COLUMBIA RIVER BASIN RESTORATION PROGRAM

EPA USGS

Columbia River Basin Restoration Program Toxics Monitoring Subgroup Meeting

JUNE 12, 2025 | 9 AM – 12 PM PACIFIC TIME

WELCOME & INTRODUCTIONS

Image: Steven Pavlov

AGENDA

40 MIN	**WELCOME, INTRODUCTIONS & SETTING THE STAGE** • Overview of the CRB Toxics Monitoring Strategy Vision
25 MIN	**STRATEGIC GOALS & ACTIVITIES** • Presentation of draft strategy goals and activities • Small group breakout discussions on goal prioritization
10 MIN	**BREAK**
35 MIN	**SCOPE AND PRIORITIZATION** • Overview of basin geography and key considerations • Yakama-led Implementation Plan for Mainstem • Facilitated large group discussion on monitoring priorities

AGENDA (cont.)

25 MIN	INDICATORS • Developing indicators and monitoring approach • Facilitated large group discussion on monitoring priorities
20 MIN	APPROACH TO RISK ASSESSMENT & DATA COLLECTION • Discussion on what drives risk and assessment methods • QA and data management
15 MIN	MONITORING DASHBOARD UPDATE & DEMO
10 MIN	NEXT STEPS & WRAP UP

SETTING THE STAGE

Recent History

- Long time Columbia Toxics Working Group lead by EPA
- 2010 Action Plan
- 2016 Columbia River Basin Restoration Program (CWA Section 123)

Clean Water Act Section 123

- **Assess trends in water quality**, including trends that affect uses of the water of the Columbia River Basin
- **Collect, characterize, and assess data on water quality** to identify possible causes of environmental problems
- **Establish a voluntary, competitive grant program** supporting actions through projects that assist in
  - eliminating or reducing pollution;
  - cleaning up contaminated sites;
  - improving water quality;
  - monitoring to evaluate trends;
  - reducing runoff;
  - protecting habitat; or
  - promoting citizen engagement or knowledge.
- **Establish a Columbia River Basin Restoration Working Group** that shall
  - recommend and prioritize projects and actions; and
  - review the progress and effectiveness of projects and actions implemented.

TOXICS MONITORING SUBGROUP (link)

Purpose: A community of practice to share information on monitoring and leverage activities within and outside of EPA funded grants.

Current Status and Engagement Process

- **Spring 2025:** Engaged 21 key partner organizations and grantees in listening sessions (Thank you!)
- **Strong support emerged** for voluntary, high-level strategy providing coordination
- **Today's workshop** is part of ongoing engagement through summer and fall 2025
- **Multiple feedback opportunities:** Written feedback through Slido, workshop discussions, future meetings
- **Deliberative draft status:** This is intentionally a working document to generate discussion

Thank you to all the partners who met with us for early engagement!

Early Engagement with Key Partners – based on chronological order of meetings	
Toxics Reduction Lead Grantees (TRLs)	Upper Columbia United Tribes
Tribal Lead Grantees	WA Ecology
Yakama Nation	Oregon Water Enhancement Board
Columbia River Inter-Tribal Fish Commission	Oregon Department of Environmental Quality
Nez Perce Tribe	Confederated Tribes of the Umatilla Indian Reservation
Lower Columbia Estuary Partnership	Colville Confederated Tribes
Western Montana Conservation Commission	Washington State Department of Ecology
University of Montana	Upper Columbia United Tribes – Member Tribes
Oregon State University	

TMS CORE TEAM

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
- Patrick Moran, USGS
- Amy Puls, USGS/PNAMP
- Mark Jankowski, EPA
- Lisa Kusnierz, EPA
- Ashley Zanolli, EPA
- Lauren McDaid, EPA
- Sarah Dunn, USGS

Contact us anytime! gs-crbtoxmon@usgs.gov


THANK YOU! We will miss you!
Jen Bayer
Amy Puls
Lauren McDaid

The Toxics Monitoring Strategy Vision

A comprehensive, collaborative approach for monitoring toxic pollutants to assess trends and inform water quality protection and restoration activities across jurisdictions and sub-basins in the Columbia River Basin.

The monitoring strategy should inform not only those in the Working Group but should guide implementation by all people and entities that share concern for the quality of waters of the Columbia Basin.

Big Picture Considerations

- Understand where toxics are, maybe their sources, and inform how to reduce them (fixable)
- Local implementation, but help with some centralized support
- What do we mean by “toxic”?
- There are a lot of toxics! Where to start?
- Where on landscape?
- Tribal concerns; Treaty Rights, cultural, food source (consumption)
- How to interpret concentrations?…..(screening values)

The Strategy

High level, brief, inclusive, but useful to many (including other Feds)

Develop it with partners; start with draft and early review

4 overarching goals

Key questions to be worked out

- Spatial Scope
- Topical scope

Ideally, not tied to funding levels and who does what

Proposed Success Framework

🎯
Coordinated Monitoring

Basin-wide implementation enhancing knowledge

🔗
Integration

Between Projects

Informs toxics reduction actions

📢
Communication

Clear reporting of status and trends

🤝
Partnership

Highly engaged regional collaboration

Moving Forward Together

A **risk-based approach** that balances scientific rigor with practical implementation, ensuring our monitoring efforts generate **information** for toxics reduction **actions**

Next Steps and Call to Action

- **Immediate:** Participate fully in today's breakout and large group discussions
- **Short-term:** Provide written feedback through our Slido page
- **Ongoing:** Stay engaged through Working Group and TMS meetings
- **Long-term:** Help implement the final strategy in your respective organizations and regions

STRATEGIC GOALS & ACTIVITIES

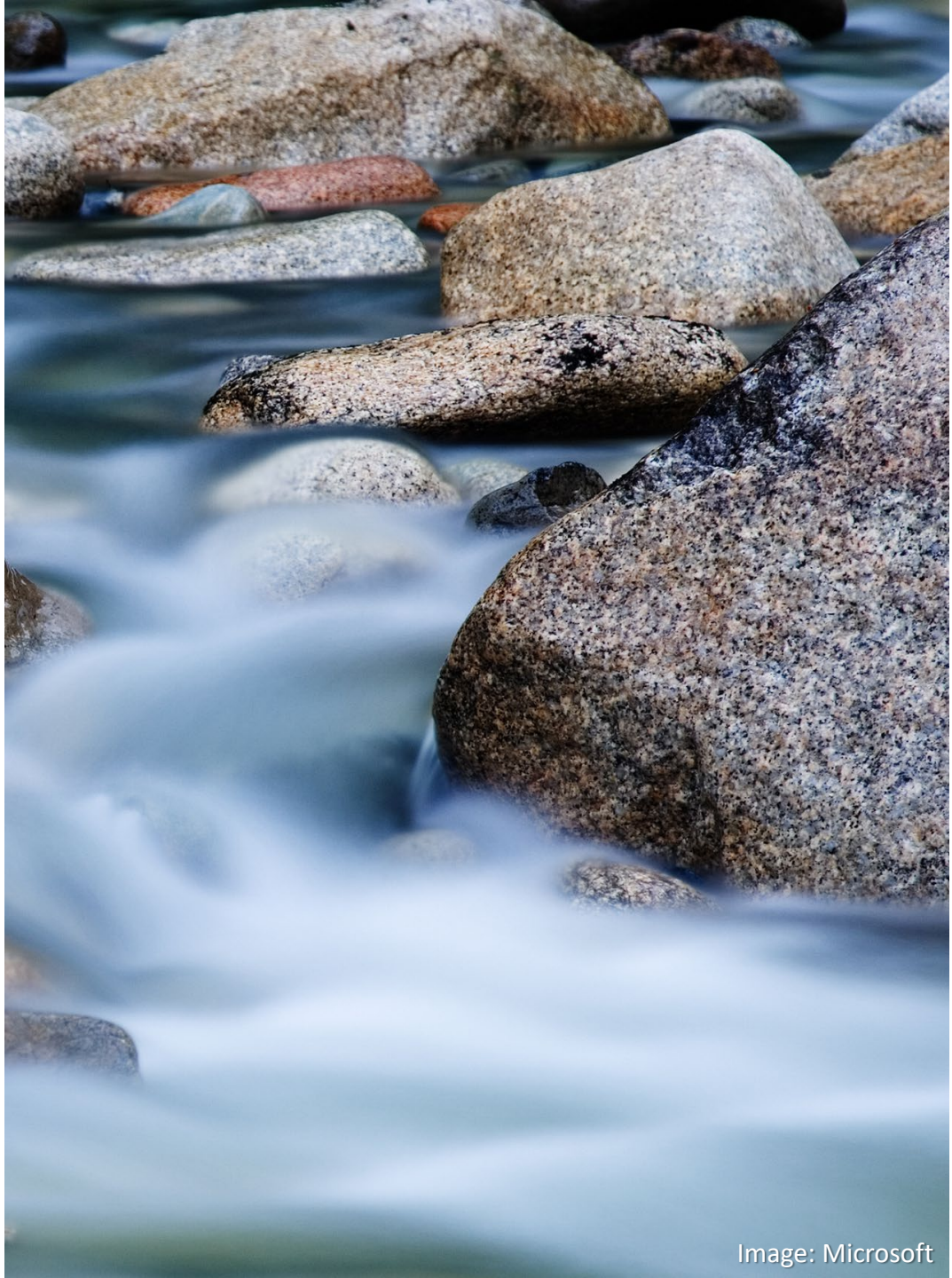
DRAFT STRATEGIC GOALS OVERVIEW

1. Sustain and grow the **partnership to monitor** toxic pollution across the Basin.

2. **Identify and prioritize pollutants** in Columbia Basin waters by evaluating risk to humans and aquatic life.

3. Assess the **status and trends** and locations of priority pollutants in water, sediment, and/or fish.

4. Utilize **new tools and approaches** to evaluate legacy, emerging chemicals, and mixtures.



Goal 1: Sustain and grow the **partnership to monitor** toxic pollution across the Basin

Objectives

- **1.1 - Establish effective governance and co-leadership structures**
- **1.2 - Enhance coordination of monitoring activities across the Basin**
- **1.3 - Facilitate knowledge transfer among partners**

Goal 2: Identify and prioritize pollutants in Columbia Basin waters by evaluating risk to humans and aquatic life **("What?")**

Objective

- **2.1 - Develop and apply a risk-based approach to prioritize chemicals for monitoring**
  - Focus on chemicals posing greatest risk to humans and aquatic life
  - Develop toxicity screening values to assist with interpretation of chemical concentration data

Goal 3: Assess the status and trends and locations of priority pollutants **(“How?”)**

Objectives

- **3.1 - Develop coordinated approaches for data collection and evaluation**

  -Quality assurance framework with standardized templates and procedures

- **3.2 - Analyze and interpret monitoring data to assess status and trends**

  -Compile existing data to identify data types, assess trends, identify hotspots and gaps

  -Establish long-term monitoring network for mainstem and major tributaries

  -Focus on resident fish for spatial, temporal trend assessment

Goal 4: Utilize new tools and approaches to evaluate legacy, emerging chemicals and mixtures

Objectives

- **4.1 - Incorporate advanced scientific methods to increase our ability to identify and address environmental problems**
  - Use diverse tools to advance understanding of CRB risks while reducing animal testing
  - Apply mass spectrometry, machine learning, and social science for chemical exposure assessment
  - Evaluate contaminant effects using bio-effects tools like in situ testing and omics
- **4.2 - Promote the responsible application of new scientific methods**
  - Emphasize non-lethal sampling and monitoring techniques
  - Integrate newer approaches to support Strategy Goals 2 and 3
  - Balance new methods with project needs, expertise, and resources

DRAFT Goals Recap

Goal 1: Sustain and grow the partnership to monitor toxic pollution across the Basin

Goal 2: Identify and prioritize pollutants in Columbia Basin waters by evaluating risk to humans and aquatic life (“What?”)

Goal 3: Assess the status and trends and locations of priority pollutants (“How?”)

Goal 4: Utilize new tools and approaches to evaluate legacy, emerging chemicals and mixtures

Breakout Group Questions

Are these the right goals and activities? What's missing?

Which goals should receive the most resources and attention?

What concerns do you have about the vision for the strategy?


BREAK (10 MINUTES)

Image: Steven Pavlov

SCOPE & PRIORITIZATION-1

First 2 "Duties" in the Clean Water Act 123 Code

1) Assess <u>trends</u> in water quality, including trends that affect uses of the water of the Columbia River Basin

2) Collect, characterize, and assess data on water quality to identify possible causes of environmental problems

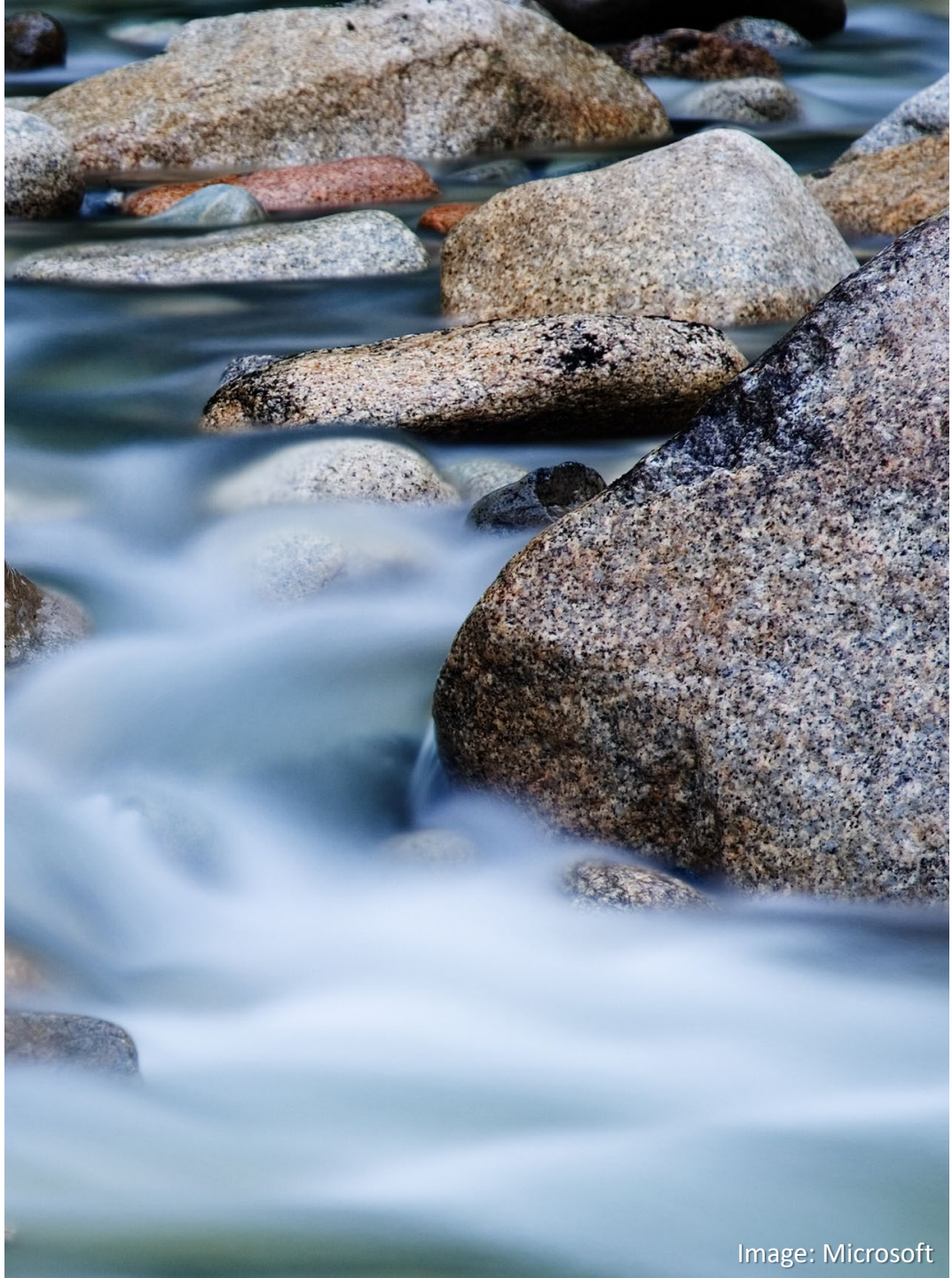


Image: Microsoft

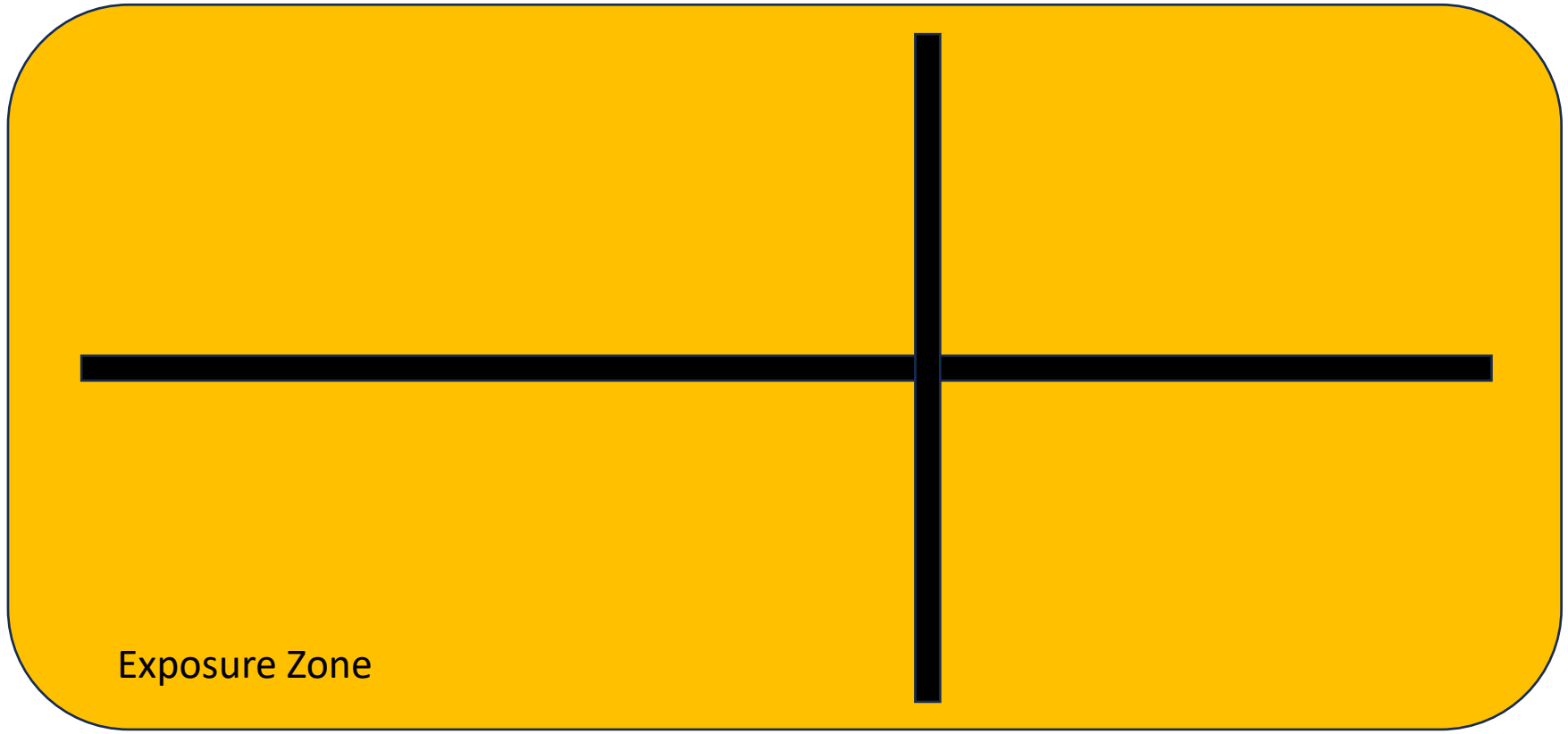
Balancing Considerations

Known Risks
(...older chemicals)

Unknown Risks
(...often new chemicals)

Human receptors

Aquatic Receptors
&
[Aquatic-Dependent Wildlife]



Collecting & Releasing Data

Interpreting & Publishing Data

SCOPE & PRIORITIZATION-2

1) Assess trends in water quality, including trends that affect uses of the water of the Columbia River Basin

2) Collect, characterize, and assess data on water quality to identify possible causes of environmental problems

So, for rest of today ……asking to think Basin-Wide

How best to answer Congress's CWA 123 request? …….Society.

1) Which trends?
2) Which stories (data driven) to tell first ?
    How to Prioritize…….
        -where is the biggest risk
        -what does the data, to date, cover
        -gaps- what or where is not being summarized

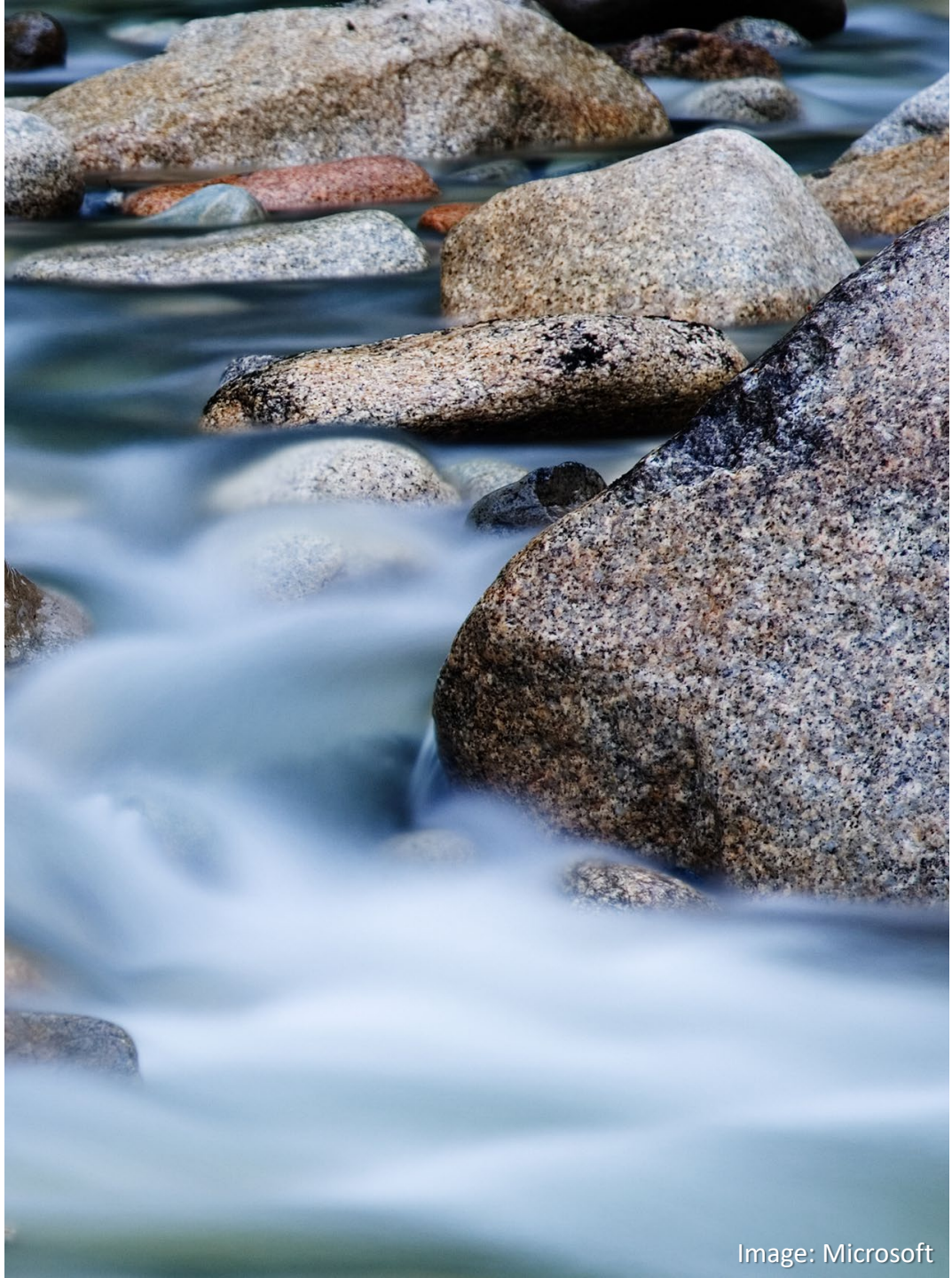


Image: Microsoft

SCOPE & PRIORITIZATION-3

1) Assess trends in water quality,
2) Collect, characterize, and assess data on water quality

Where is the biggest (known) risk?
Humans-
-Food- Mercury, PCBs, some Organochlorines
-Drinking Water exposures (PFAS, Disinfection Byproducts)
Aquatic Receptors- (short lived)
-Metals (Cu, Hg, Cd, Zn), current Pesticides, PFOS, 6PPD

Where is the Data?
-"PBTs"- Hg, PCBs, Organochlorines in fish tissue and sediments

Where or What is NOT being summarized? (A lot. So, which first)
-spatially- Mainstem, and western MT and Idaho
-species- Salmon, Lamprey, First Foods
-chemicals- PFAS, current pesticides, selenium, microplastics

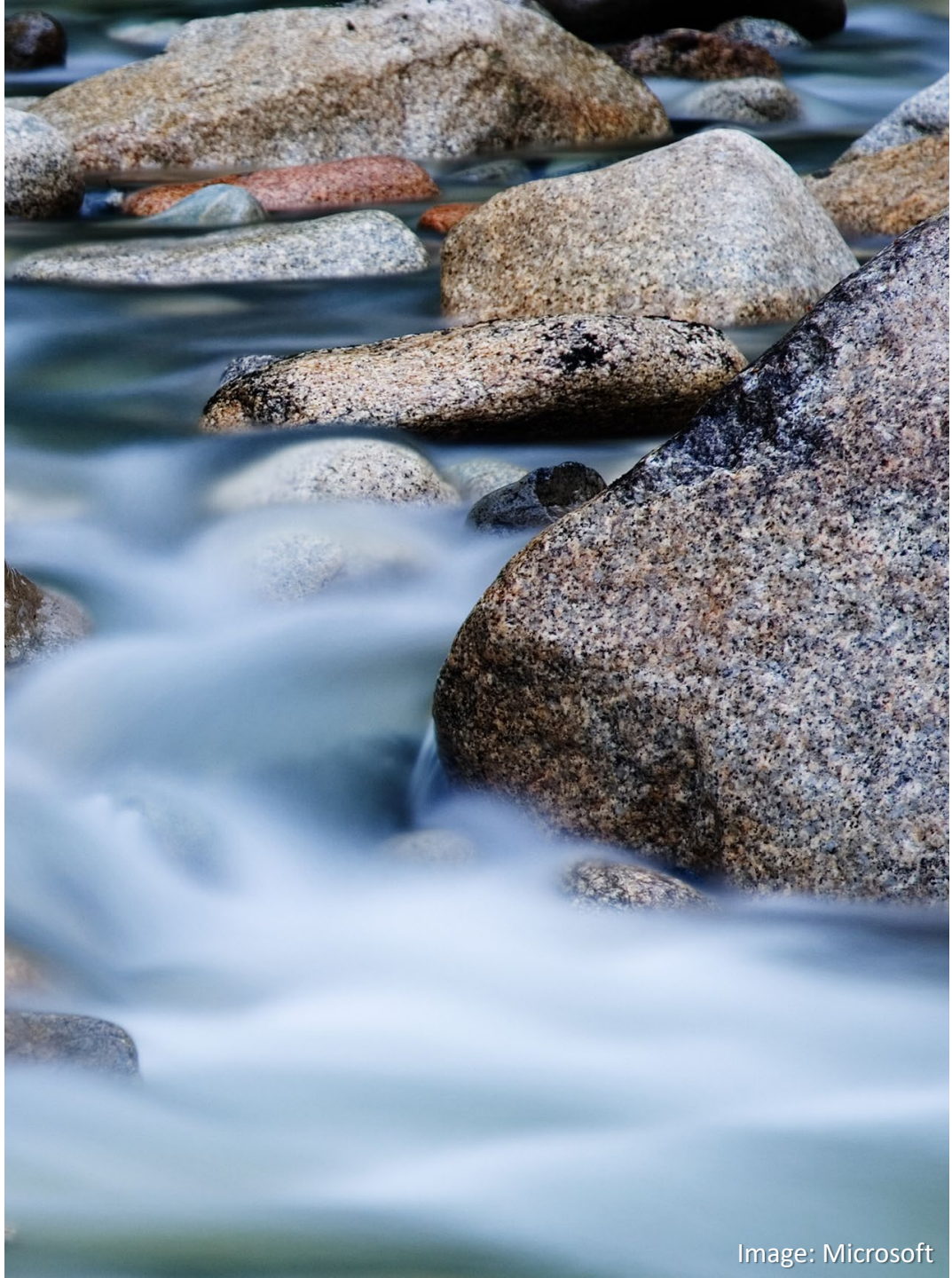


Image: Microsoft

Yakama Nation Columbia River Basin

Draft Implementation Plan for a Basin-Wide Monitoring Program

June 10 and 12, 2025

Laura Shira and Sherrie Duncan, Yakama Nation Fisheries

Columbia River Basin Partnership

Draft Implementation Plan for a Basin-Wide Monitoring Program

The Yakama Nation
Department of Natural Resources, Fisheries
Superfund Section

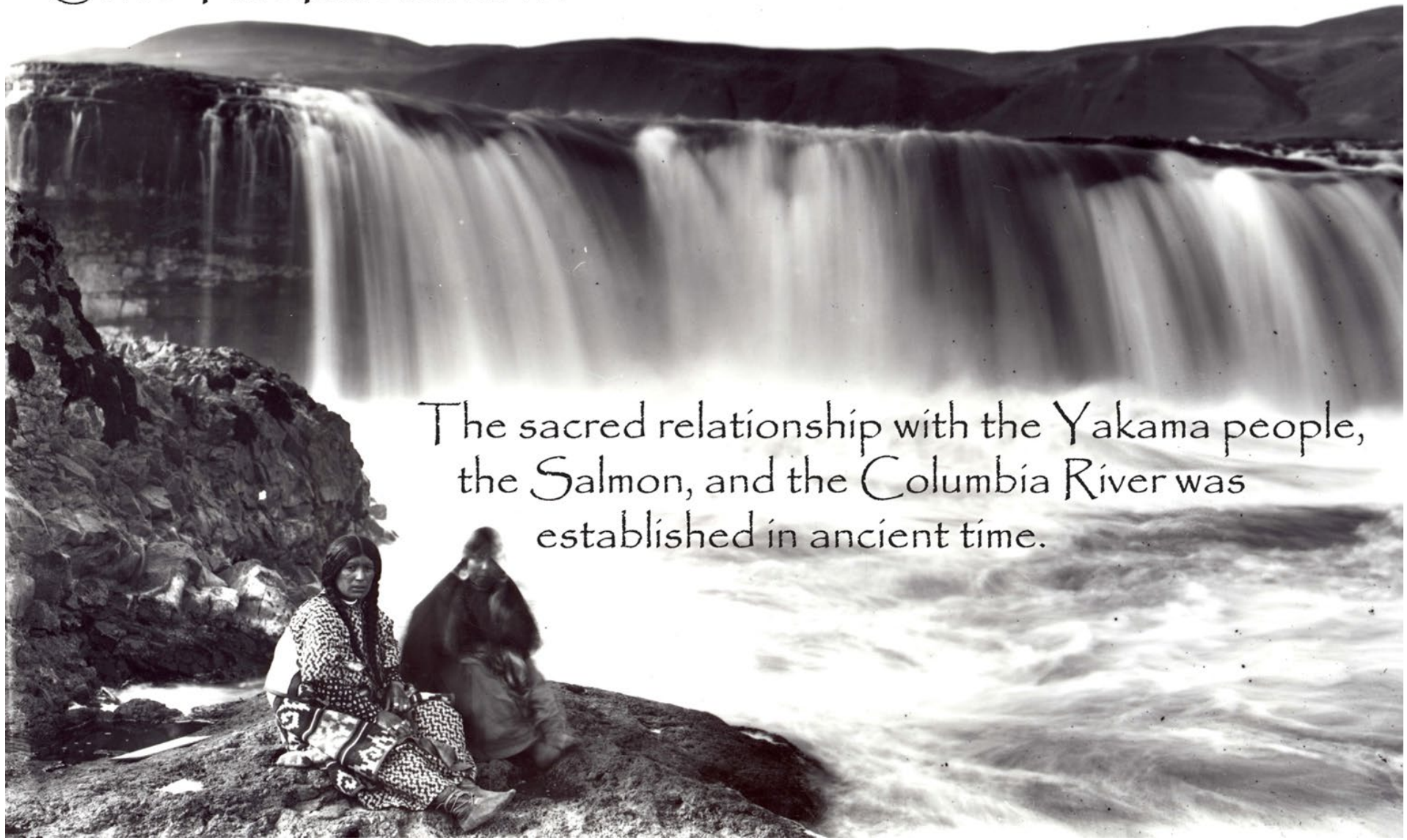
And

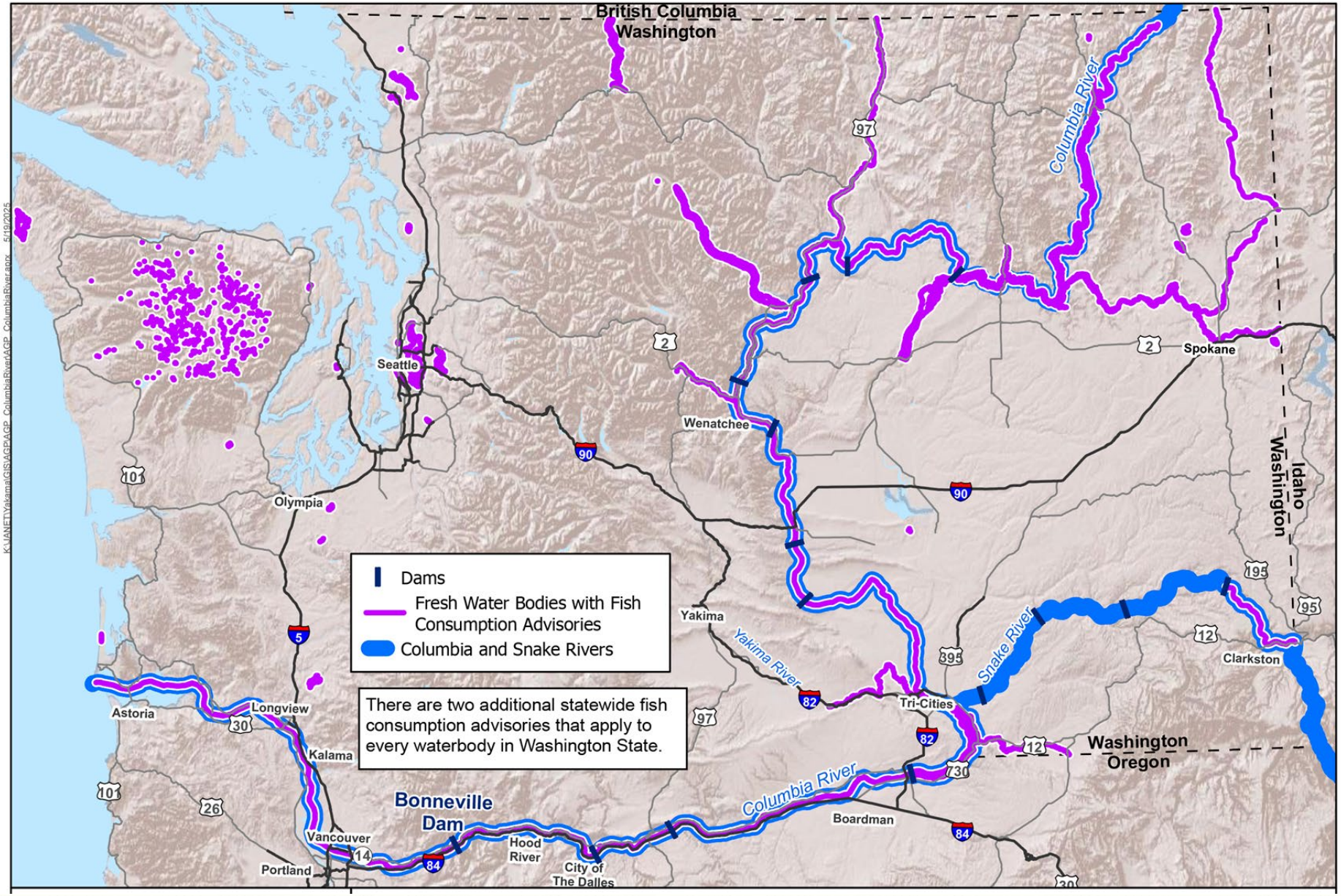
Janet Knox, LG

MOTT MACDONALD

May 2025

Since Time Immemorial . . .



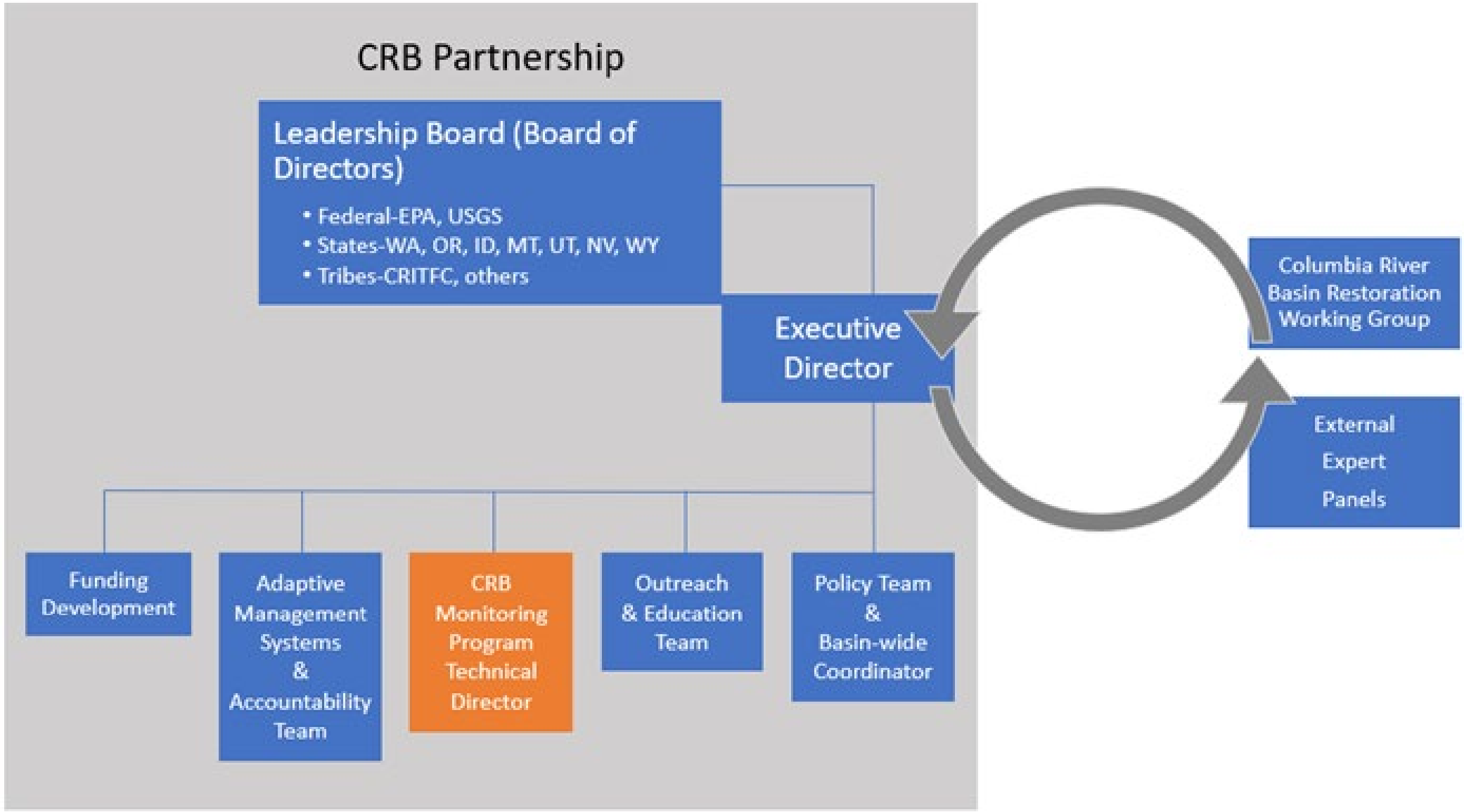

British Columbia
Washington
Columbia River
Seattle
Spokane
Wenatchee
Idaho
Washington
Olympia
Dams
Fresh Water Bodies with Fish Consumption Advisories
Columbia and Snake Rivers
There are two additional statewide fish consumption advisories that apply to every waterbody in Washington State.
Yakima
Yakima River
Snake River
Clarkston
Tri-Cities
Washington
Oregon
Astoria
Longview
Kalama
Bonneville Dam
Columbia River
Boardman
Vancouver
Portland
Hood River
City of The Dalles

Yakama Nation Fisheries

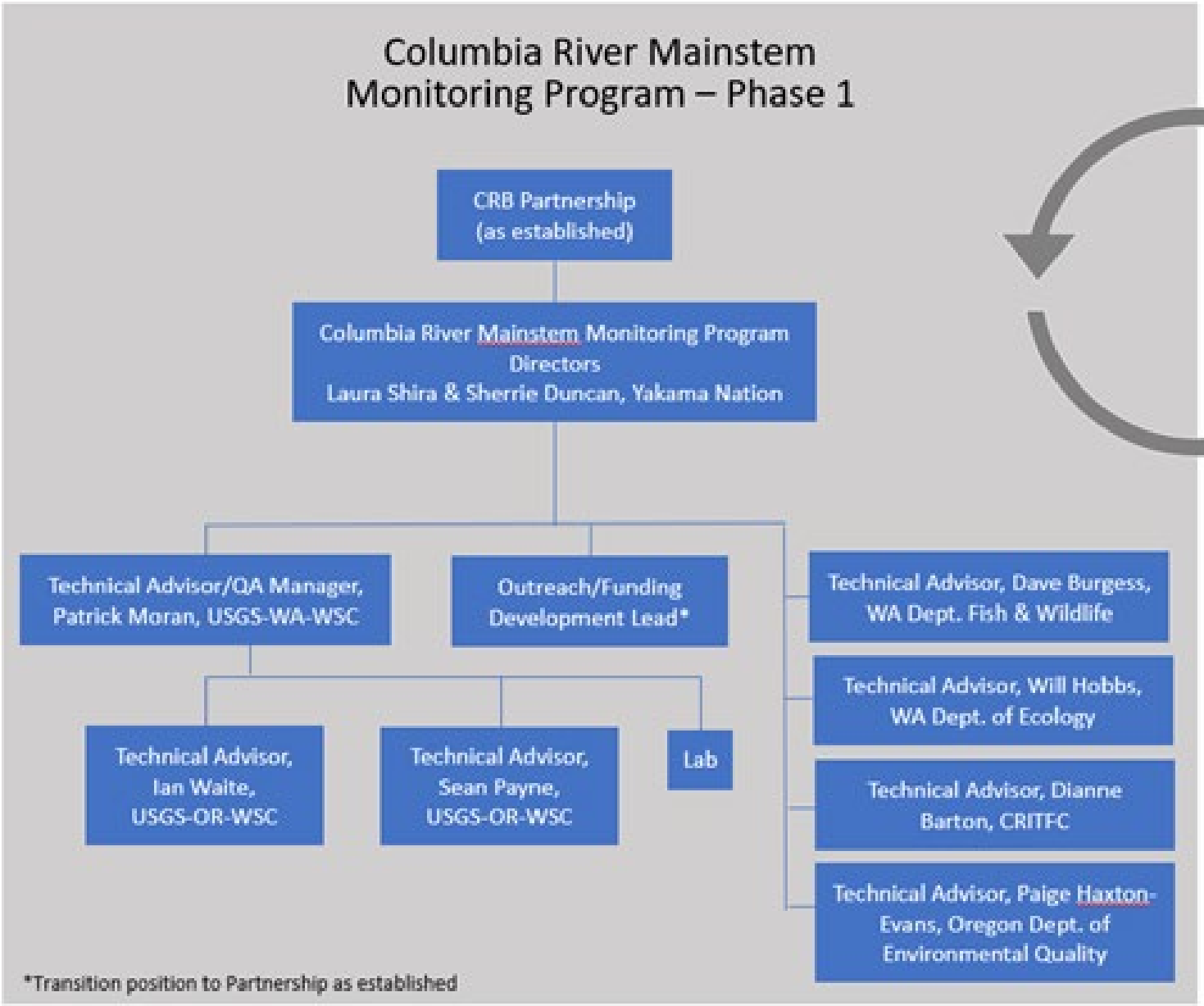
Impacts from Contaminated Sediment Sites

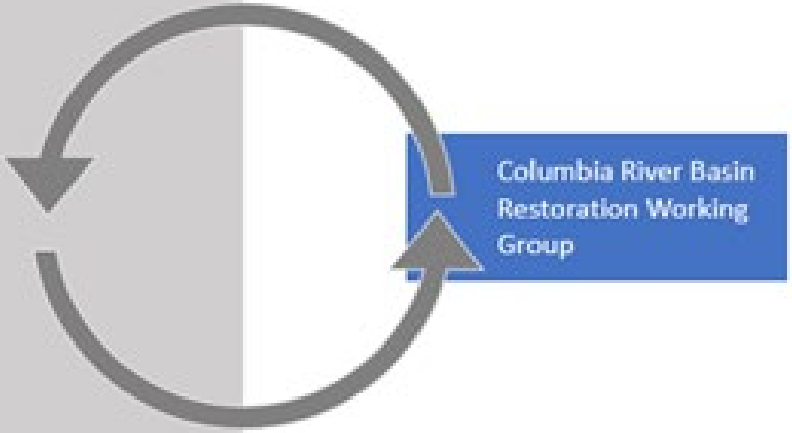
Above. Two Yakama girls cradle Asum for release into the Yakima River.

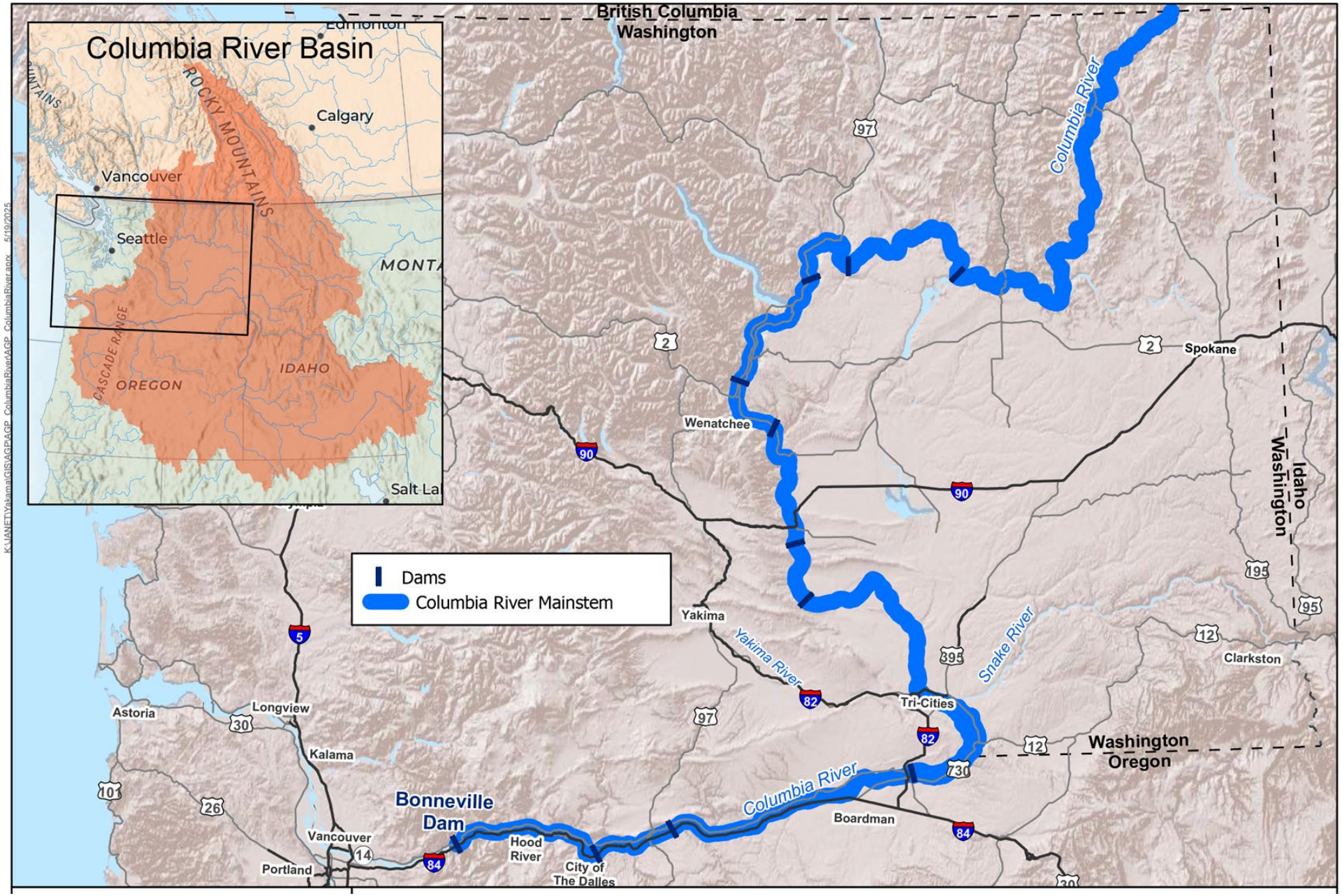
- Contaminated sediments result in contaminated fish.
- Tribal populations (including children) consume significantly more fish than other populations.
- There are extensive fish advisories on the Willamette and Columbia rivers.
- Risks from contaminated sediments and fish have negative impacts to health and well being.
- Contamination of First Foods is a form of violence and injustice experienced specifically by Indigenous people.

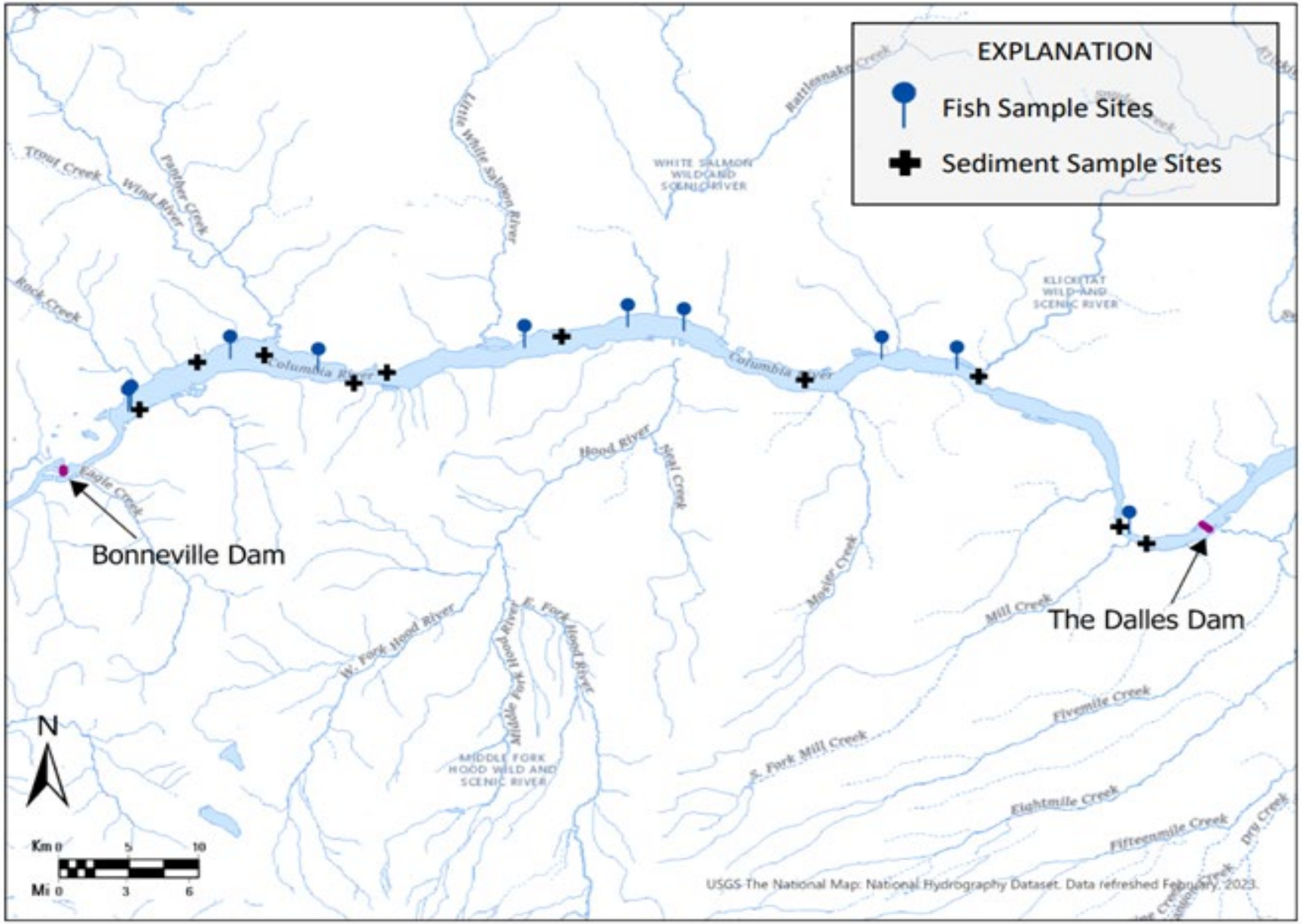

CRB Partnership
Leadership Board (Board of Directors)
• Federal-EPA, USGS
• States-WA, OR, ID, MT, UT, NV, WY
• Tribes-CRITFC, others
Executive Director
Columbia River Basin Restoration Working Group
External Expert Panels
Funding Development
Adaptive Management Systems & Accountability Team
CRB Monitoring Program Technical Director
Outreach & Education Team
Policy Team & Basin-wide Coordinator

Columbia River Mainstem Monitoring Program – Phase 1






Columbia River Basin
Edmonton
Calgary
Vancouver
Seattle
Salt La
ROCKY MOUNTAINS
CASCADE RANGE
OREGON
IDAHO
British Columbia
Washington
Columbia River
Spokane
Wenatchee
Idaho
Washington
Dams
Columbia River Mainstem
Yakima
Yakima River
Snake River
Clarkston
Tri-Cities
Washington
Oregon
Astoria
Longview
Kalama
Bonneville
Dam
Vancouver
Portland
Hood
River
City of
The Dalles
Boardman


EXPLANATION
Fish Sample Sites
Sediment Sample Sites
Bonneville Dam
The Dalles Dam
Columbia River
Columbia River
Hood River
Trout Creek
Wind River
Panther Creek
Rock Creek
Little White Salmon River
Battleground Creek
WHITE SALMON WILD AND SCENIC RIVER
KLICKITAT WILD AND SCENIC RIVER
Eagle Creek
Neal Creek
Mosier Creek
Mill Creek
W. Fork Hood River
E. Fork Hood River
Middle Fork Hood River
MIDDLE FORK HOOD WILD AND SCENIC RIVER
S. Fork Mill Creek
Fivemile Creek
Eightmile Creek
Fifteenmile Creek
Dry Creek
N
Km 0 5 10
Mi 0 3 6
USGS The National Map: National Hydrography Dataset. Data refreshed February, 2023.

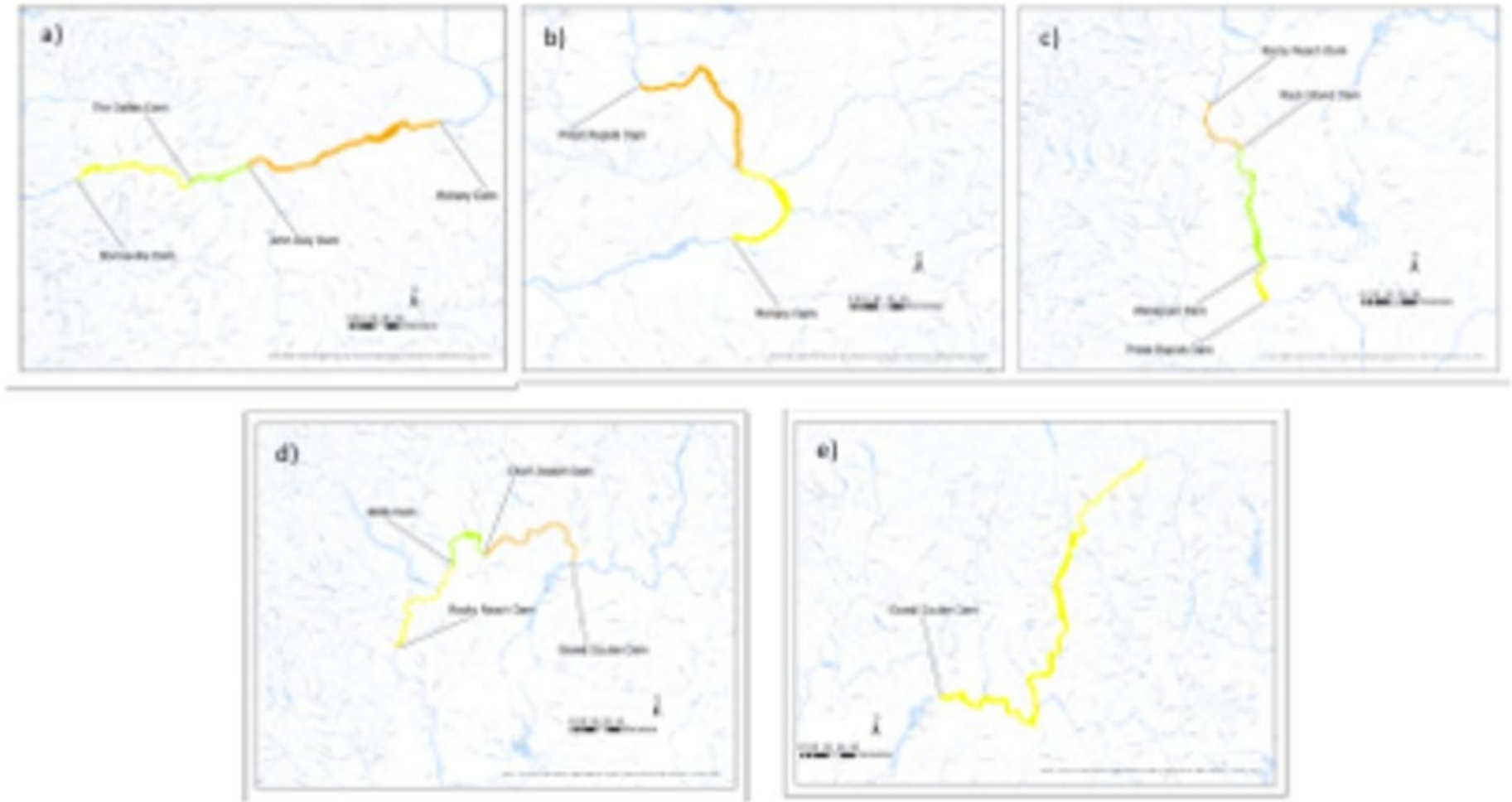


Figure 2. Example of reservoir groupings that would allow the study area, from Bonneville Dam to the international border with Canada, to be sampled in a 5-year rotation. Example groupings depicted are a) Bonneville, The Dalles, and John Day reservoirs; b) McNary reservoir and the Hanford Reach; c) Priest Rapids, Wanapum, and Rock Island reservoirs, d) Rocky Reach, Wells, and Chief Joseph reservoirs, and e) Lake Roosevelt. See Table S1 for additional details about the reaches. Source: USGS-TNM, USGS The

Yakama Nation Fisheries

HONOR. PROTECT. RESTORE.

CONFEDERATED TRIBES AND BANDS
YAKAMA NATION
TREATY OF 1855

Resources

- Confederated Tribes and Bands of the Yakama Nation - https://www.yakama.com/
- Yakama Nation Fisheries - https://www.yakamafish-nsn.gov/restore/projects/columbia-river-mainstem-water-quality-monitoring-program
- “Land of the Yakamas” - https://yakamafish-nsn.gov/LandOfTheYakamas

Group Discussion

Relative importance of mainstem vs. tributaries vs. wadable streams

Share your priority monitoring work related to toxics (current and planned)


INDICATORS

DEVELOPING TOXICS MONITORING INDICATORS

Think about this from a basin-wide perspective, i.e., beyond your own backyard

🌊 **Vast Scale**

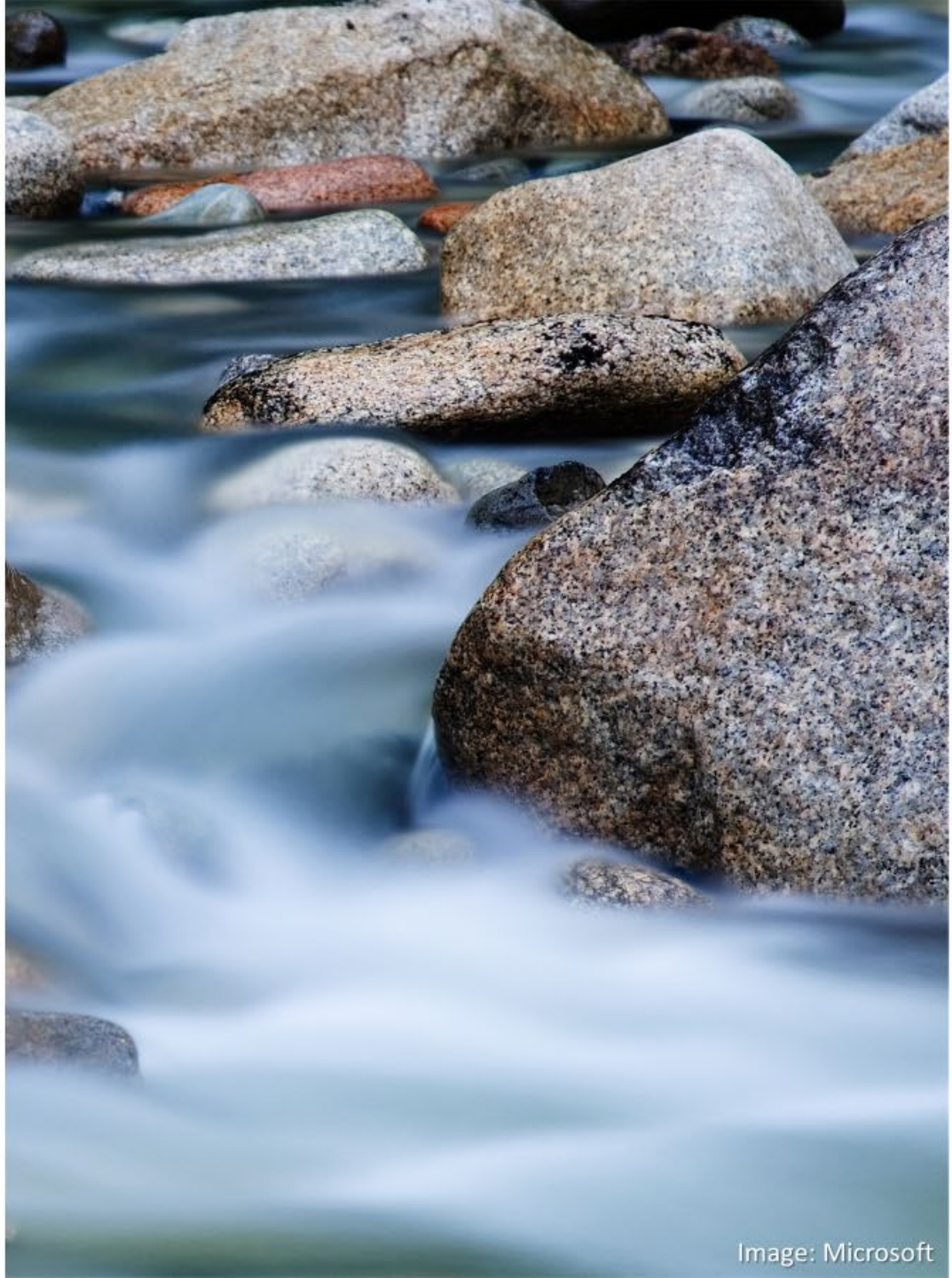
- 260,000 square miles across 7 states, serving 8 million residents

🧪 **Chemical Complexity**

- 350,000+ chemicals in commerce today –
    - 30,000 in waste water stream
- we must focus on the most toxic

🐟 **Cultural Impact**

- Tribal fish consumption rates 20x higher than average American - disproportionate health risks



Proposed Strategic Approach

Risk-Based Prioritization Framework

🎯 Risk Assessment

- Exposure + Toxicity= Hazard (Risk)

Priority

📊 Screening Values

- Toxicity thresholds for humans & aquatic life

🔄 Adaptive Management

- Priorities evolve as information changes

"One Health" Approach: Human sustainability requires a healthy ecosystem, they are dual priorities

Monitoring Strategy Chemical Selection –

For Discussion

Legacy Contaminants
- PCBs (bioaccumulative)
- Mercury (neurotoxic)
- PBDEs (flame retardants)
- Organochlorine pesticides
- Well-understood risk profiles

Emerging Chemicals
- PFAS (persistent, mobile)
- 6PPD-Q (tributaries?)
- Pharmaceutical compounds
- Limited occurrence or hazard data, uncertain risk

Current Use Pesticides
- Agricultural applications
- Seasonal variations

Environmental Mixtures
- Real-world exposures
- Cumulative effects

Tracers
- Represent a chemical cocktail
- Represent a pathway

Media Selection – Food for Thought

Water

Dissolved chemicals affecting respiratory surfaces

Best for: Mobile, water-soluble compounds

Sediment

Particle-bound contaminants affecting bottom-dwelling organisms

Best for: Hydrophobic, persistent compounds

Fish Tissue

Bioaccumulated toxics directly relevant to consumption risk

Best for: Lipophilic compounds like PCBs

Species Selection – Food for Thought

- Indicators of what?
- Ecological/trophic position of the organism and how it interacts with toxics in the Basin
- Sensitivity of the organism to a given toxic compound or group of compounds
- Social or ecological value

What about Salmon?

.....and lamprey, sturgeon

🌊 The Challenge

Keystone Species- Culturally, Ecologically, Socially/Politically (dollars invested)
But, salmon and lamprey, sturgeon, years in the ocean, gaining 80%+ body weight
Adult salmon carry contaminants from oceanic food webs
Cannot track tissue changes back to specific Basin locations- easily
So, how much effort towards Salmon?

🎯 Proposed Solution

Basin-wide, focus more on Resident Fish:
Fixed-Station monitoring for Salmon (ie. Annual measurements at Bonneville)

- **Forage species:** sculpin, stickleback, Minnows (redside, dace), invertebrate species
- **Predatory species:** bass, walleye
- **Salmon (lamprey):** regularly at one-fixed location, annually- juveniles out, adult returns

Innovation to Improve Effectiveness

🔬 **Non-Targeted Chemical Analysis**
Mass spectrometry to identify unknown compounds
Discover emerging contaminants

🧬 **Non-Targeted Biological Analyses**
Omics technologies → Detect impacts early; detect novel bioactivities; mixtures
eDNA to track species communities over time and space

🤖 **Machine Learning**
Exposure modeling and pattern recognition
Predict chemical behavior and risk

 **Passive Sampling of Water**
Measure low levels in water using absorbent material
Lower ‘non-detection’ frequency (6ppd)

Indicator Examples- for Discussion

Toxics to Human Health Indicators

- Fish Fillet Tissue
  - Predatory Fish across watershed
    - Walleye, Bass, Pikeminnow
  - Salmon- at 'fixed point'
    - Juvenile- whole fish
    - Adults- fillets
- Water
  - Recreation exposure
  - Drinking Water* Supply

Toxics in Aquatic Life Indicators

- Resident Forage Fish- whole
  Sculpin, minnows (redside, dace), whitefish
- Resident Predatory Fish- liver, fillet
  - Walleye, Bass, Pikeminnow
- Salmon- fillet, liver

- Water -> passive samplers
- Sediment
- Algae/ Biofilms

* CWA 123 requests engagement with utilities

EPA 2007 PRIORITIZATION OF TOXICS

Tier I (highest priority)	Tier II	Tier III
• DDT (and metabolites) • PCBs • Mercury (including methylmercury) • PBDEs	• PAHs • Arsenic • Dioxins/furans • Lead • Organophospate Insecticides (azinphos methyl, chlorpyrifos, diazinon) • Copper • Estrogenic compounds (Bisphenol A, AHTN, natural and synthetic estrogens, Nonylphenol)	• Organochlorines (including alpha BHC, aldrin, dieldrin, chlordane) • Trace elements • Current use pesticides (including carbamates, triazine herbicides, fipronil) • Pharmaceuticals and Personal Care Products • Other wastewater compounds (plasticizers, detergents, surfactants) • Hormones • Synthetic pyrethroids • Phthalates

Working Group Goal:

Identify highest priority toxics for the Columbia River Toxics Reduction Working Group.

The 2009 State of the River Report summarized existing information on the Tier I pollutants.

Source: https://www.epa.gov/columbiariver/prioritization-toxics-columbia-river#documents

Priority Chemicals – 2020 Update

The 2020 Contaminants of Concern framework does not attempt to rank/prioritize toxics.
The goal was to group toxic pollutants by common **pathways of exposure** and the **potential actions** that entities could take to address pollutants.
Here are examples of some of the pollutants included:

Pathways	Actions				
	Keep Sediment in Place	**Reduce Runoff/Discharges**	**Source Reductions**	**Clean-up Contamination**	**Other?**
Agriculture	DDT				
Forestry		2,4-D, Glyphosate			
Mining			Cyanide		
Urban/Stormwater				PAHs	
Wastewater Treatment Plants			PFAS		
Industrial Use		PCBs			
Air Deposition	Mercury				

https://www.epa.gov/columbiariver/columbia-river-basin-contaminants-concern-framework

Group Discussion

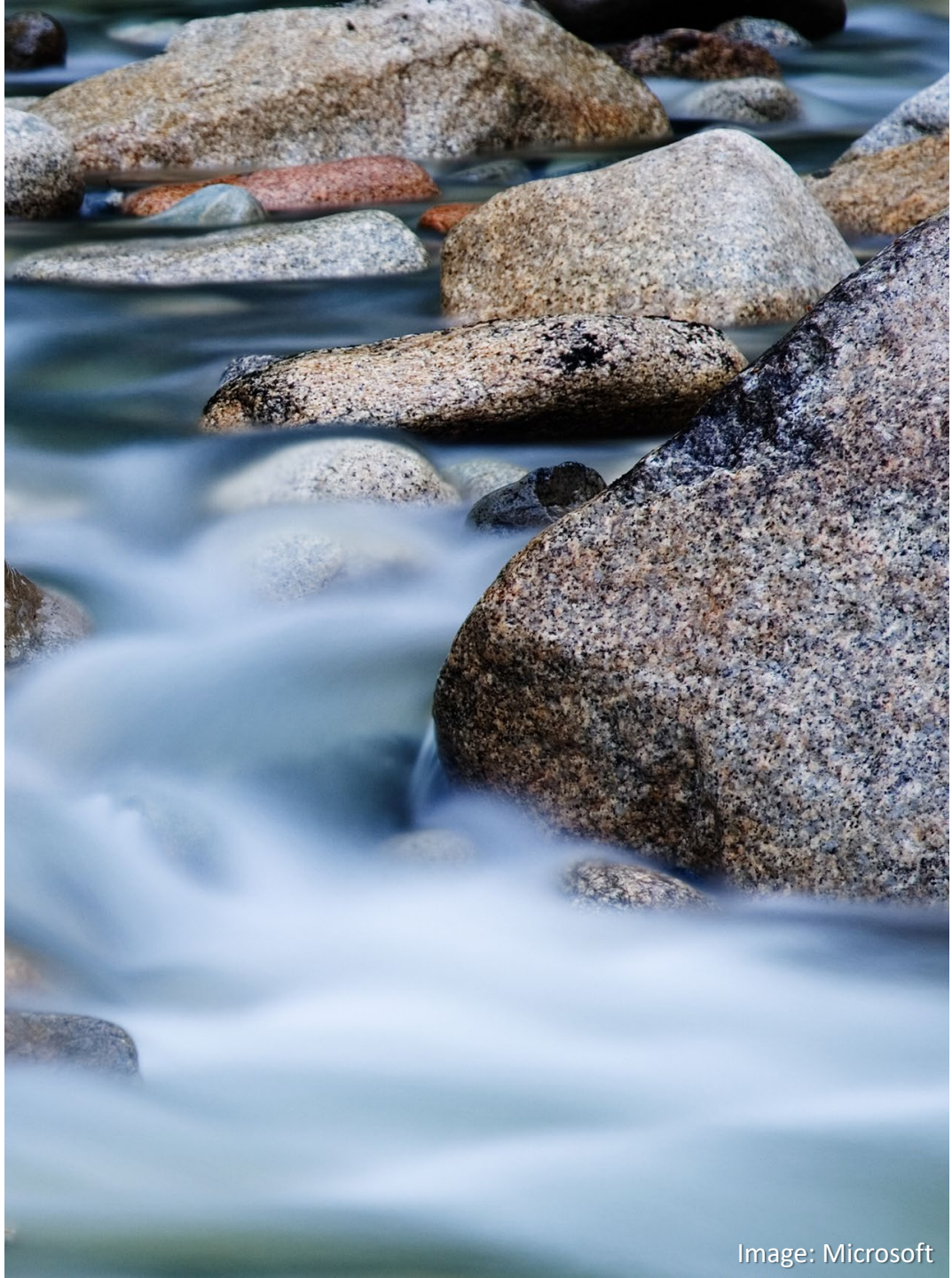
Based on these considerations, what indicators should be included in the Strategy?

APPROACH TO EVALUATING RISK & DATA COLLECTION

Image: Steven Pavlov

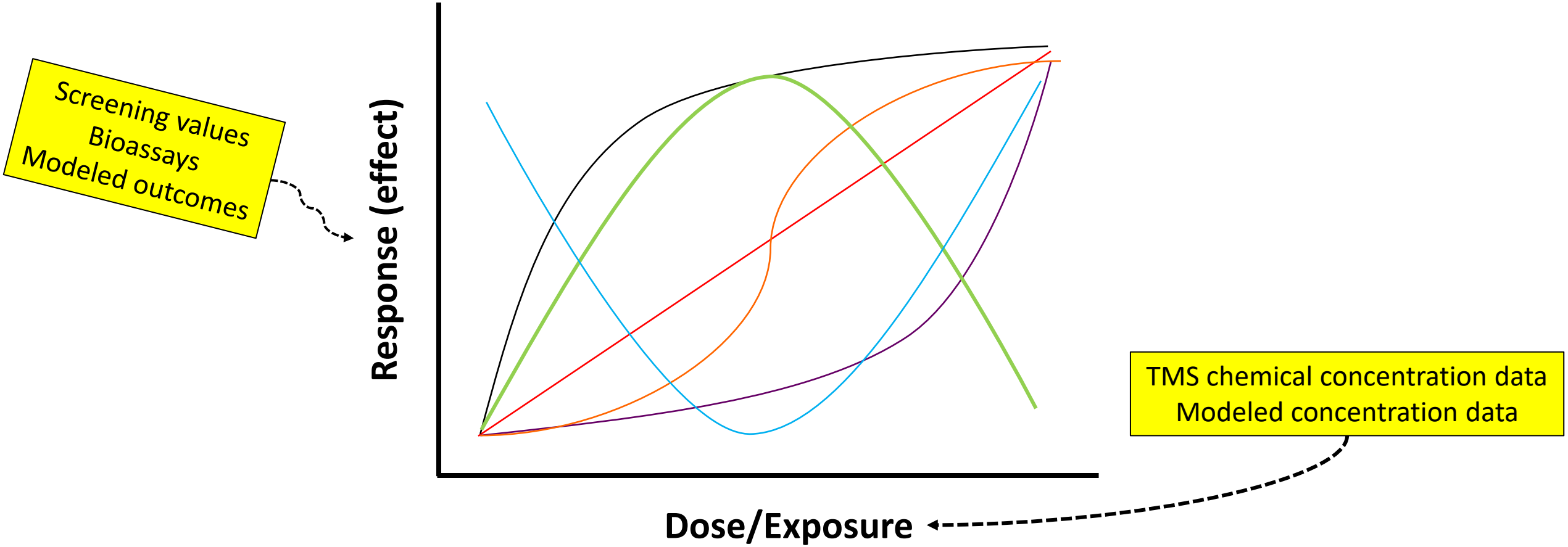
Evaluating Risk

- Not using a CERCLA or other specific programmatic process
- What is “risk” and how do CRBWG TMS data inform it?
- What evaluation methods might be appropriate for us?

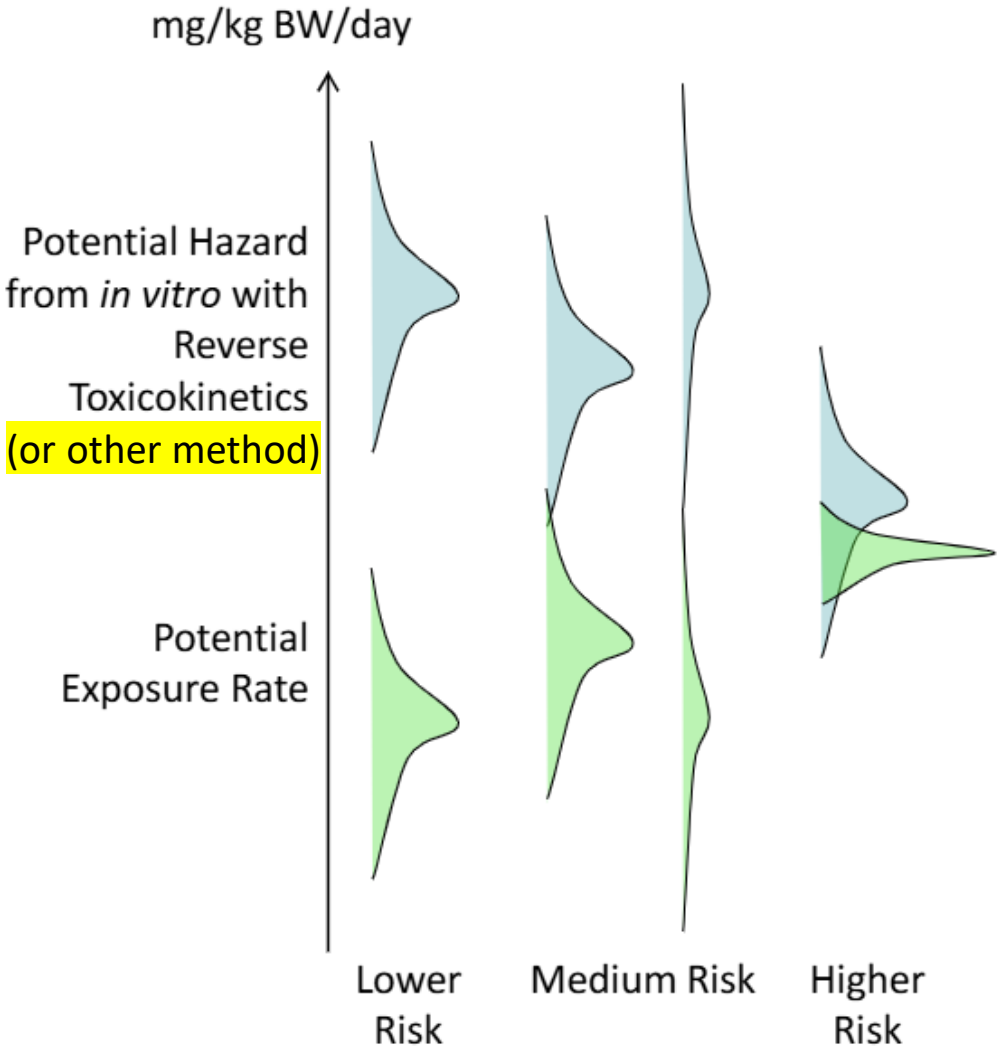


“The dose makes the poison”

-Paracelsus, 16th Century



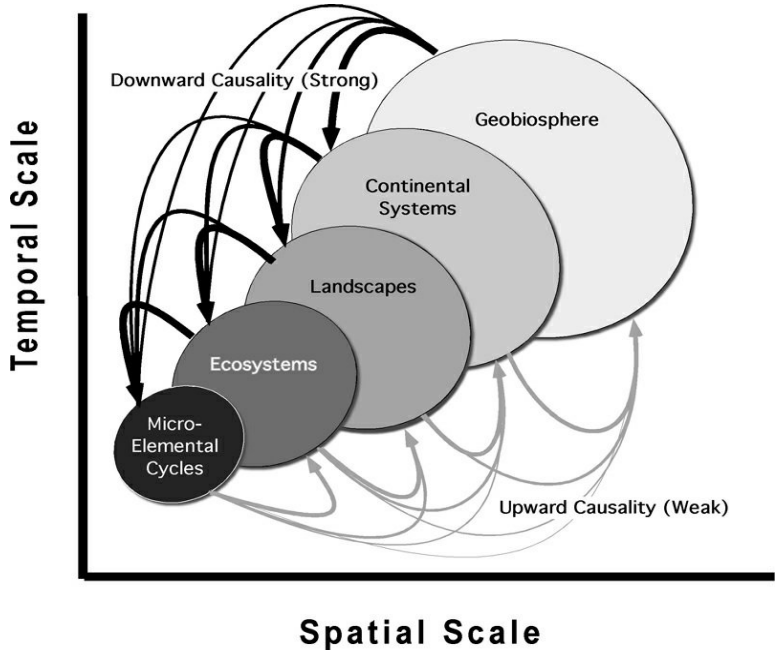
“Risk” is a function of exposure + toxicological hazard

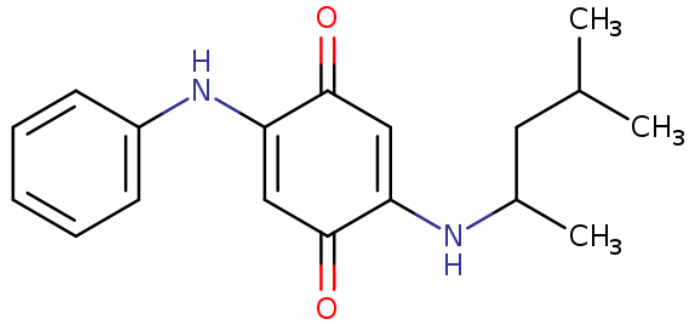


- Exposure = Basin chemical concentration data (etc.)
- Hazard = Screening values, *in situ* responses (etc.)
- Risk = Exposure/Hazard
  - Probabilistic
  - Deterministic
  - Cumulative, single chemical

Verro et al. 2002 ES&T

Things to Consider For Risk Evaluation





Scale

Receptor

Chemical

Risk Evaluation Methods Depend on Assessment Needs and Data Availability

- Probabilistic
- Deterministic
- Cumulative
- Basin-wide versus local
- Seasonality

Developing Screening Values to Support the Process

- Contaminants of Emerging Concern (CECs) got the most votes for need
- Start with values for "Aquatic Receptors", aquatic eco
- Review of CRBRP CECs-
  - Most common; PFAS, PBDEs, phthalates, other
- Check for existing values – California and BC recently
- When no values exist, follow established processes, given the available data
  1) E.g., Aquatic Life Benchmark development process
  2) Apply 'new approach methods' for those compounds lacking traditional toxicity data

Proposed Success Framework

🎯
Coordinated Monitoring

Basin-wide implementation enhancing knowledge

🔗
Integration

Research informs toxics reduction actions

📢
Communication

Clear reporting of status and trends

🤝
Partnership

Highly engaged regional collaboration

Moving Forward Together

A **risk-based, adaptive approach** that balances scientific rigor with practical implementation, ensuring our monitoring efforts generate **actionable information** for toxics reduction

Quality Assurance Framework

📋 Standardized QAPPs

Quality Assurance Project Plan templates

📋 Standardized Protocols

List of common analytical methods, repository of field sampling SOPs

🤝 Partner Coordination

Consistent approaches across Basin organizations

Flexibility with Standards

Framework accommodates different pollutants and media while maintaining comparability

Group Discussion

Would the QA framework described meet your needs and save you time?

Do you have any feedback on the suggested appendices?

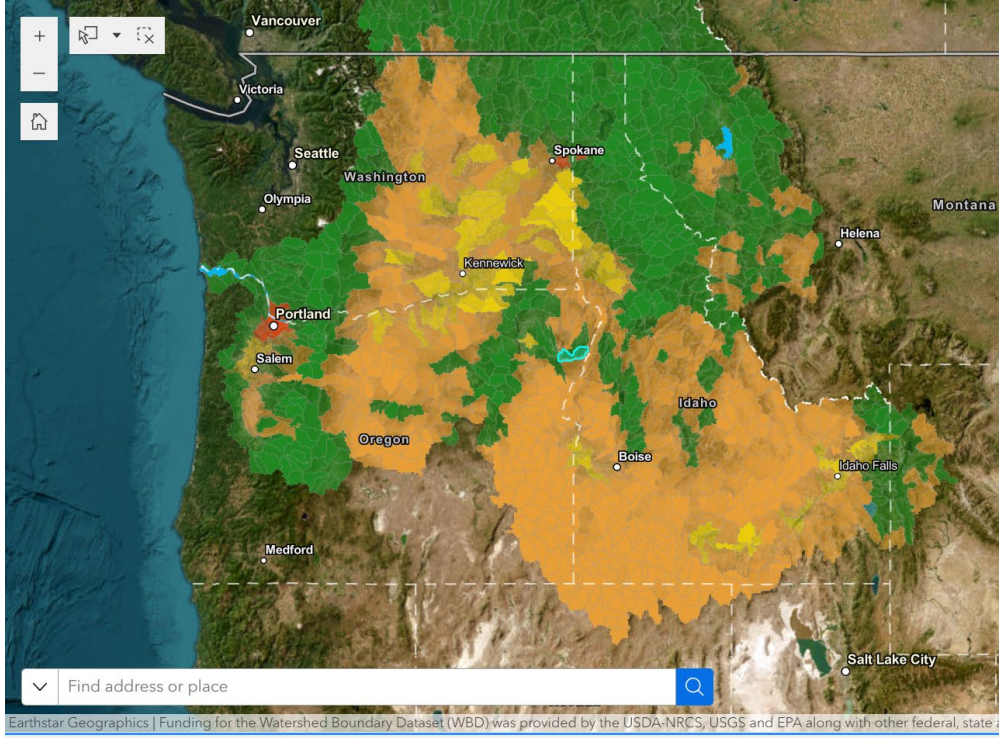

MONITORING DASHBOARD
UPDATE & DEMO

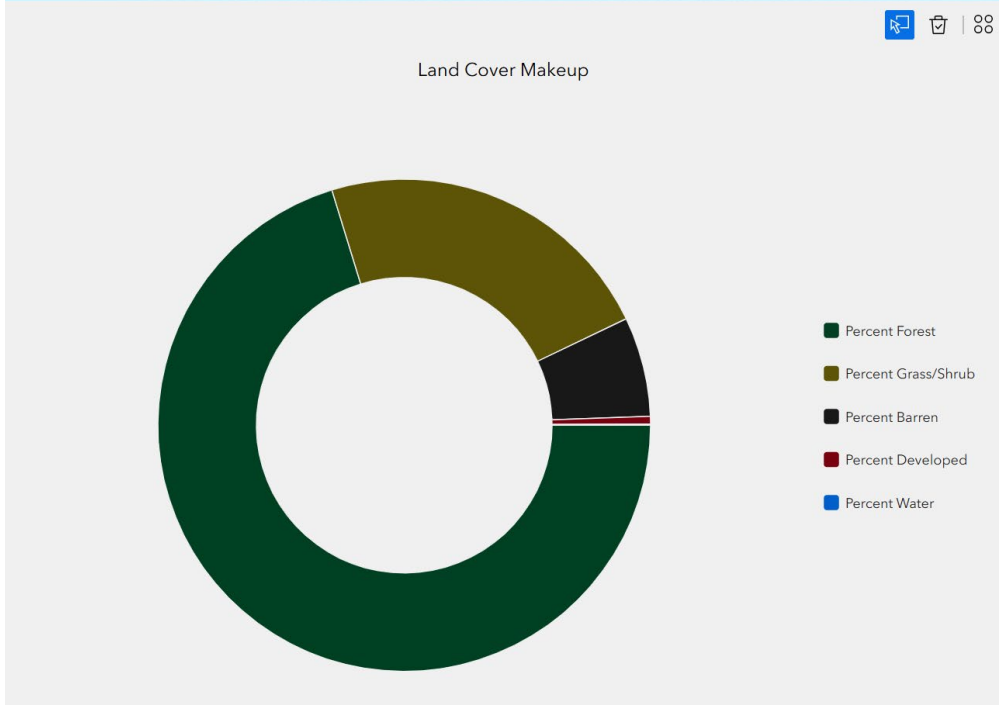
Toxics Monitoring Dashboard

Link/QR to Dashboard:
https://shorturl.at/Kr1Wp

Updated Dashboard now includes:

- Land use layers
- Toxics Release Inventory (TRI) data
- New search feature





Next Steps

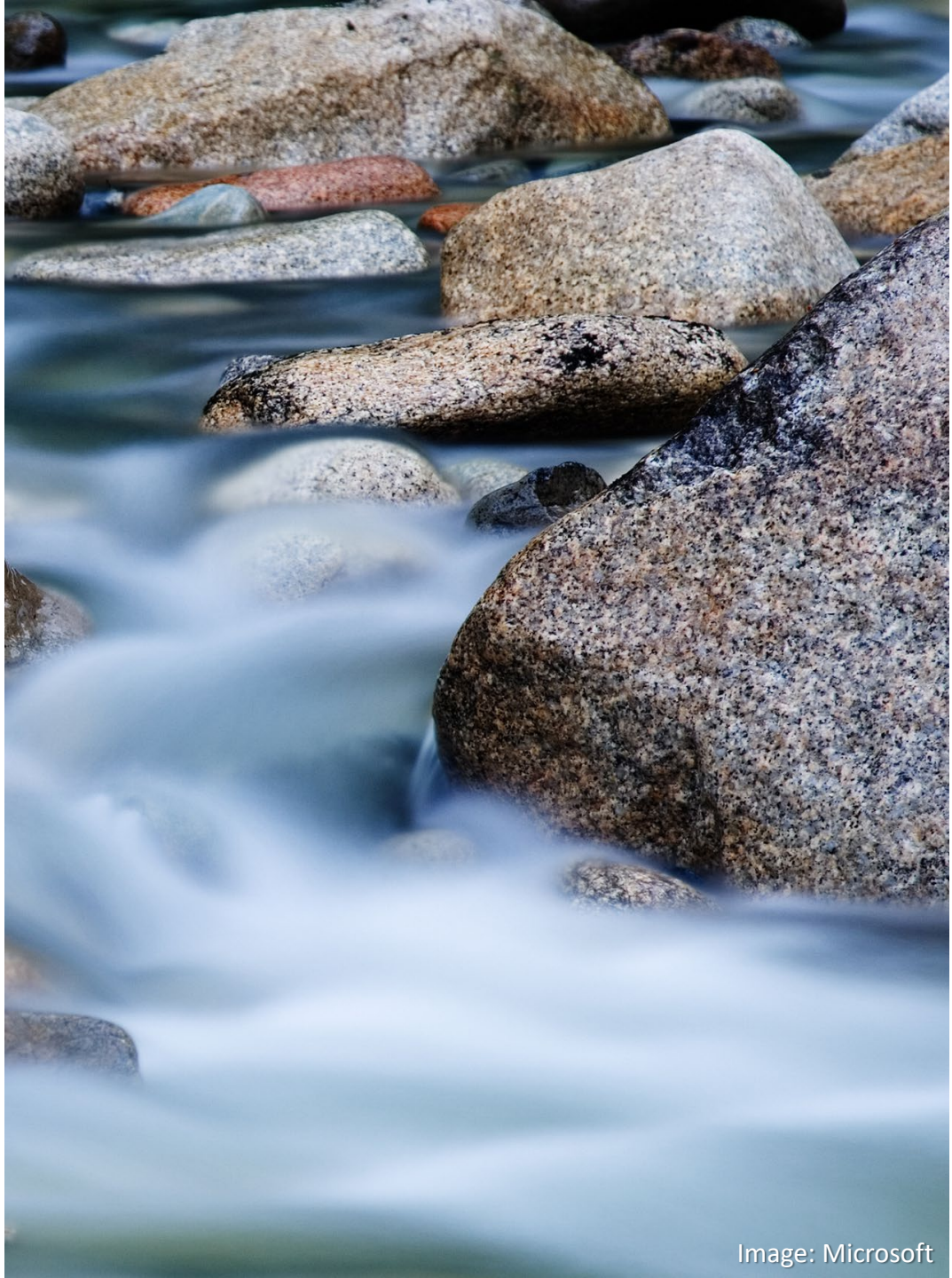
- Draft Vision for a Monitoring Strategy presented to TMS – June 12, 2025
- TMS feedback requested by – June 30, 2025
- TMS meeting – September 2025
- Share updated draft and engage Working Group in Fall – October 30, 2025
- TMS Meeting – December 2025

ACTION ITEMS

Meeting notes and slides will be sent out as follow-up

Send us your feedback via Slido by June 30

If you'd like a 1:1 meeting, let us know



HELP SHAPE THE FUTURE OF TMS

Provide feedback on the Vision for the Toxics Monitoring Strategy by June 30

Follow the link in the chat, scan the QR code, or visit www.slido.com and enter the code #TMSMonStrat

Image: Steven Pavlov

THANKS FOR JOINING US!

Next TMS Meeting:
September, date TBD

Reach out to us anytime!

The TMS Core Team

- Patrick Moran (USGS)
- Mark Jankowski (EPA)
- Lisa Kusnierz (EPA)
- Ashley Zanolli (EPA)
- Sarah Dunn (USGS)

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