WILLAMETTE INTAKE FACILITIES COMMISSION

Development of a Watershed Protection, Monitoring, & Outreach Plan: ***An Update***

May 2, 2024
PNWS-AWWA Conference

Agenda

- Introduction & Background
- Mission, Vision, & Values
- Watershed Protection Monitoring & Outreach Plan
  - Results from Phase 1
- Stakeholder Outreach
- Phase 2 Risk Analysis
- Next Steps
- Audience Q&A

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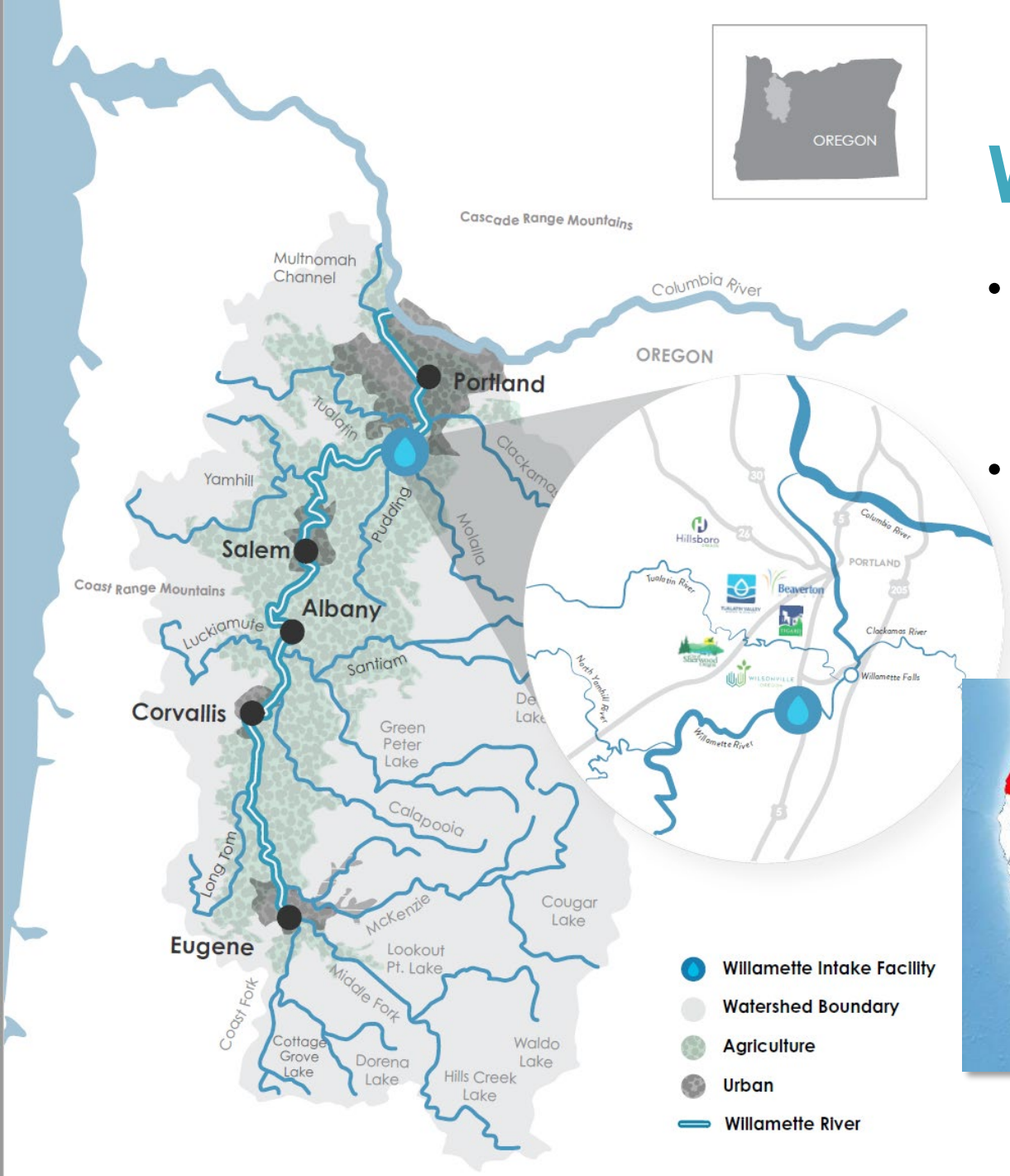
Introduction & Background

Willamette River Watershed

- The Willamette River is the heart of our area, supplying water to support people, agriculture, industry, native plants, fish, and wildlife habitat
- Willamette River basin consists of 13 tributaries that feed into the main stem of the river



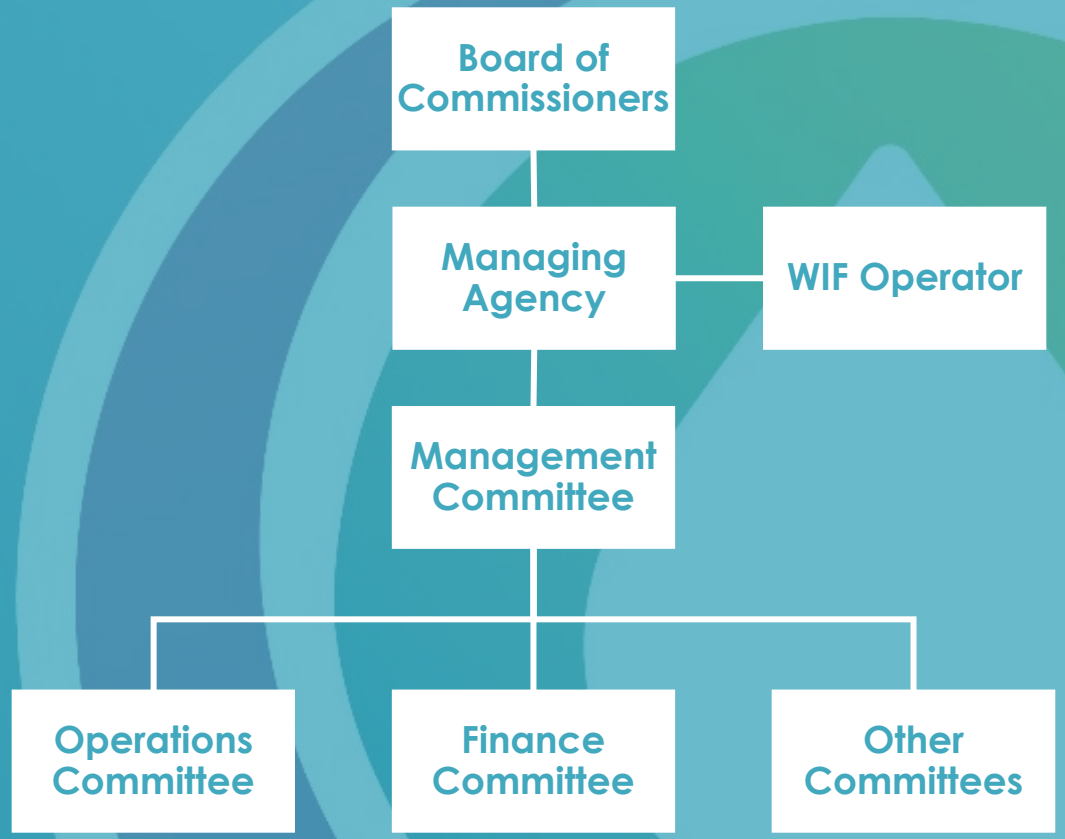
It defines our region and communities we call home and is a natural treasure of Oregon

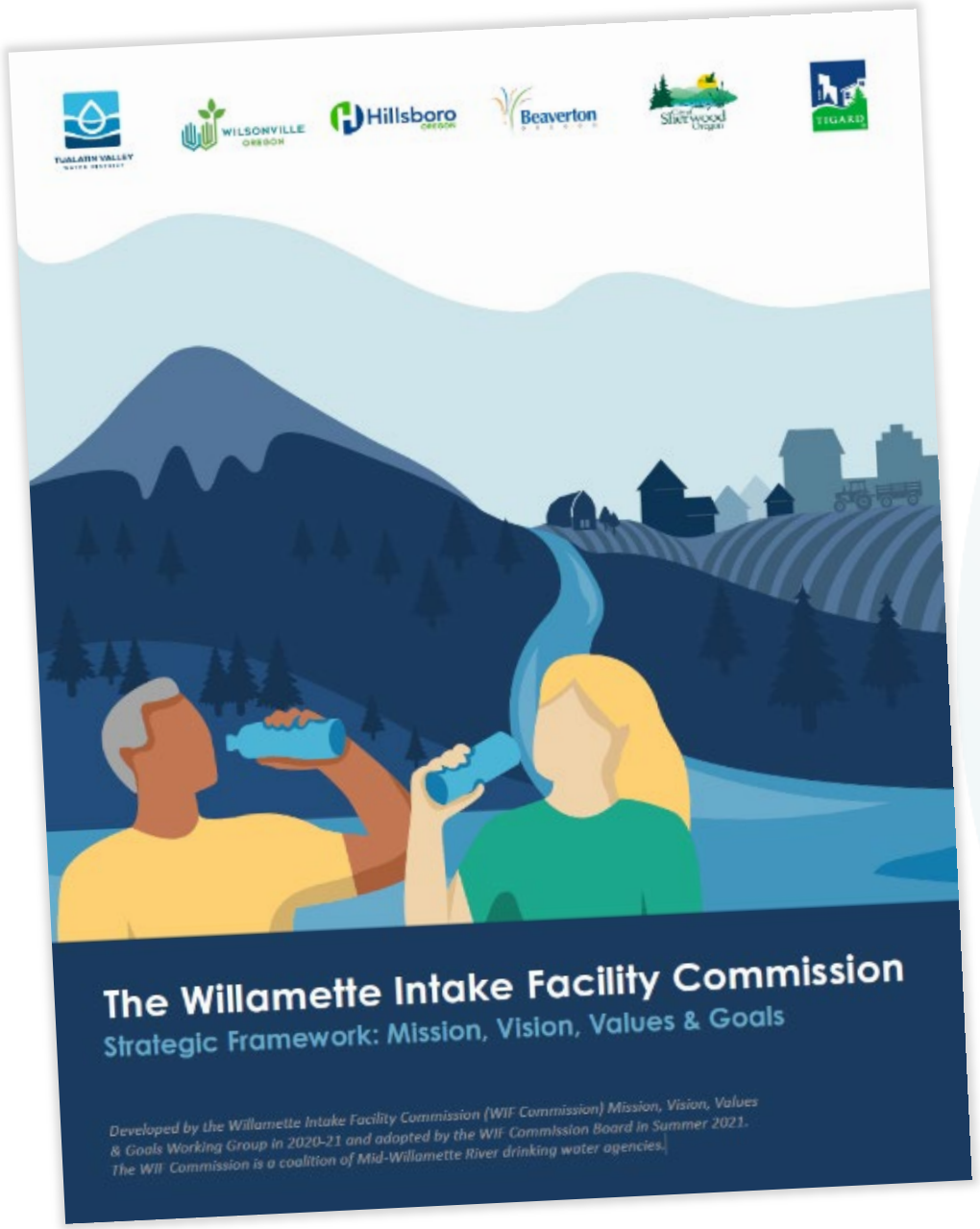
Willamette Intake Facilities (WIF) Commission

- Oversee management and operation of the intake facilities (e.g., fish screens, caisson, pump building)
- Strong model for shared ownership for a vital regional drinking water asset
- Work effectively to address a multitude of impacts associated with water rights, watershed protection, stakeholder collaboration, and intake facilities operations

WIF Commission Structure

- Partnership of the Tualatin Valley Water District and cities of Wilsonville, Sherwood, Hillsboro, Tigard and Beaverton
- Committees required by IGA
- Managing Agency is TVWD
- Watershed Protection, Monitoring, and Outreach Plan Working Group from Operations Committee and Managing Agency





WIF Commission Strategic Plan

Our Mission: To responsibly secure a safe and reliable Willamette River drinking water supply for our communities.

SCAN ME!
to read the plan

Desired Outcomes

Build strong partnerships and collaboration

Strong Partnerships

Leverage influence to protect watershed

Protect Watershed

Adapt to uncertainties in the future

Adapt to Uncertainties

Partner alignment to maximize ROI for protection & risk reduction

Maximize Watershed ROI

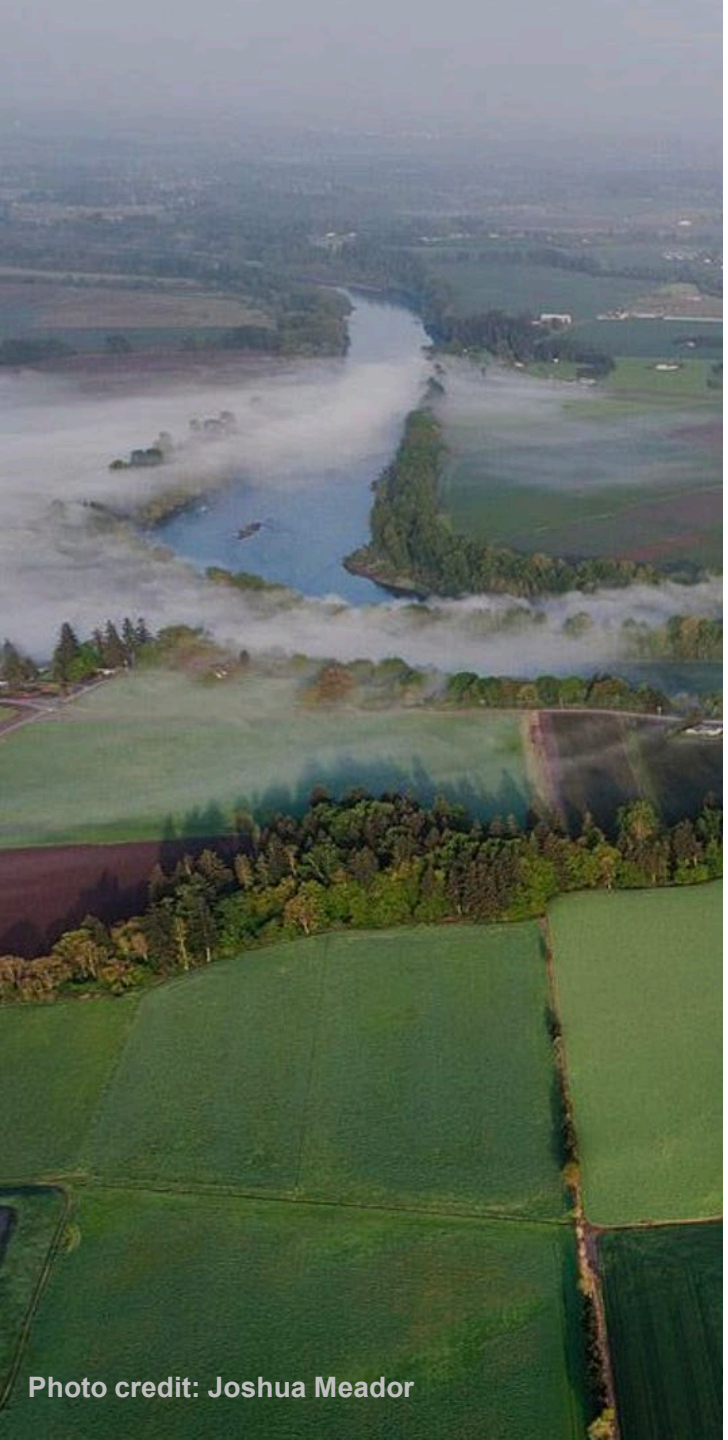


Photo credit: Joshua Meador

Development of the WIF Commission's Watershed Protection, Monitoring, & Outreach (Source Water) Plan

Plan components:

- Watershed history and characteristics
- Risk analyses (source and treatment)
- Funding opportunities matrix
- Case studies and monitoring technology
- Stakeholder outreach and engagement
- Final plan development (Winter 2023/2024)

Phase 1

Nov 2021 to June 2022

Discovery: Research history of Willamette River Basin, changing conditions and public perceptions

Identification of Water Quality Risks: type, source, location and long term anticipated climate changes

Review of water quality data, analysis, and trends of last 20 years

Identification of data gaps

Development of a list of stakeholders
(government, private entities, and non-profit)
from which to build partnerships

Phase 2

July 2022 to Present

Initial outreach to local/regional stakeholders

Comprehensive review and assessment of current/pending funding opportunities to support Plan

Review and Assessment of Available monitoring technology and watershed protection monitoring software

Further Refinement of risk assessment to better understand greatest potential contamination sources relevant to WIF and treatability

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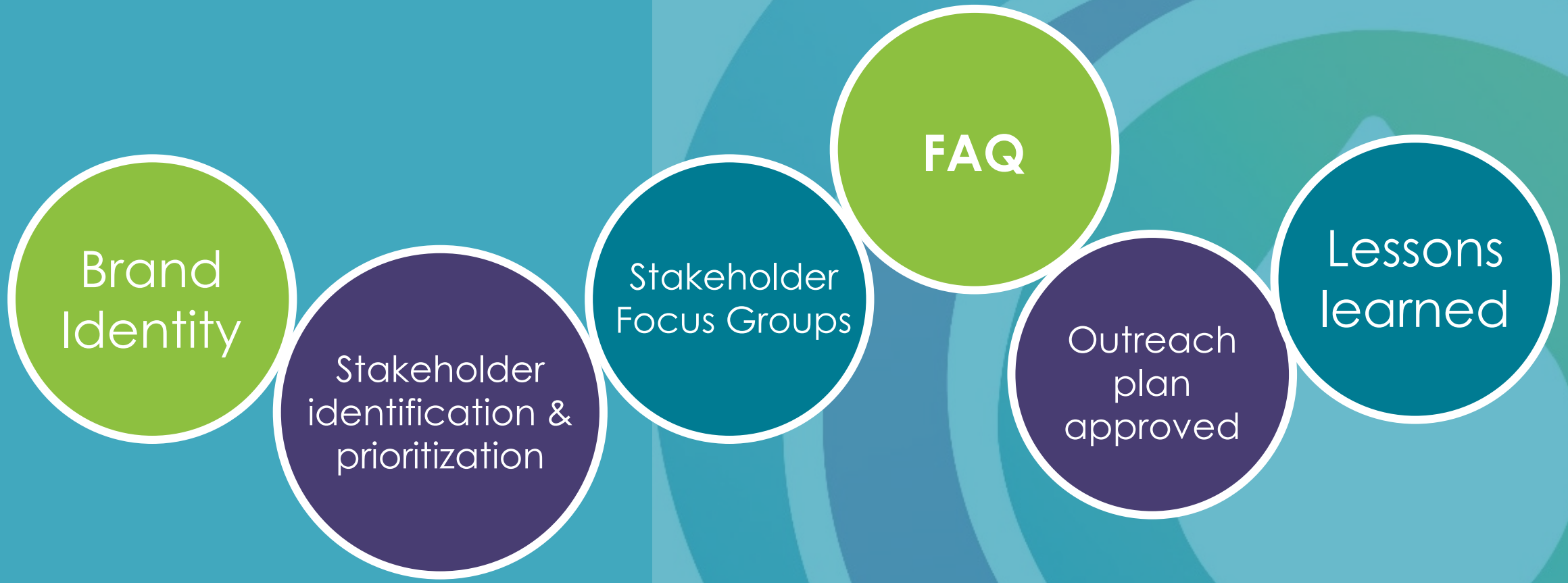
Stakeholder Engagement

Process & Lessons Learned

Achievements in 2023



Graphic Brand

COLOR

WILLAMETTE INTAKE FACILITIES COMMISSION

BLACK

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REVERSE

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WHITE

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PRIMARY

R0 G122 B145	R71 G168 B191	R158 G181 B181	R3 G15 B38
C87 M39 Y34 K5	C68 M16 Y20 K0	C39 M19 Y26 K0	C90 M80 Y54 K71
HEX: #007A91	HEX: #47A8BF	HEX: #9EB5B5	HEX: #030F26

A unique brand elevates your story from the rest!

Why invest in a graphics & brand?

- Consistency
- Raises awareness in the public consciousness
- Awareness → Greater Trust
- Stakeholders are more likely to read and retain information

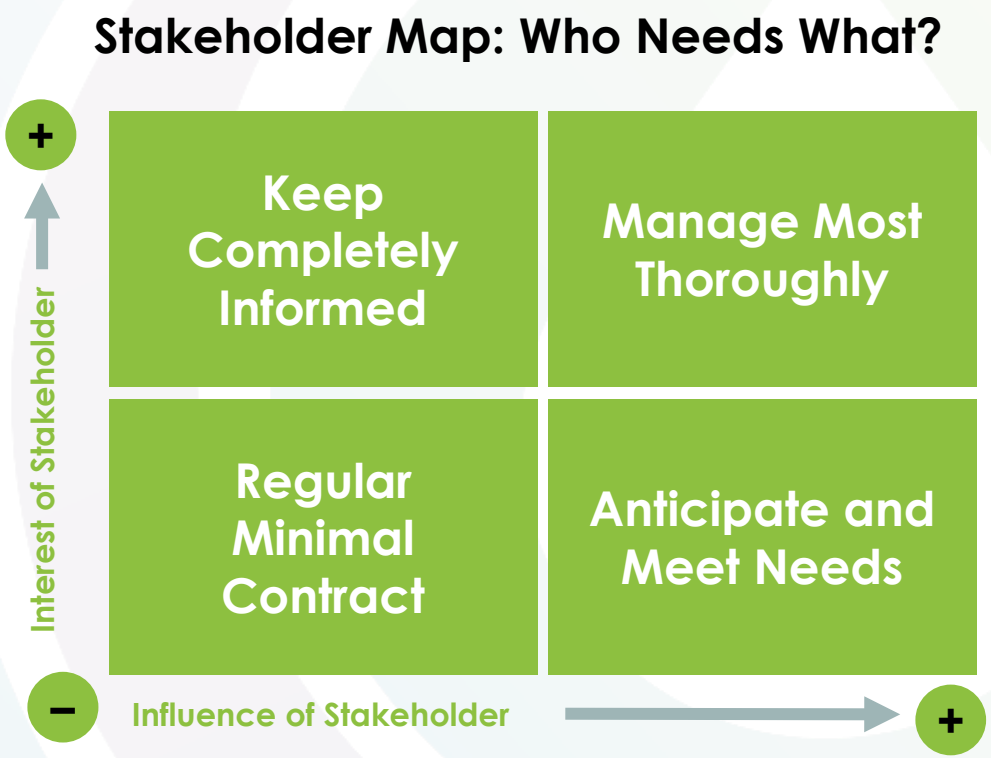
What's included?

- Imagery, color palette, typography, icons, new logo

Stakeholder Identification

Filter stakeholders with your end goal in mind

1. Brainstormed stakeholders in the watershed
2. Identified **criteria** to narrow the stakeholders we'd target
3. Identified stakeholder **interests, challenges, & goals**
4. Determined outreach **type and frequency.**



Stakeholder Identification

- Resulted in six distinct groups
- Internal partners are always included
  - Board members, partner agencies, operations and management staff
- Equally balanced perspective
- Always keeping the end goal and WIF values in mind.

‘Master Messaging’ Framework

What are the Benefits of ‘master messaging’?

- Consistency
- Supports staff in communicating accurately
- Provides a foundation for all education materials (including your website, fliers, etc.).

Focus Groups

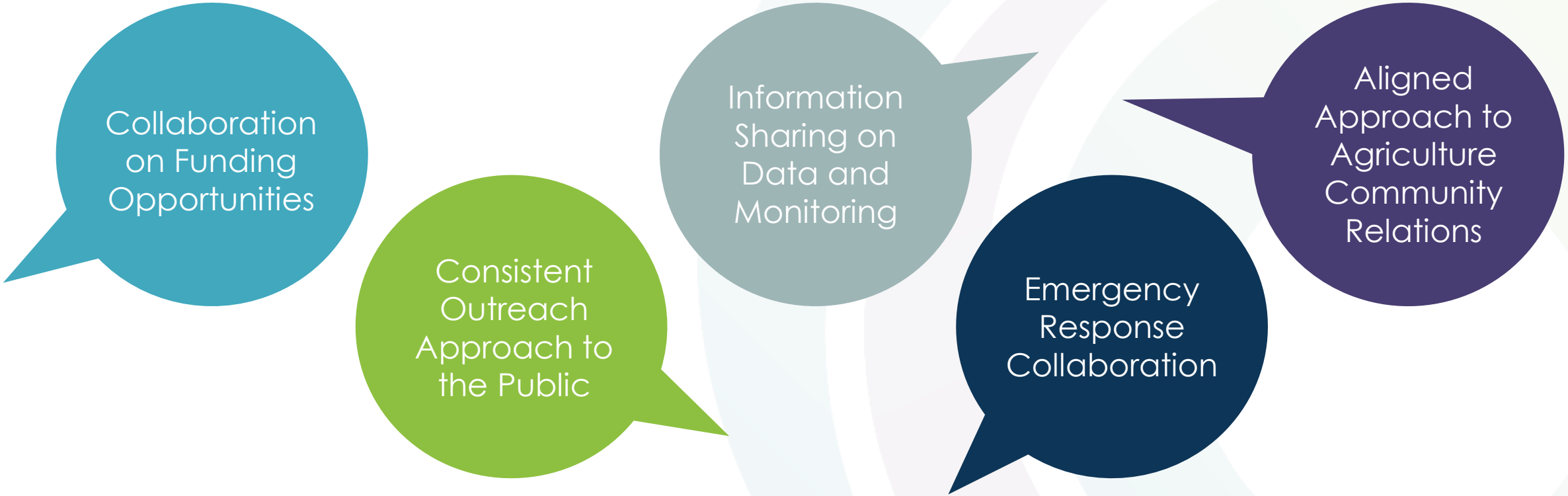
Five 90-minute meetings were held virtually in May and June 2023.

Tribal communities were not able to attend due to limited capacity

We sought to
learn and understand

- Introduce the WIF & its mission
- What are their challenges?
- What are their interests?
- What are their capacities?
- How might we collaborate?

What We Heard: Feedback Themes



Lessons Learned

1. Internal Alignment
2. Design from a Goal
3. Build in Sufficient Time
4. We're Building Relationships

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Risk Analysis & Identification of Priority Areas

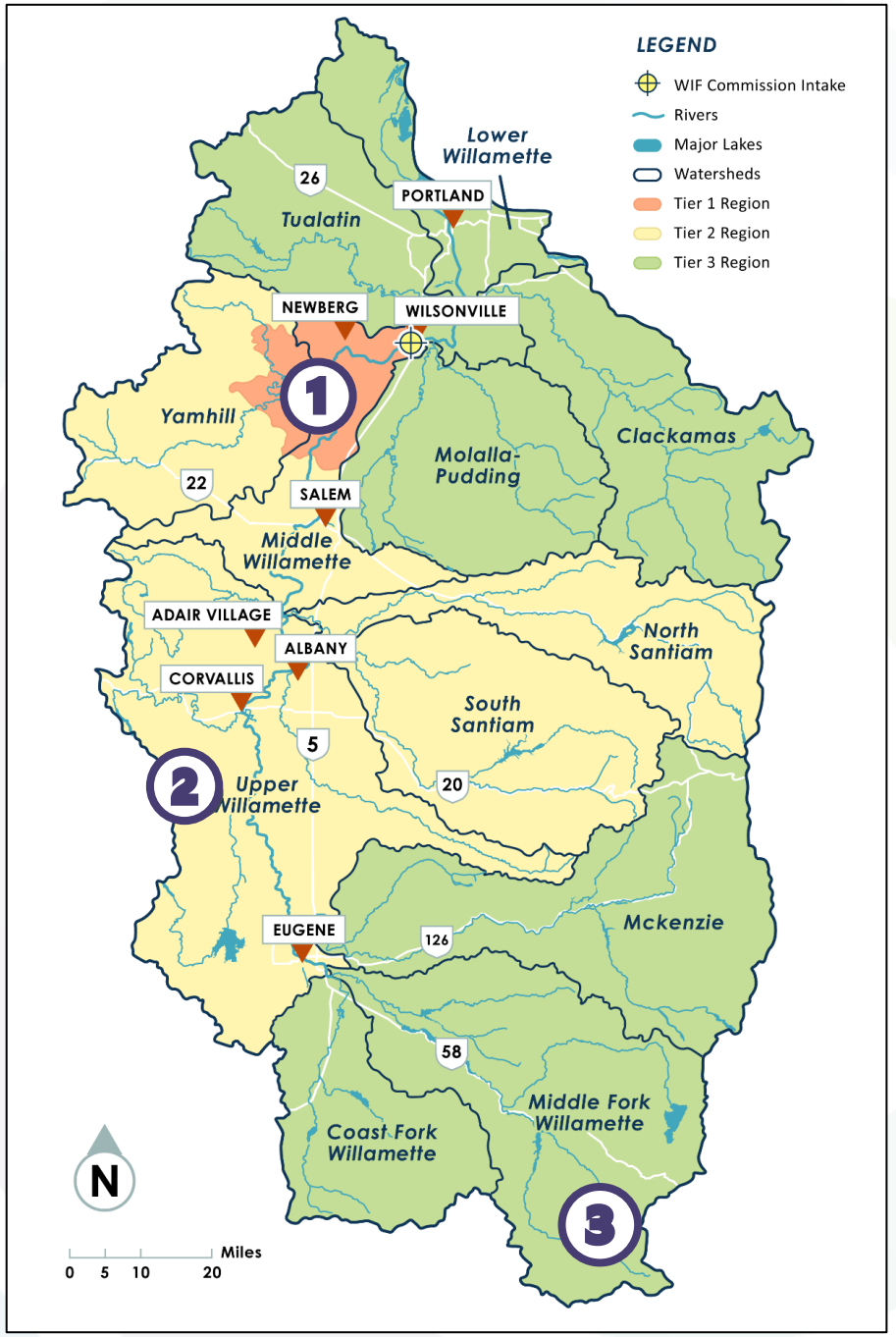
Phase 2

Tiered Analysis Areas

1 Tier 1:
8-hour travel time
(emergency response)

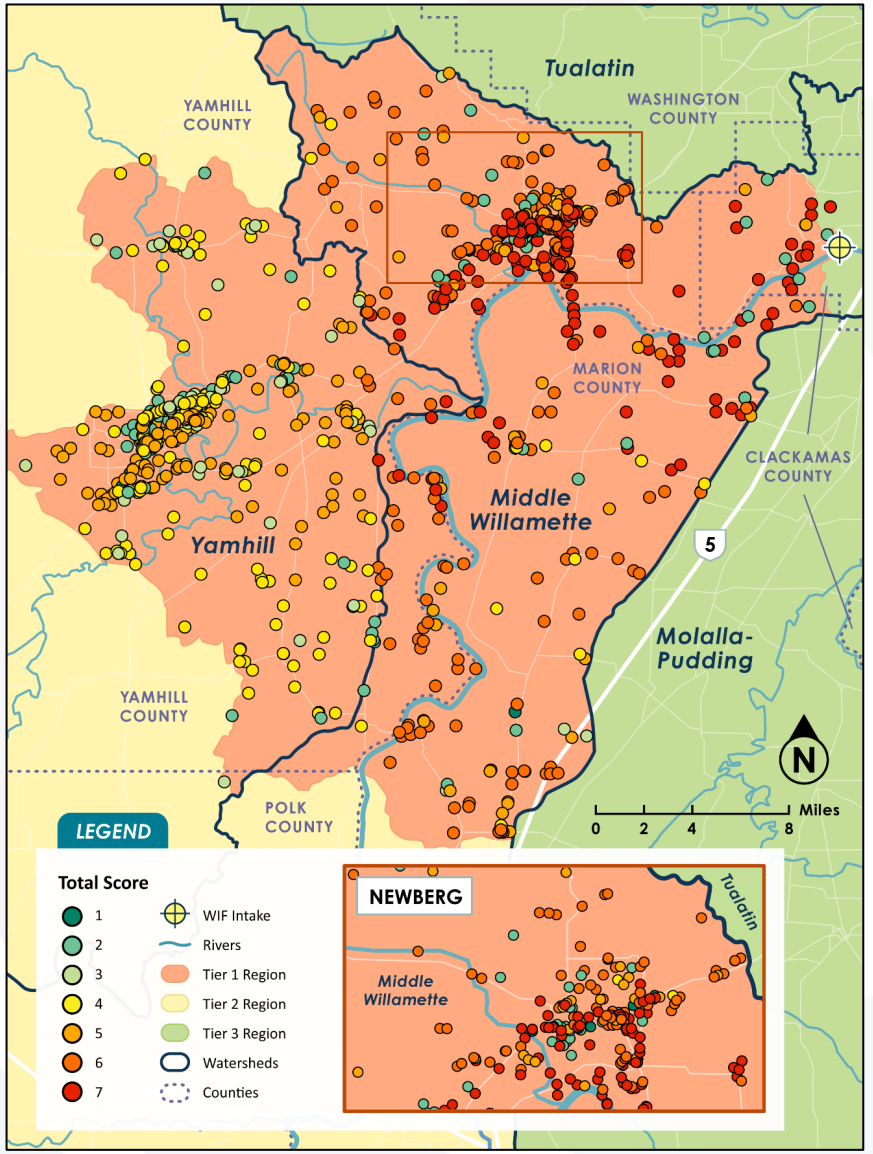
2 Tier 2:
Secondary area for management and water temperature analysis

3 Tier 3:
Full Willamette Basin, including headwaters and downstream stakeholders



Risk Analysis- Begin by leveraging DEQ Database

PCS Feature Category Type	Overall Risk Score						
	1	2	3	4	5	6	7
	Low		Medium			High	
Other PCSs	0	0	2	4	0	5	4
Dry Cleaners	0	0	3	4	0	5	0
Mining Permits	0	0	4	10	7	19	5
Solid Waste Sites	0	0	0	2	2	5	4
CAFOs	0	0	0	8	10	9	20
Domestic Wastewater Treatment	0	0	0	1	3	0	3
Water Quality Permits	0	1	1	31	33	47	33
Boating Access Sites	0	0	0	0	1	3	3
Route Crossings	0	0	0	20	26	34	18
Effluent Outfalls	0	0	0	4	3	1	6
Environmental Cleanup Sites	0	0	0	5	13	7	7
Hazardous Material Generator	0	0	0	25	33	13	41
Hazardous Substance Information System	0	14	68	68	67	48	22
Aboveground Storage Tanks	1	2	23	21	22	22	10
Leaking Underground Storage Tanks	0	106	1	0	0	0	0
Underground Storage Tanks	27	0	0	0	0	0	0
Total	28	123	102	203	220	218	176



Risk Assessment- Framework and Data Gaps

Risk Assessment Framework

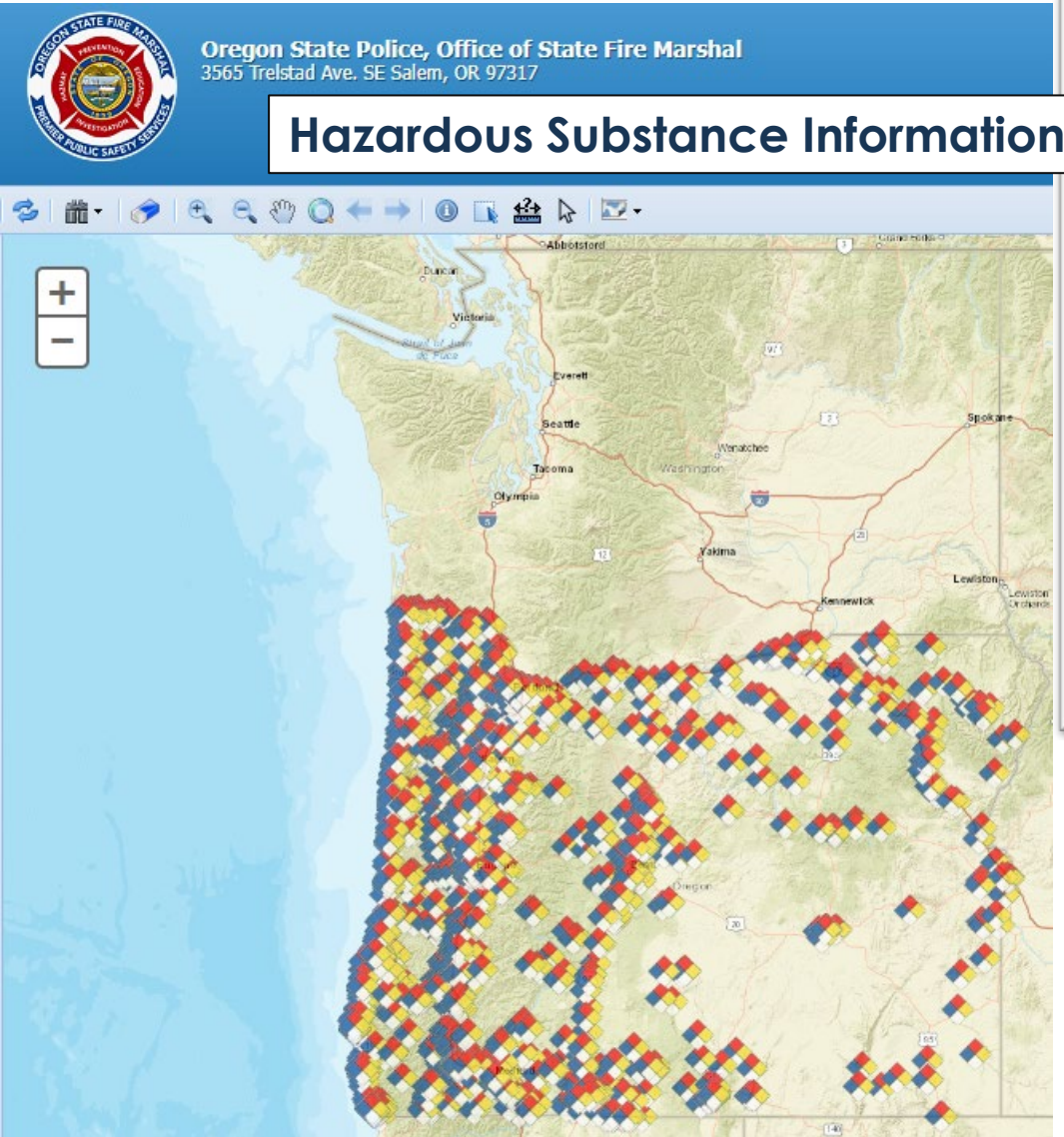
Activity	Inputs	Outputs
Compile PCS Inventory	PCS Databases and Local Outreach	Complete PCS Inventory PCS Location Map
Characterize PCS Movement	GIS Analysis	Travel Time Assessment
	Fill Quantity Data Gaps	Plume Duration
	Dye Tracer Studies and Hydraulic Models	Peak Concentration at Intake
Characterize PCS Toxicity	State and National Toxicity Data Fill Chemical Type Data Gaps	Compare Peak Concentration to Toxicity Thresholds
Evaluate PCS Risk	Travel Time Assessment	Travel Time Sub-score
	Plume Duration	Plume Duration Sub-score
	Peak Concentration Operational Considerations	Feature Potency Sub-score*

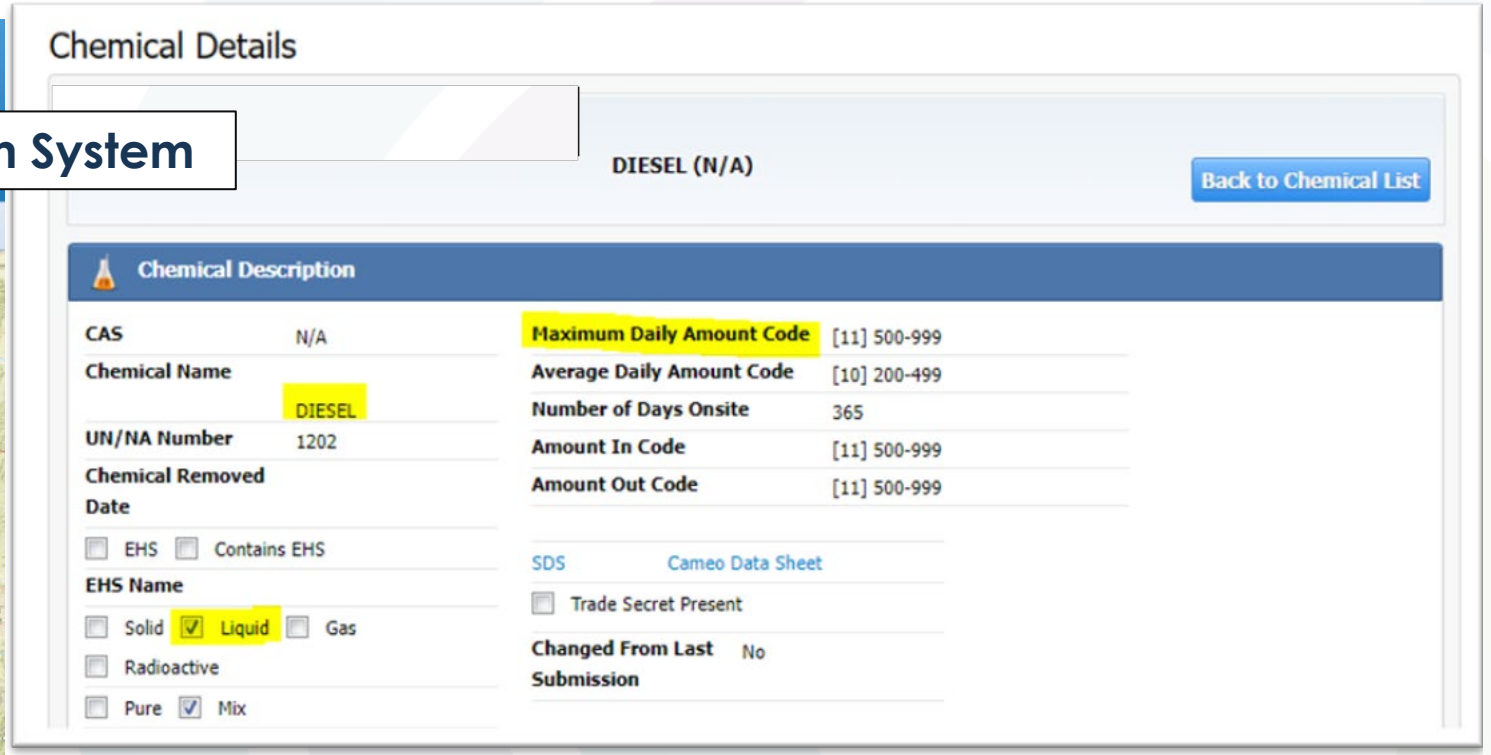
LEGEND

- Components completed in Phase 1
- Components completed in Phase 2
- Components removed from framework considering system redundancies and intended use of risk analysis

** Where data gaps exist, ODEQ Qualitative Risk Categories were substituted*

Risk Assessment- Evaluate Potential Release Quantity and COCs





Risk Assessment- Evaluate Potential Release Quantity and COCs

Major Route Stream Crossings and Bridges

Some Locations in DEQ Database do not appear to be a meaningful concern. *Reevaluated each location*

ASSUMPTIONS

Potential Release Quantity

- *11,600 gallons, typical of large tanker truck*

Likely Contaminant of Concern

- *Petroleum / Gasoline*

Risk Assessment- Evaluate Determination of Toxicity

Example: Gasoline Tank

COC: Gasoline, 1000 gallons
Density: 2.83 lb/gal
Surrogate Chemical for Toxicity: Benzene

Database in development to characterize toxicity of COCs

- EPA Cancer/Noncancer Risk Screening Levels
- Oregon Maximum Contaminant Levels
- Drinking Water Standards
- Other Limits

For Mixtures, Most Toxic Chemical Present in Mixture Used as Surrogate for Risk Analysis

Risk Assessment- Evaluate Dispersion Evaluation

Determine potential concentration at the intake. Depends on:

- Dispersion characteristics *(obtained from USGS study)*
- Potential Mass of COC released
- Travel time
- River flow *(evaluated range of flow conditions)*

$$C_p = 12100 * T_{intake}^{-0.79} * M/Q$$

C_p:	Peak concentration at WIF of COC released from upstream PCS site
M:	Mass of COC released (lb)
Q:	River discharge at PCS site
T_{intake}:	Travel time from PCS site to WIF

$$C_{up} = a * T_T^b$$

C_{up}:	Unit peak concentration of dye in $[(\frac{\mu g}{L})/lb] * (ft^3/s)$
T_T:	Time elapsed after dye injections in (hr)
a:	Unit-peak concentration at 1-hour elapsed time, in $[(\mu g/L)/lb](ft3\ /s$
b:	Slope of the unit-peak concentration curve

Risk Assessment- Evaluate Updating Ranking of Risks

For COCs With Toxicity and Quantity Data

- Compute peak concentration at intake
- Compare this concentration to most strict standard of consumption (toxicity threshold)

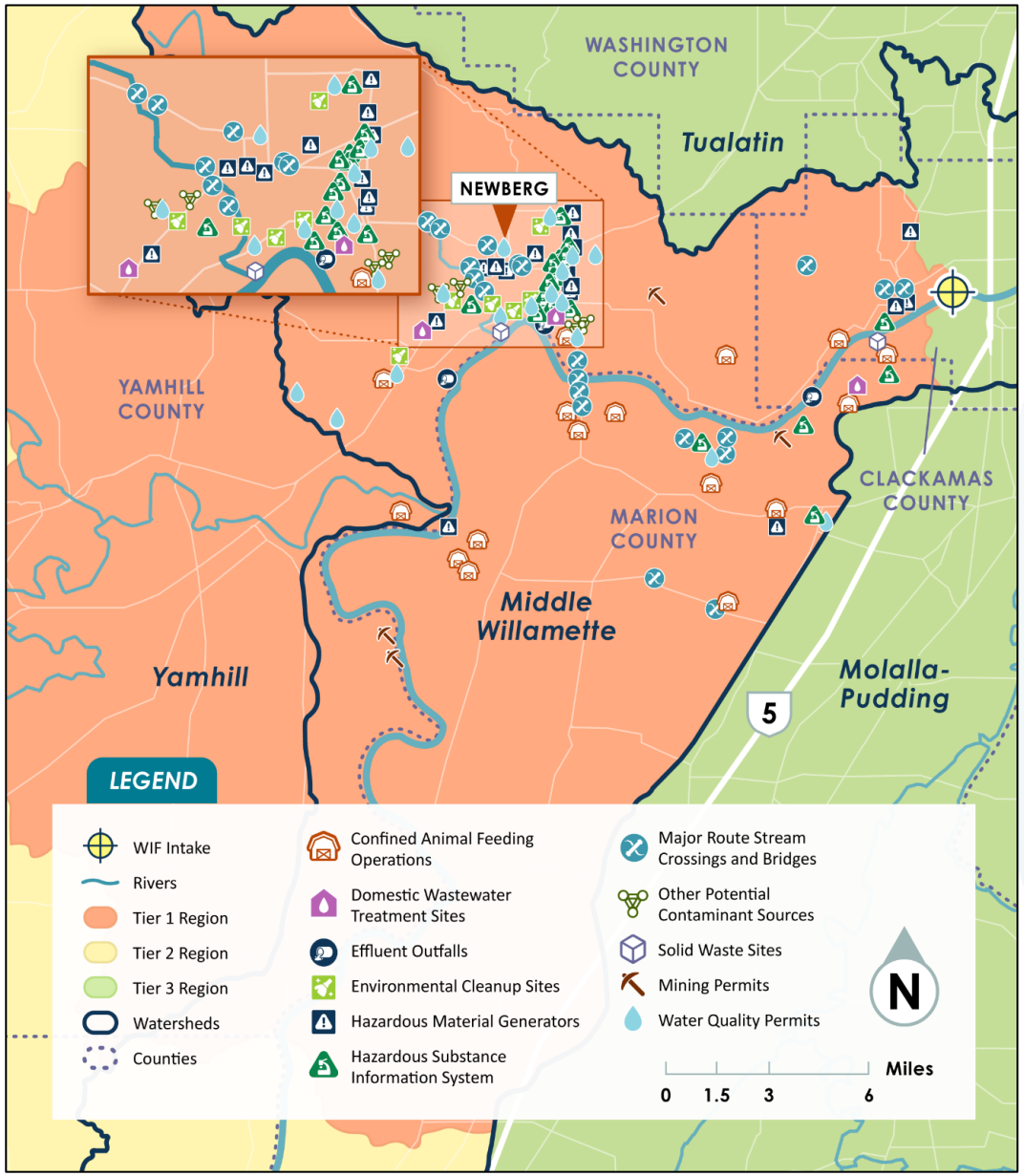
$$\text{Feature Potency Ratio (FPR)} = \frac{\text{Peak Concentration at Intake } \left(\frac{\mu g}{L}\right)}{\text{Toxicity Threshold } \left(\frac{\mu g}{L}\right)}$$

EXAMPLE: GASOLINE TANK

- *Peak Concentration at Intake* $= 188\ \frac{\mu g}{L}$
- *Toxicity Threshold, Benzene* $= 33\ \frac{\mu g}{L}$ *(EPA Noncancer Risk Screening Level)*

"Feature Potency Ratio"=5.7

Normalized Score: FPR
High Risk (4): ≥100
Medium Risk (3): 10<FPR<100
Low Risk (2): 1<FPR≤10
Minimal Risk (1): ≤1



Risk Assessment- Evaluate Updating Ranking of Risks

Initial screening- 1,072 database entries

Following Risk Assessment

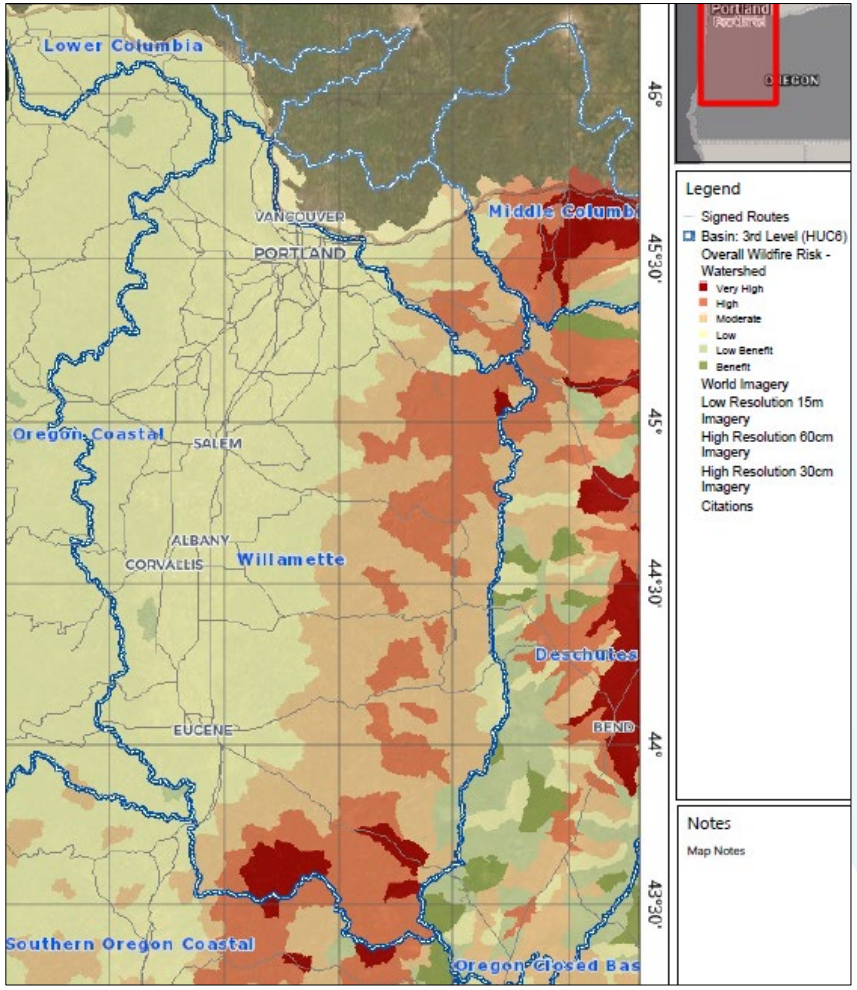
At low flow, 144 sites in highest risk category

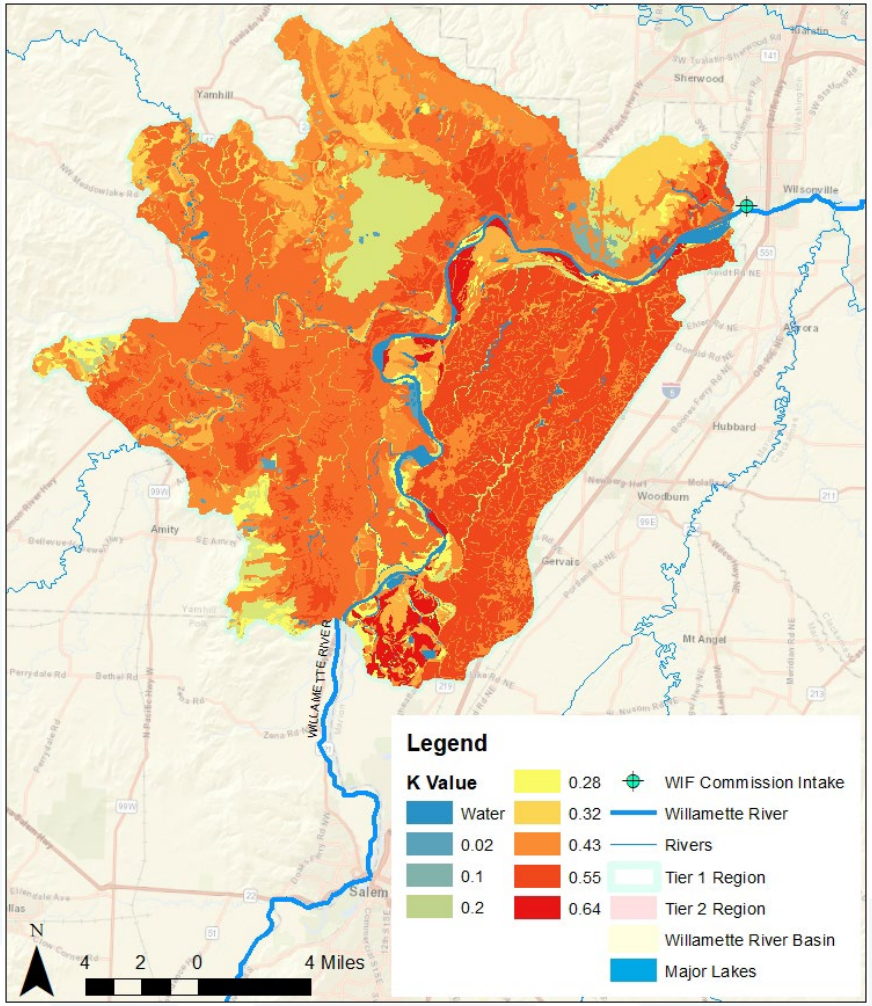
Main PCS Site Categories

- Hazardous Substance Information System
- Major Route Crossings and Bridges
- CAFOs
- Water Quality Permits

Risk Assessment- Additional Considerations

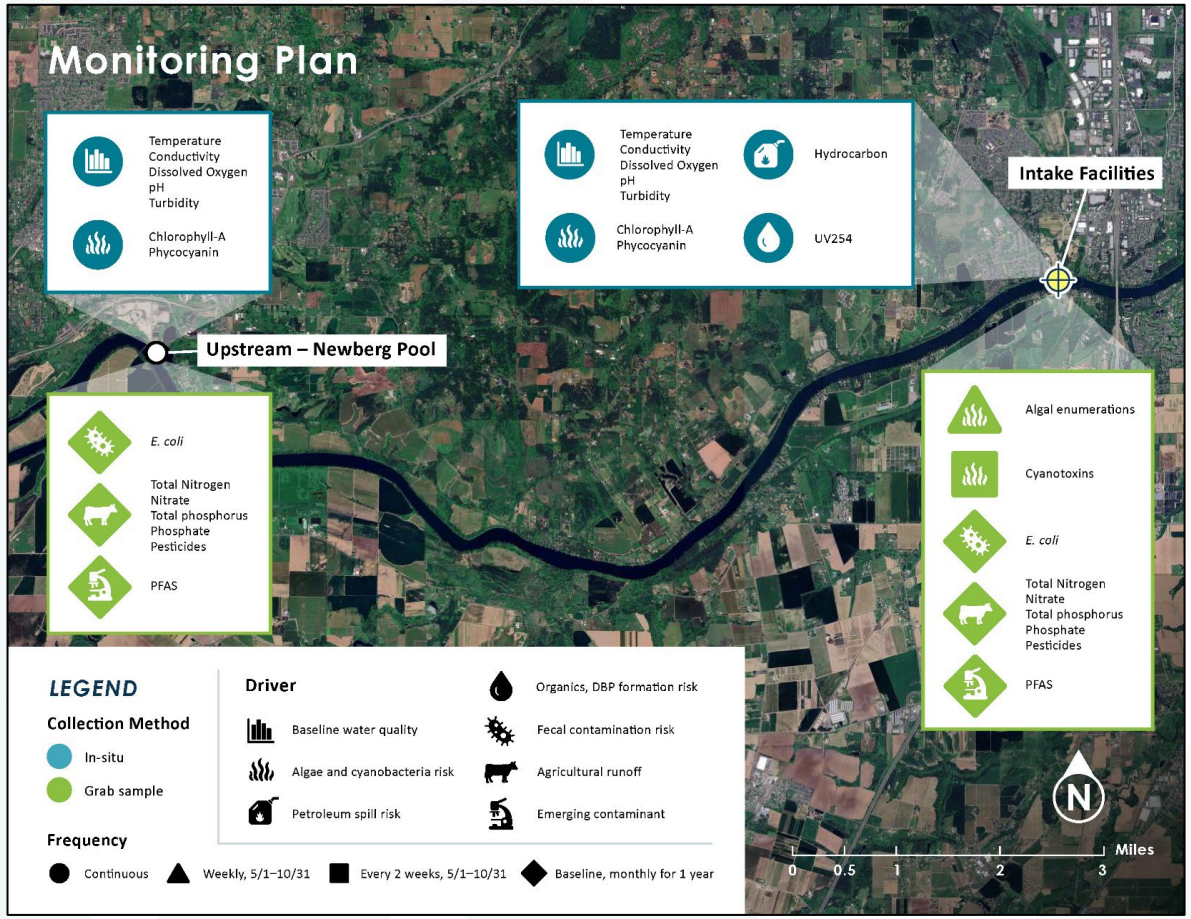
Landslides and Erosion, Wildfire and Extreme Weather, Climate Change





Monitoring Priorities

Parameter	Location	Frequency
Temperature	Intake, upstream	Continuous, 15 minute intervals
Conductivity	Intake, upstream	
DO	Intake, upstream	
pH	Intake, upstream	
Turbidity	Intake, upstream	
Chlorophyll-a	Intake, upstream	
Phycocyanin	Intake, upstream	
Hydrocarbon	Intake	
UV254	Intake	
Algal enumerations	Intake	Weekly from May to October 31
Cyanotoxins	Intake	Every two weeks from May to October 31
PFAS	Intake, upstream	Baseline sampling, monthly for one year and following storm events
Pesticides	Intake, upstream	
E. coli	Intake, upstream	
Total nitrogen	Intake, upstream	
Nitrate	Intake, upstream	
Total phosphorus	Intake, upstream	
Phosphate	Intake, upstream	



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Next Steps

Next Steps

- Watershed Protection, Monitoring, and Outreach Plan for the Willamette River Watershed was finalized March 2024
- WIF Commission Adoption was April 22, 2024

Near-term Actions:

- Monitoring at intake facility
- Exploration of monitoring location in Willamette River upstream of intake in partnership with USGS
- Outreach focusing on highest priority water quality risks identified in Plan
- Follow up stakeholder meetings

Lessons Learned

1. Build project timeline up front with several engagement opportunities
2. Engage your elected officials at each stage
3. Recognize partners' goals, respect differences, and collaborate
4. Develop a multi-faceted approach on a large-scale project
5. Consider the sustainability of the Plan over decades

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WILSONVILLE OREGON
Hillsboro OREGON
Beaverton OREGON
City of Sherwood Oregon
TIGARD

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Questions?

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Thank you!