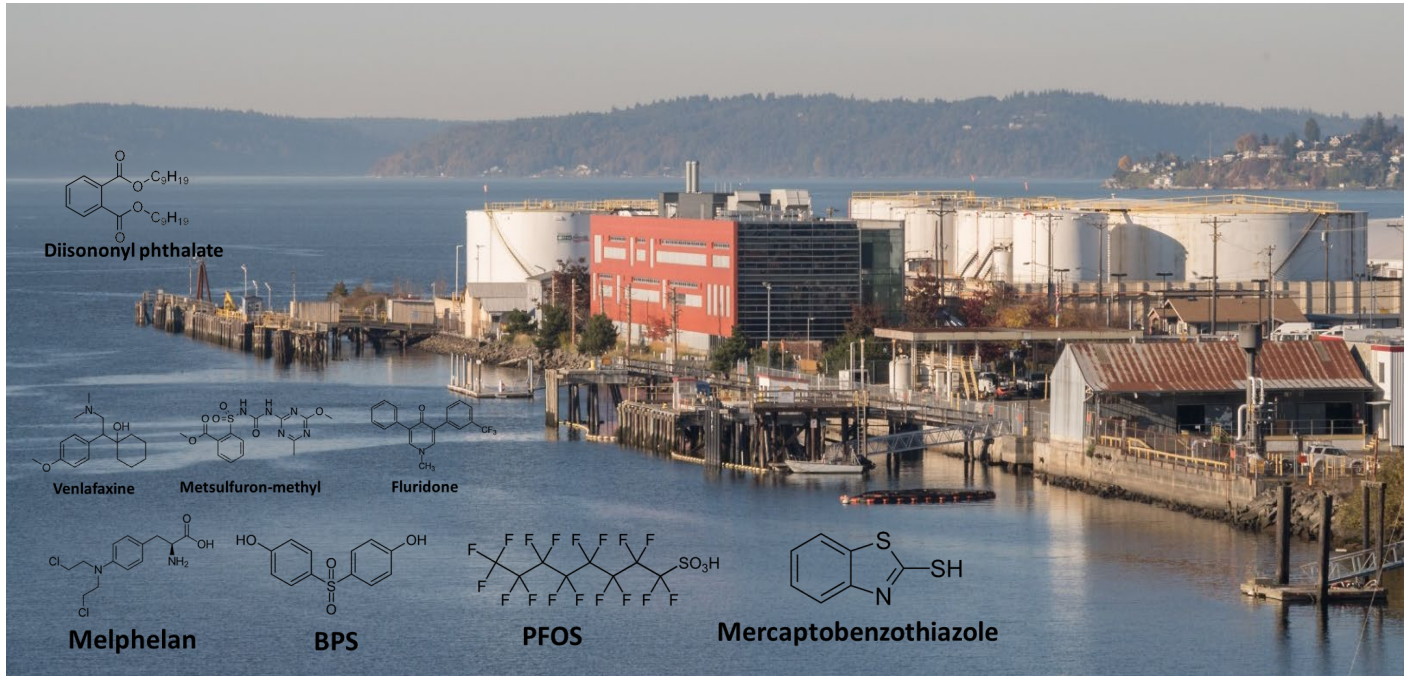
University of Washington Tacoma

Andy James
Dave Wark
Craig Rideout

Project:

Characterize the occurrence of Contaminants of Emerging Concern in the Lower Columbia River using High Resolution Mass Spectrometry methods

Evaluate ecotoxicological context in order to understand if there is a potential to harm exposed biota



Tian et al, ES&T, 2019

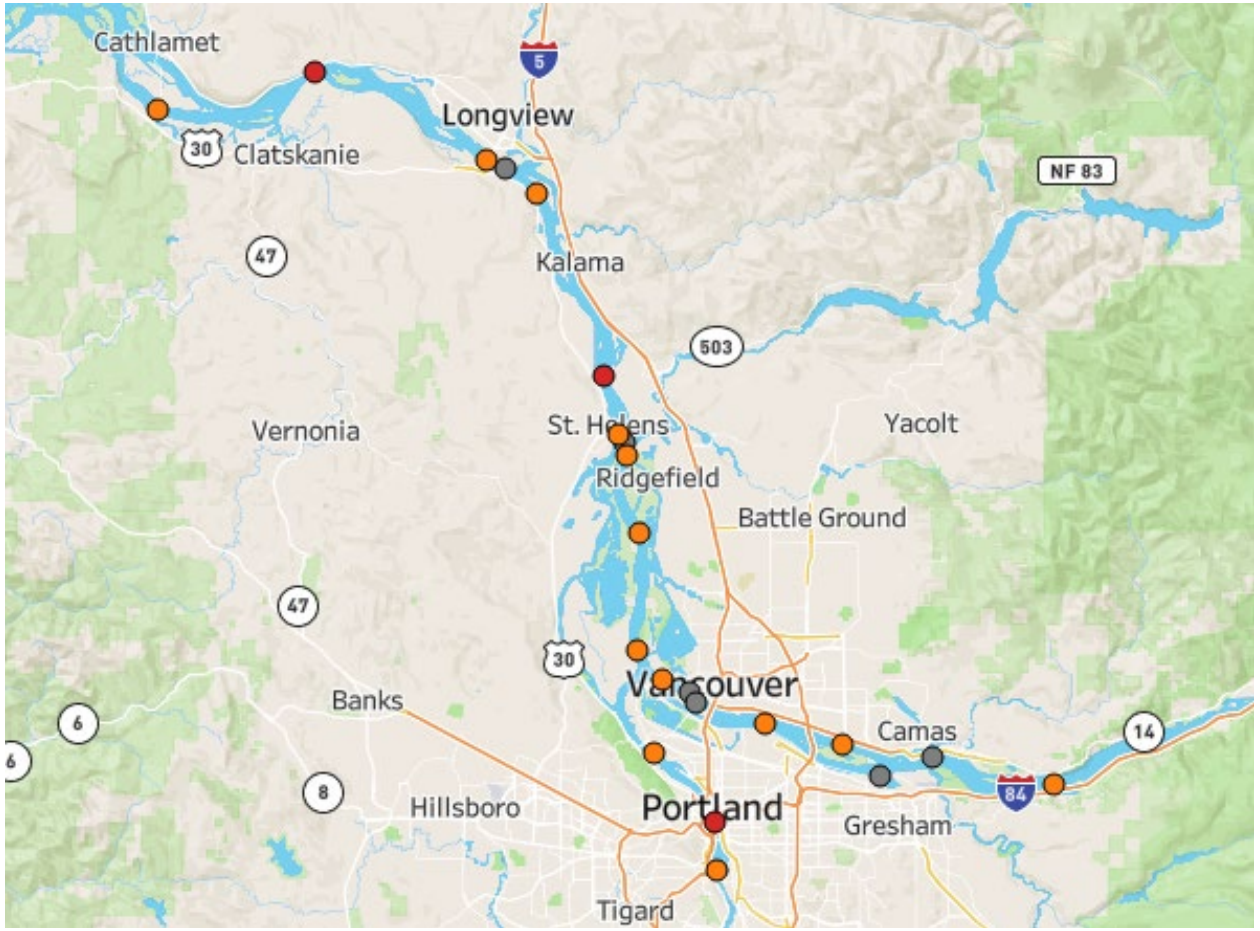
Motivation:

- CECs are in the environment. Some have been associated with environmental harm.
  - Endocrine disruption, reduced survival, pre-spawn mortality syndrome
- Improving our understanding of CECs is a priority of ecosystem recovery programs

CENTER FOR URBAN WATERS

UNIVERSITY of WASHINGTON TACOMA

Monitoring



- 16 sampling locations
  Selected in consultation with USGS Oregon Water Science Center in order to characterize potential areas of impact based on past monitoring or inputs
- Four sampling events
  Two – February and March
  Two – August and September

Note: Selected WWTP outfall locations are shown for reference only. WWTP effluent will not be sampled under this project.

Compound Identification

- Identified ~120 unique anthropogenic compounds across samples
- Had analytical standards to semi-quantify ~ 20 compounds
- 5 compounds had RQ >1 potential to cause harm

Compound Name	CEC Category	PNEC (µg/L)
Bis(2-ethylhexyl) phthalate	Phthalates	0.0048
Erucamide	Industrial	0.0071
Dimethyldioctadecylammonium	Commercial	0.0072
Docosahexaenoic acid	Commercial	0.012
Hexa(methoxymethyl)melamine	Industrial	0.017
Octadecanamide	Industrial	0.020
N,N'-Diphenyl-p-phenylenediamine	Industrial	0.029
Oleamide	Commercial	0.037
Venlafaxine	Pharmaceutical	0.038
4-Cholesten-3-one		0.038
Linolenic Acid		0.042
Carbamazepine	Pharmaceutical	0.050
Fexofenadine	Pharmaceutical	0.053
Metribuzin	Pesticide (Current use)	0.058
Diuron	Pesticide (Current use)	0.070
Palmitamide	Commercial	0.074
Benzyldimethyltetradecylammonium	Industrial	0.074
Benzyldodecyldimethylammonium	Commercial	0.078
Fludioxonil	Pharmaceutical	0.100

Tris(2-chloroisopropyl) phosphate
Tris(2-butoxyethyl) phosphate

- Replacement flame retardant used in foams
- Present in house dust and WWTP effluent
- Evidence of bioactivity (ToxCast) and endocrine disruption (Liu et al., 2016)
- TBOEP exposure of zebrafish decreases the average number of egg production, as well as hatching success and survival rates in offspring (Xu et al., 2017)

Venlafaxine

- Antidepressant
  (serotonin and norepinephrine reuptake inhibitors (SNRI).
- Primary metabolite (O-Desmethylvenlafaxine) is also present
- #33 in most prescribed drug list (~2.5M people taking drug)
  #2 by mass (48,363 kg in 2018; Gould et al., 2021)
- May affect reproductive success and individual fitness
- Identified as High Priority in Puget Sound system (James et al., 2023)

Next Steps

- Follow up monitoring of focused locations within lower Columbia system
- Additional ecotoxicological screening and information
- Coordinate with environmental resource managers in region to understand data/information needs

Thank You

Andy James
jamesca@uw.edu

Dave Wark
davewark@uw.edu

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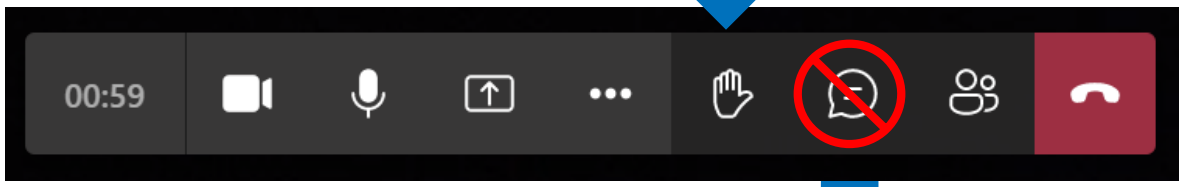

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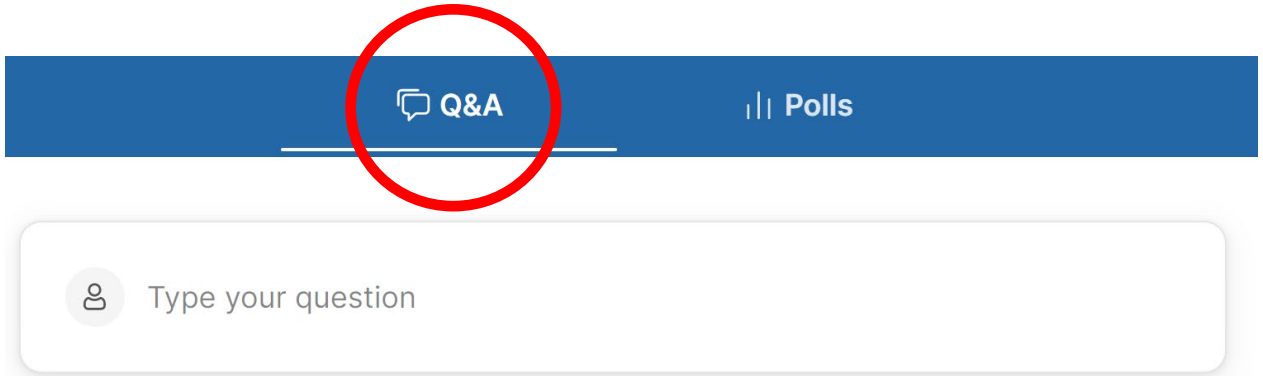

QAPP Q&A for EPA Grantees

Columbia River Monitoring

Meghan Dunn

US EPA, Region 10

QA Chemist

Laboratory Services and Applied Science Division

March 23, 2023

FAQ #1: Secondary Data / Non-Direct Measurements

Data needed for project implementation or decision making that are obtained from non-measurement sources such as databases, programs, literature files, and historical data.

→ Describe the intended use of the data

→ Describe the "acceptance criteria" for the use of the data in the project

→ e.g. Data from XYZ database will be used. Outliers indicated in the database will be excluded.

→ e.g. Daily local precipitation amounts will be obtained from the National Weather Service at weather.gov

FAQ #2: Data Review, Verification and Validation

What are the criteria for accepting, rejecting, or qualifying data from the project? This can includes checking for typos, use of standardized forms, and thorough data validation and qualification of laboratory data by standard procedures.

→ Keep in mind the "graded approach" to quality assurance and the level of review needed for the project

→ EPA guidance is written for wide range of projects

Thank you!

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Questions?

THANKS FOR JOINING US!

Columbia River Basin Restoration Program Working Group Meeting
May 31, all day, hybrid

CRBRP Toxics Monitoring Subgroup (TMS) Meeting
June 14, 1-3 pm, virtual

Questions? Want to join the TMS distribution list?
Email us at gs-crbtoxmon@usgs.gov