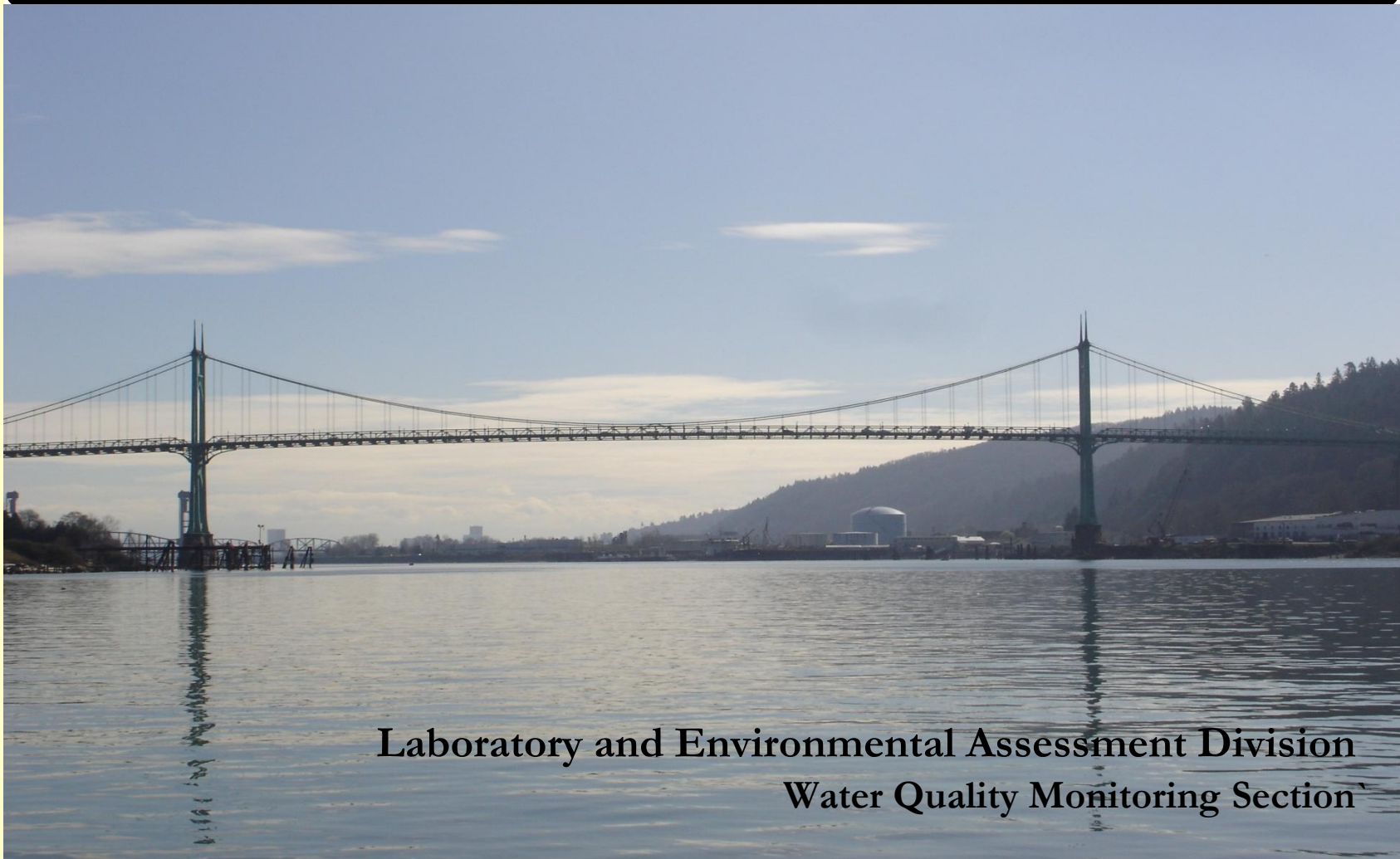
Oregon's Toxics Monitoring Program: A Year-One Update

Pesticide Analytical Response Center Meeting- September 16th, 2009



Laboratory and Environmental Assessment Division
Water Quality Monitoring Section`

Topics

Today's Presentation

- Program Objectives
- Programmatic Development
- Approach
- Analytical findings
- Linkages to other programs
- Communication / Outreach
- Next Steps

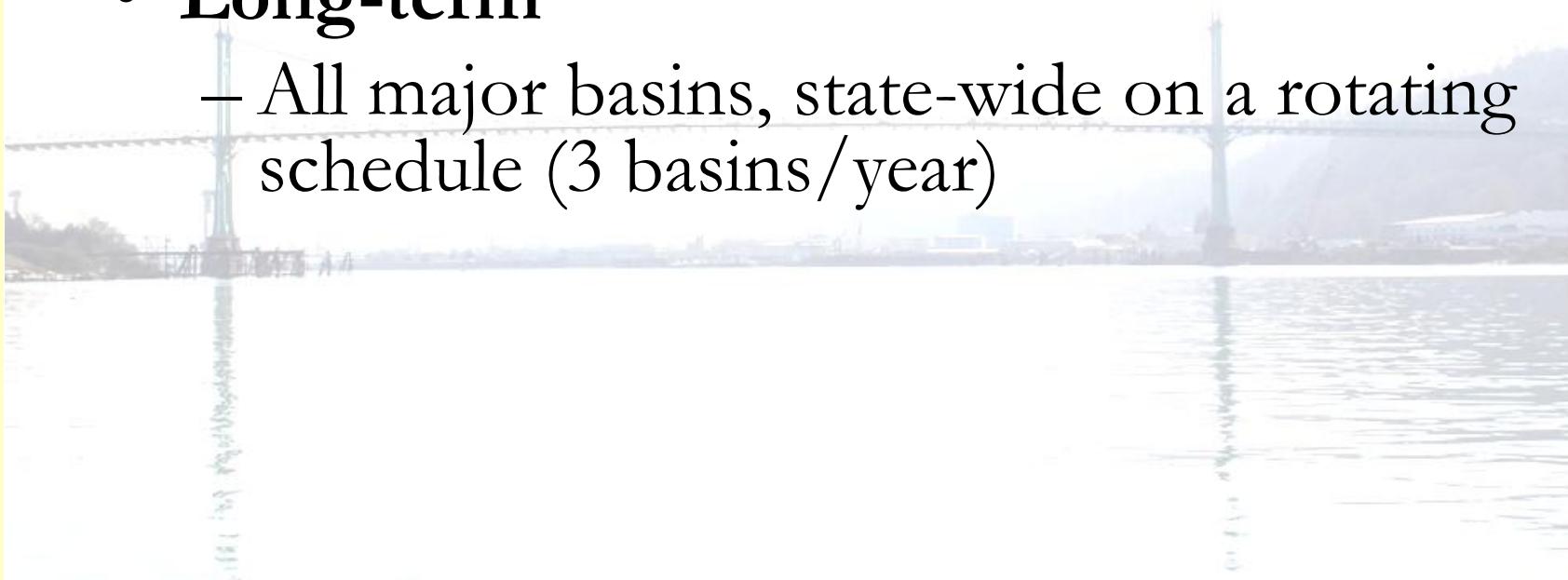
Program Objectives

- Establish state-wide, watershed-based toxic pollutant monitoring and evaluation program
- Document environmental concentrations of toxic pollutants in Oregon waters and biota and interpret findings relevant to established criteria
- ***Support pollutant reduction strategies*** and assess progress towards meeting established criteria

Programmatic Development

Program Spatial Scope - Initial / Long Term

- **Initial 3 years**
  - Focus on Willamette River Basin and associated tributaries
- **Long-term**
  - All major basins, state-wide on a rotating schedule (3 basins/year)



Programmatic Development *(Continued)*

2008 Programmatic Milestones

Administrative

- Hired program staff

Plan Development / Stakeholder Review

- Synthesized existing Willamette River Basin contaminant information
- Drafted initial plan, circulated for review
- Revised plan and implemented monitoring

Capital Investments / Capability Enhancements

- Selected/acquired "state-of-the-art" High Resolution Gas Chromatograph/High Resolution Mass Spectrometer)

Approach

Toxic pollutants and media of interest

Toxic pollutants which are likely to:

- be present in Oregon's surface waters
- pose the greatest threat to human health and the environment

Environmental media

• **Water column and fish tissue**	**(2008)**
• Aquatic invertebrates – i.e., crayfish	*(Future)*
• Sediment	*(Future)*
• Passive integrative samplers	*(Future)*

Approach
(Continued)

Rationale for selecting 2008 target analytes

- Analytical targets identified *prior* to establishment of **SB 737 Workgroup**
- Based largely on DEQ's **Drinking Water Protection Program** analytical suite
- Includes many pesticides measured by **Pesticide Stewardship Partnership**
- *Future* analytical targets to include toxic persistent and bioaccumulative pollutants identified by **SB 737 Workgroup** and **Toxics Reduction Strategy**

Approach
(Continued)

Initial (2008) Target Analytes

Water

- PAHs
- PBDEs
- PCBs
- Metals
- Current-use & Legacy Pesticides
- Industrial Materials & Solvents
- "Contaminants of Emerging Concern"
  - pharmaceuticals, personal care products, plasticizers

Fish

- Dioxins/ Furans
- PCB Congeners
- Mercury
- OC Pesticides
- PBDE Congeners

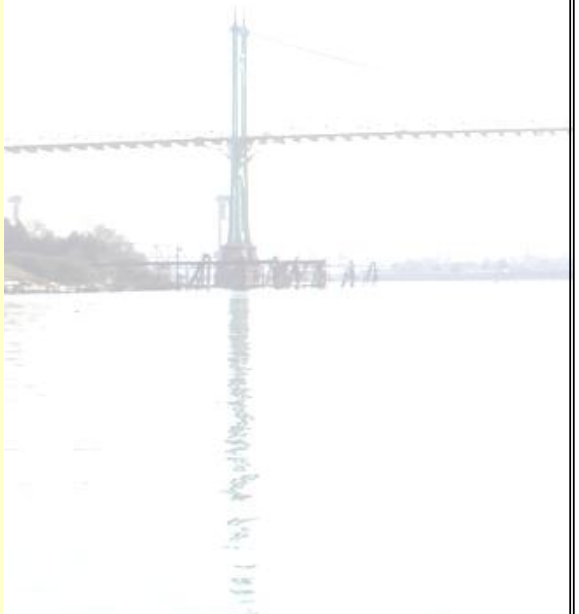
Approach *(Continued)*

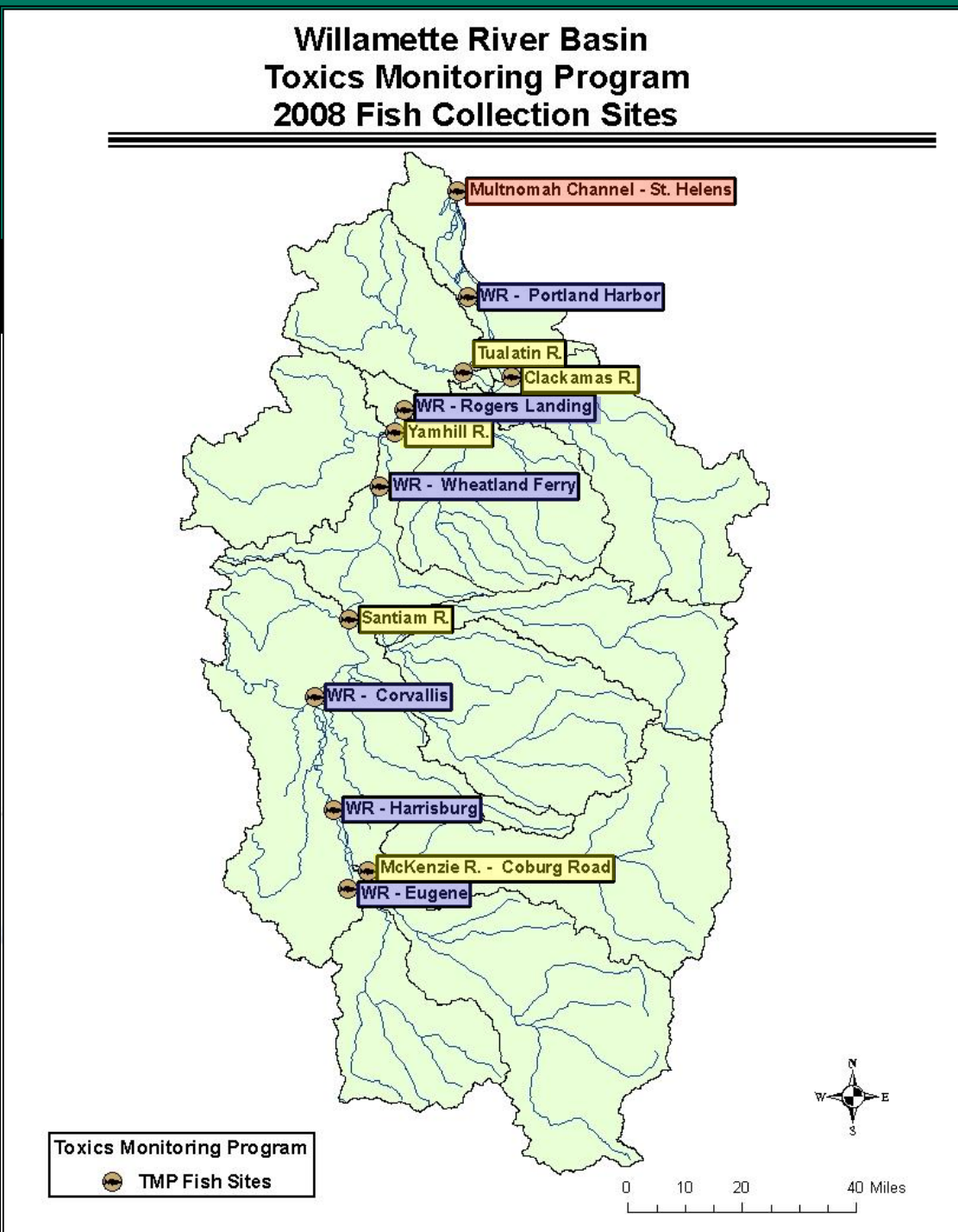
Fish Collection Reaches

Multnomah Channel (1)

6 Mainstem (6)

Major Tributaries (5)

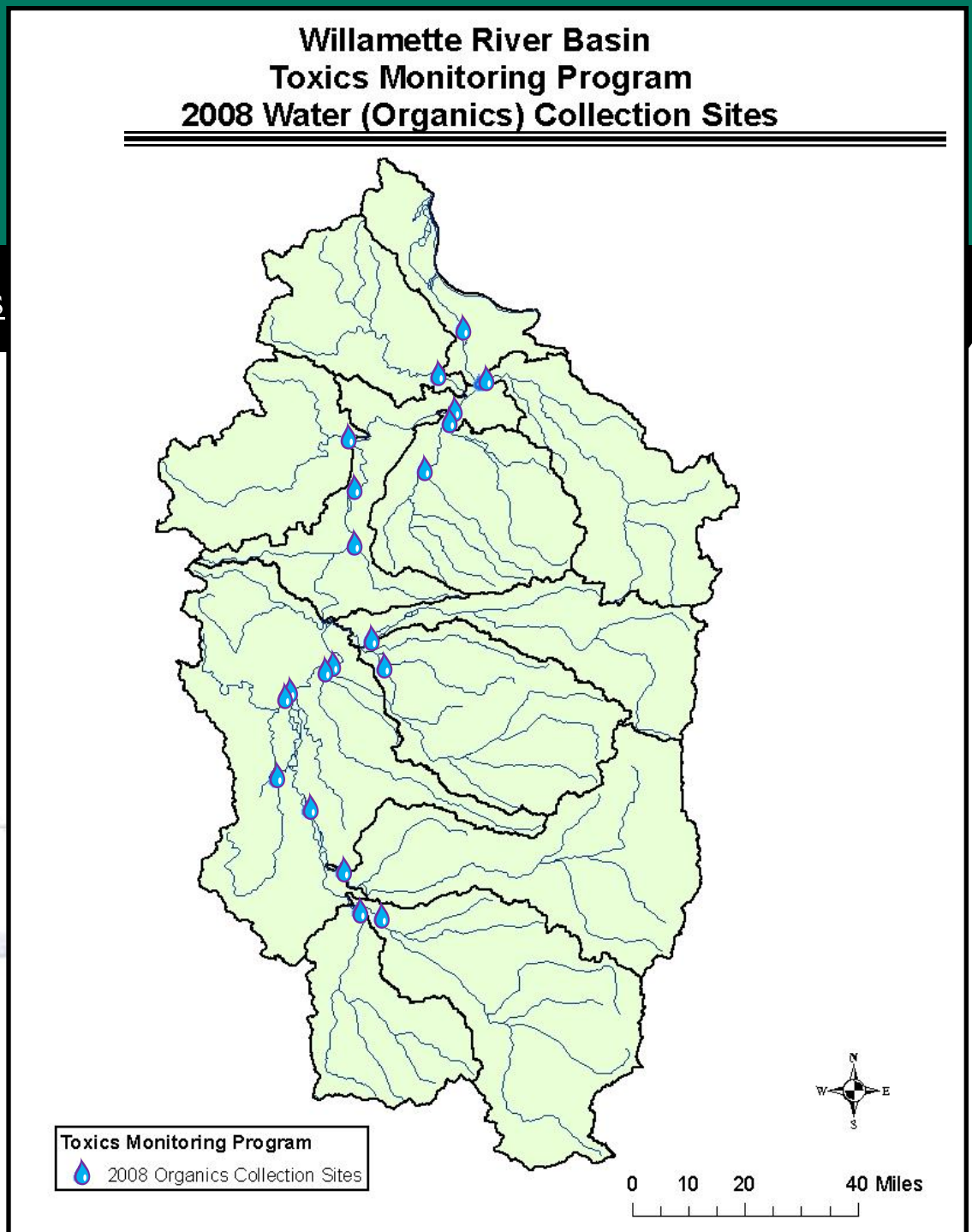




Approach *(Continued)*

Water Collection–organics

- **7 Mainstem**
  - Hawthorn Bridge
  - Canby Ferry
  - Wheatland Ferry
  - Salem
  - Albany
  - Corvallis
  - Harrisburg
- **13 Tributaries**
  - Clackamas
  - Tualatin
  - Molalla
  - Pudding
  - Yamhill
  - North Santiam
  - South Santiam
  - Calapooia
  - Mary's
  - Long Tom
  - McKenzie
  - Coast Fork
  - Middle Fork



Approach *(Continued)*

Water Collection-metals

Columbia River
Upstream of Willamette

Columbia Slough
Landfill Road

Swan Island Channel

Willamette River
Hawthorne Brdg Portland
SP&S Brdg Portland
Salem
Springfield
Canby Ferry
Wheatland Ferry
Albany
Corvallis
Harrisburg

Tualatin River
Near Elsner Road
Hwy 210
Rood Road
Boones Ferry Road
Fanno Creek
Beaverton Creek

Clackamas River
Mciver Park
Memaloose Road
High Rocks

Johnson Creek
Portland

Pudding River
Woodburn

Yamhill River
Dayton

North Yamhill
Poverty Bend Road

South Yamhill River
Mcminnville

North Santiam River
Gates School Road Brdg
Coopers Ridge Road Brdg
Greens Bridge

South Santiam River
Crabtree

Mary's River
Corvallis

Molalla River
Canby

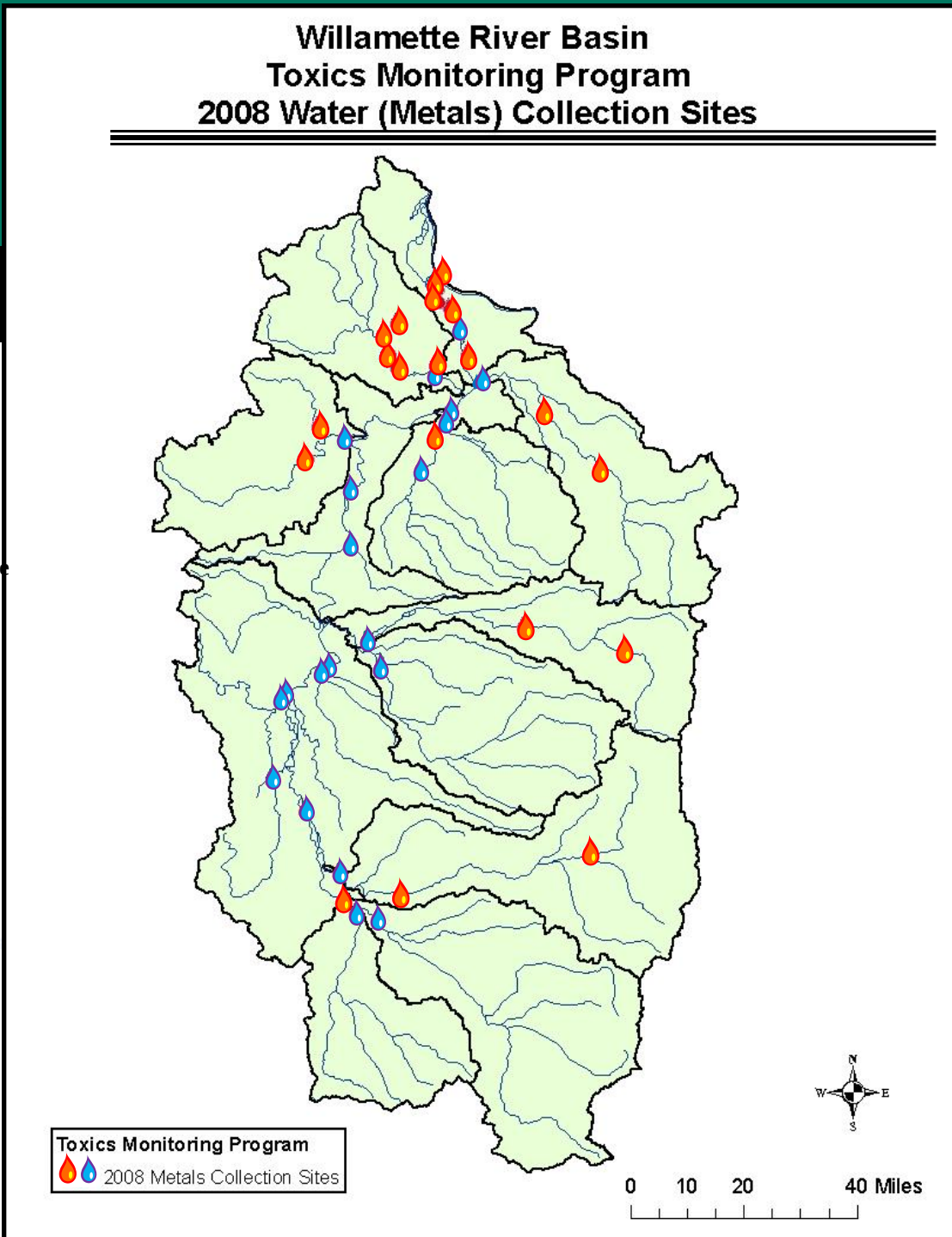
Long Tom River
Monroe

Calapooia River
Queen Road

Middle Fork Willamette
Jasper Bridge

McKenzie River
Hendricks Brdg
Coburg Road
McKenzie Brdg

Coast Fork Willamette
Mt. Pisgah Park



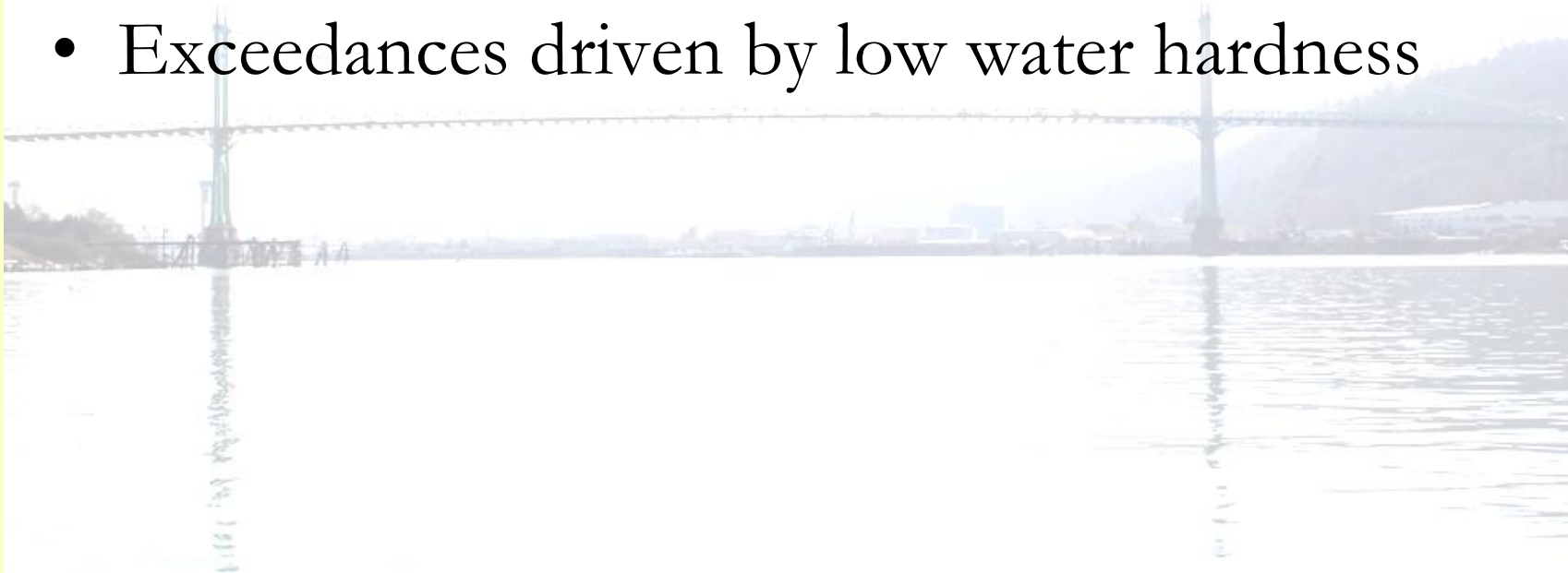
2008 Accomplishments

- Water samples collected for determination of organic pollutant concentrations at 20 mainstem and tributary locations
- Re-initiated metals analyses at 40 ambient water quality sites in Willamette Basin
- Fish sampled at 11 mainstem and tributaries reaches (smallmouth bass and northern pikeminnow)
- Mercury analysis of fish tissue completed
- Analytical results for water sampling completed
- Organic analytical results for fish tissue completed

Summary Findings: Waterborne Metals

2008 Findings (April – December)

- 40 sites sampled 5 to 9 times each
- Water quality aquatic life criteria exceedances documented for **copper** and **lead** only
- Exceedances driven by low water hardness



Summary Findings: Waterborne Organics

2008 Findings (April – December)

- 20 sites sampled twice
- No water quality criteria exceedances documented
- Herbicides were most frequently detected pollutant class; insecticides rarely detected
- Sewage indicators found at nearly every site
- Multiple, low-level detects for "emerging contaminants"

Summary Findings: Waterborne Organics (*Continued*)

Herbicide detections and concentration in surface water

Herbicide	EPA Priority Pollutant	Oregon Table 20 / 33	SB 737	MRL (ng/L)	Detection Range (Low-Flow)	Number of Detects	Detection Range (Rising-Flow)	Number of Detects
Diuron	No	No	(3)	2.0	< 2.0 - 255	10	< 2.0 - 103	15
Atrazine	No	No	No	2.0	< 2.0 - 8.4	10	< 2.0 - 7.8	14
Propiconazole	No	No	No	10.0	< 10 – 21	3	< 10 – 23	7
Simazine	No	No	No	2.0	< 2.0 - 17.8	2	< 2.0 - 12.3	8
Metolachlor	No	No	(3)	5.0	<5.0 - 41.6	2	< 5 – 23	9
Prometon	No	No	No	2.0	<2.0 - 2.8	1	No Detc.	0
Metribuzin	No	No	No	2.0	No Detc	0	< 2.0 - 10.9	8
Terbutylazine	No	No	No	1.0	< 1.0 - 3.5	3	No Detc	0

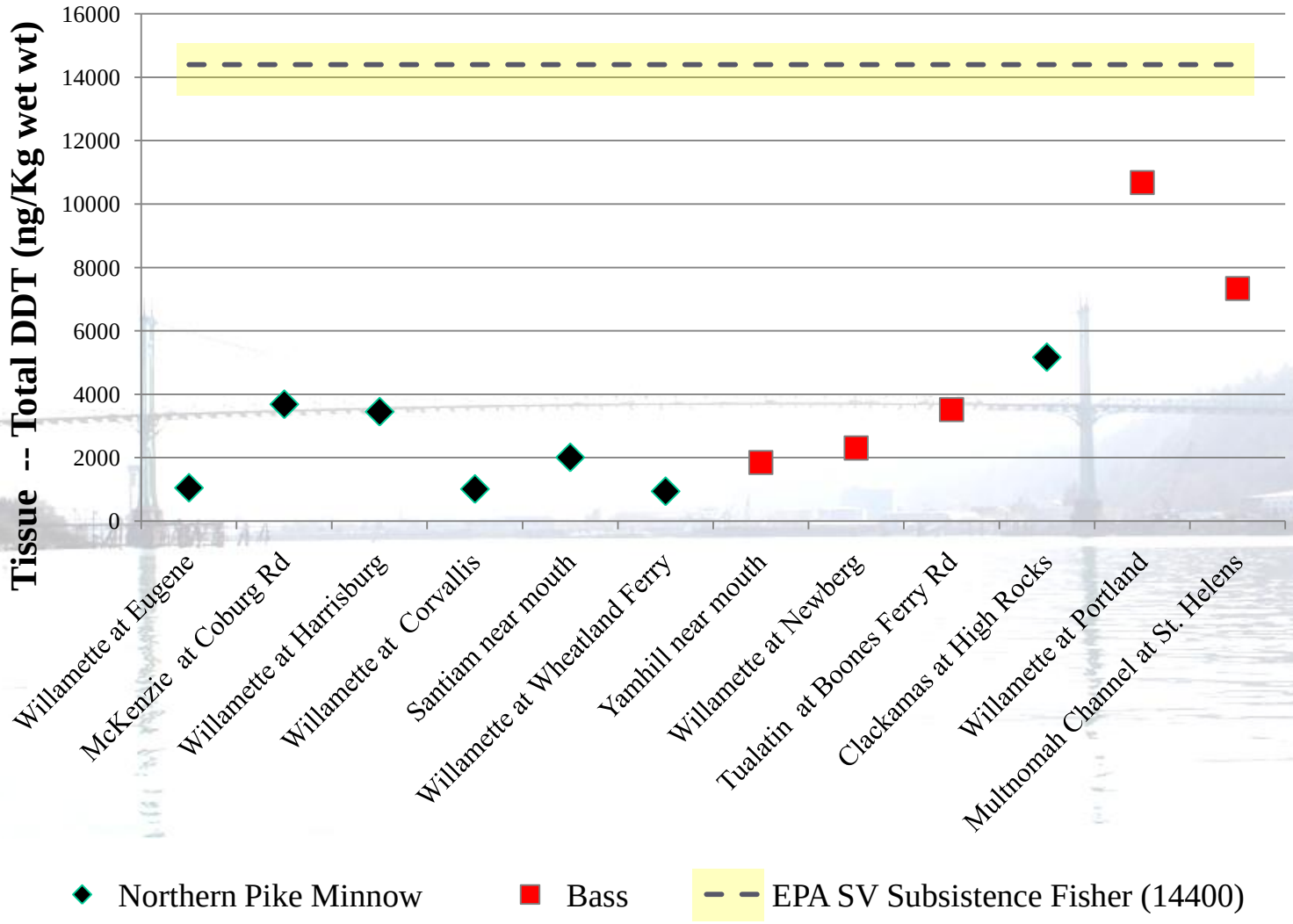
Summary Findings: Waterborne Organics (*Continued*)

"Pesticides of Interest" or "Pesticides of Concern" in water - 2008.

Pesticide of Interest	MRL	Low Flow				Rising Flow			
		Minimum Value	Maximum Value	Average	**Detects > MRL**	Minimum Value	Maximum Value	Average	**Detects > MRL**
2,4-D	0.1 µg/L	0.1	0.1	0.1	**0**	0.1	0.11	0.1	**1**
Triclopyr	0.3 µg/L	0.1	0.3	0.29	**0**	0.29	0.32	0.30	**5**
Diuron	2 ηg/L	<2	255		**10**	<2	103		**15**
Trifluralin	20 ng/L	20	20	20	**0**	20	20	20	**0**
Carbaryl	2.5 ng/L	2.5	3.9	2.57	**1**	2.3	16.8	4.0	**11**
Esfenvalerate	1 ηg/L	--	--	--	**--**	--	--	--	**--**
Imidacloprid	10 ηg/L	10	30	11	**1**	9	20	13.5	**7**
Chlorothalonil	20 ηg/L	25	25	25	**0**	20	20	20	**0**
Pesticide of Concern									
Atrazine	2 ηg/L	2	8.4	3.11	**5**	2	10.4	3.875	**11**
Simazine	2 ηg/L	2	17.8	3	**2**	2	12.3	3.2	**9**
Diazinon	20 ηg/L	--	--	--	**--**	--	--	--	**--**
Ethoprop	20 ηg/L	--	--	--	**--**	--	--	--	**--**
Endosulfan	20 ηg/L	20	20	20	**0**	20	20	20	**0**
Azinphos-methyl	10 ηg/L	--	--	--	**--**	--	--	--	**--**
Chlorpyrifos	20 ng/l	--	--	--	**--**	--	--	--	**--**

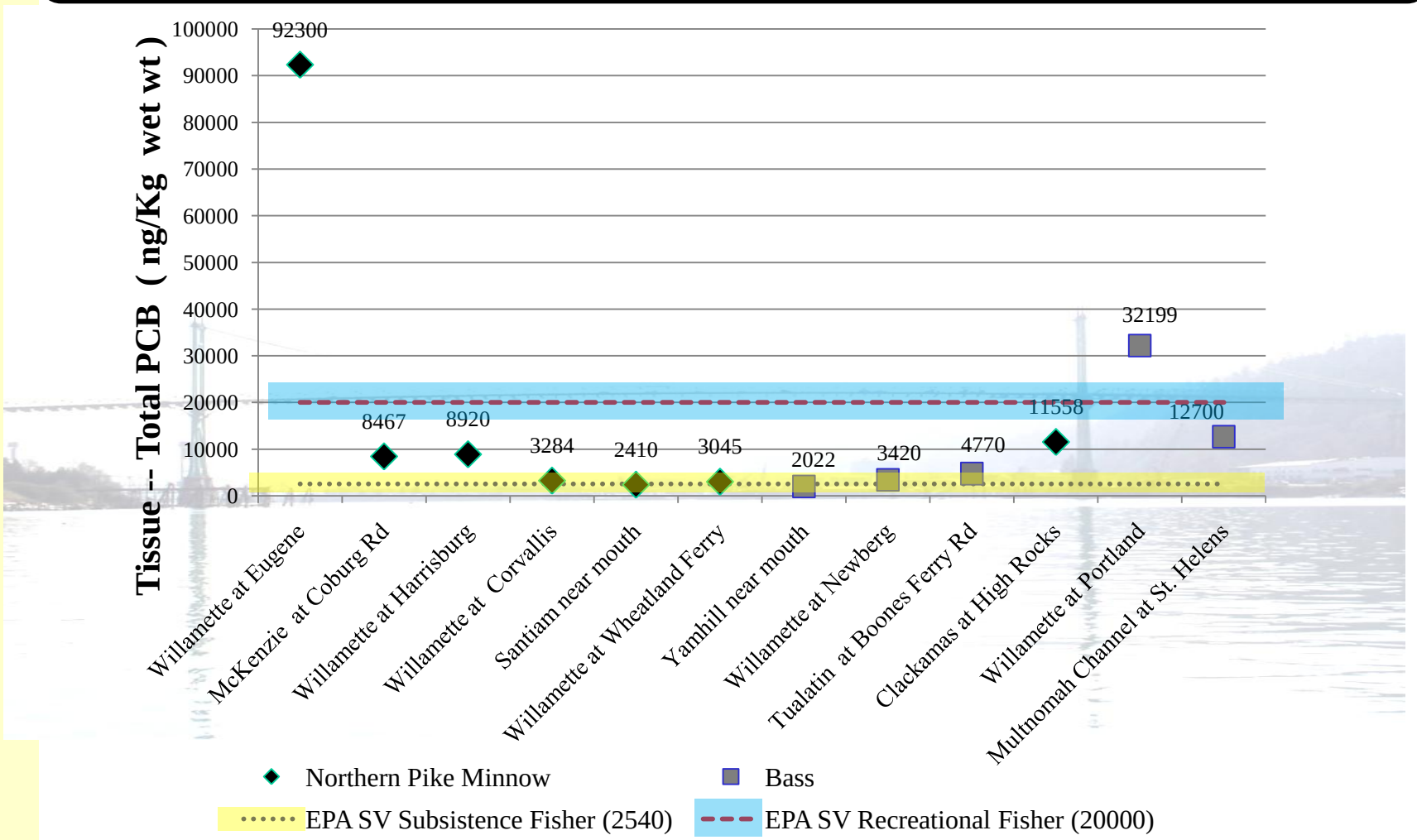
Summary Findings: Fish Tissue

Total DDT



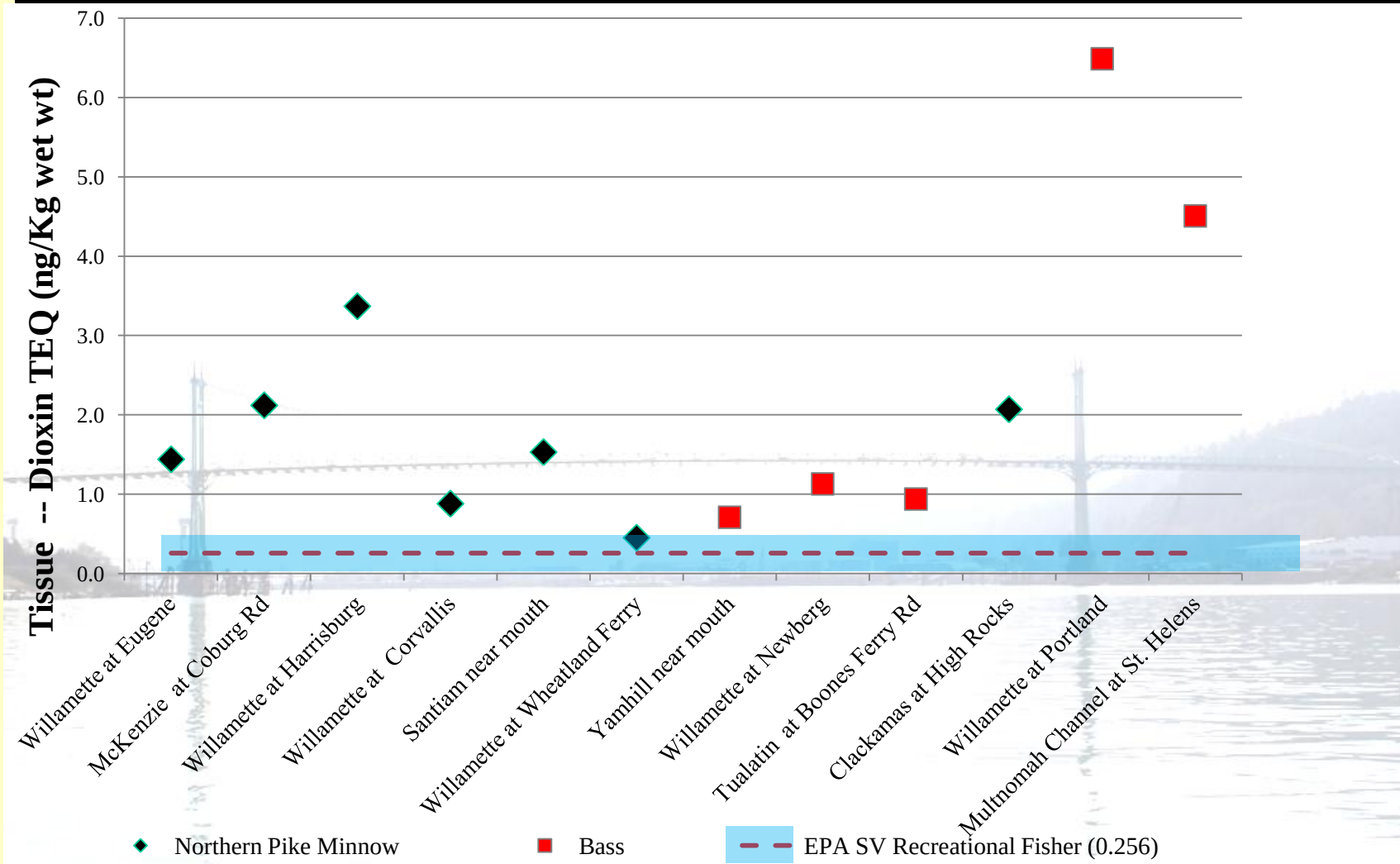
Summary Findings: Fish Tissue *(Continued)*

Total PCBs



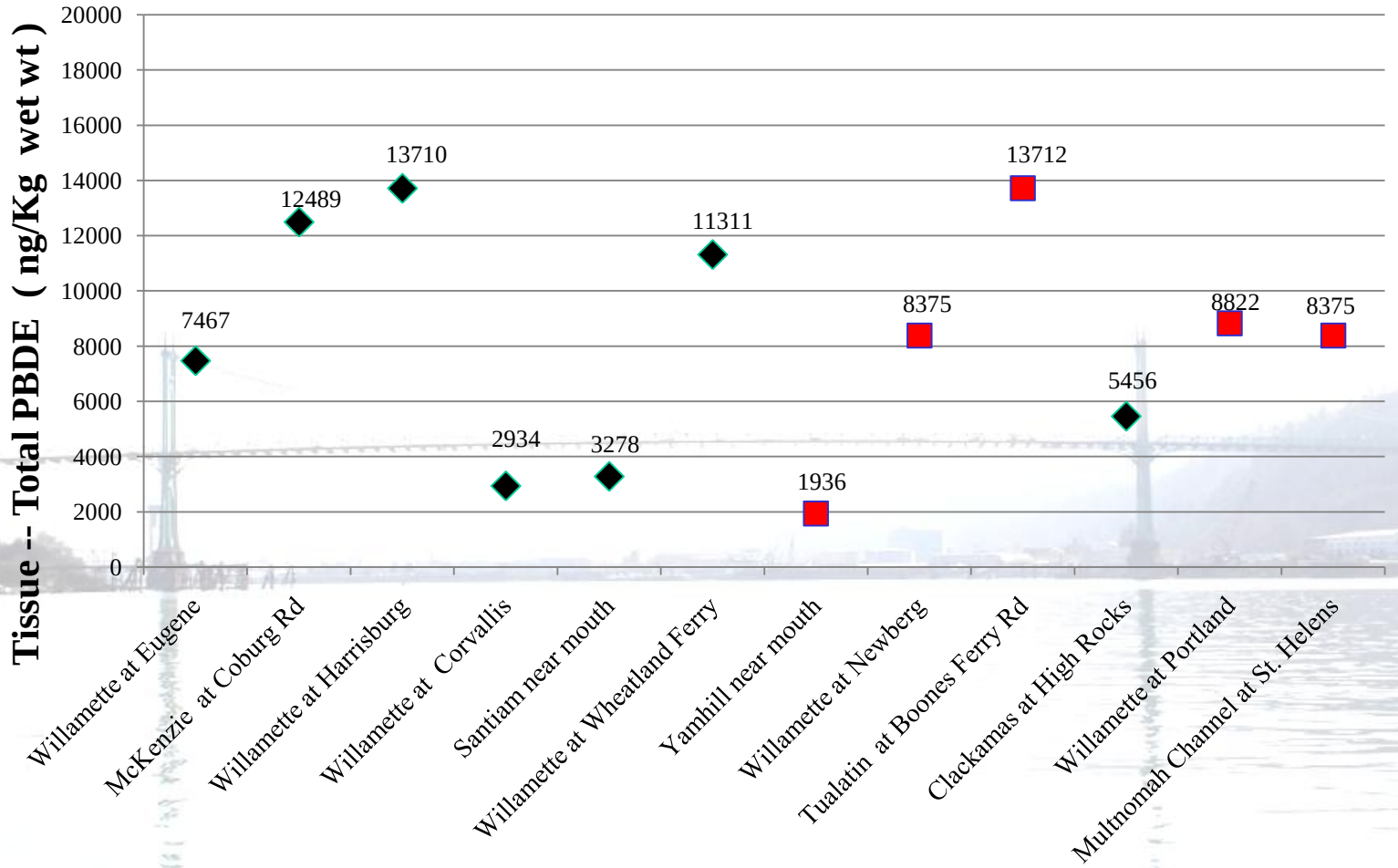
Summary Findings: Fish Tissue *(Continued)*

2,3,7,8 Dioxin Equivalents



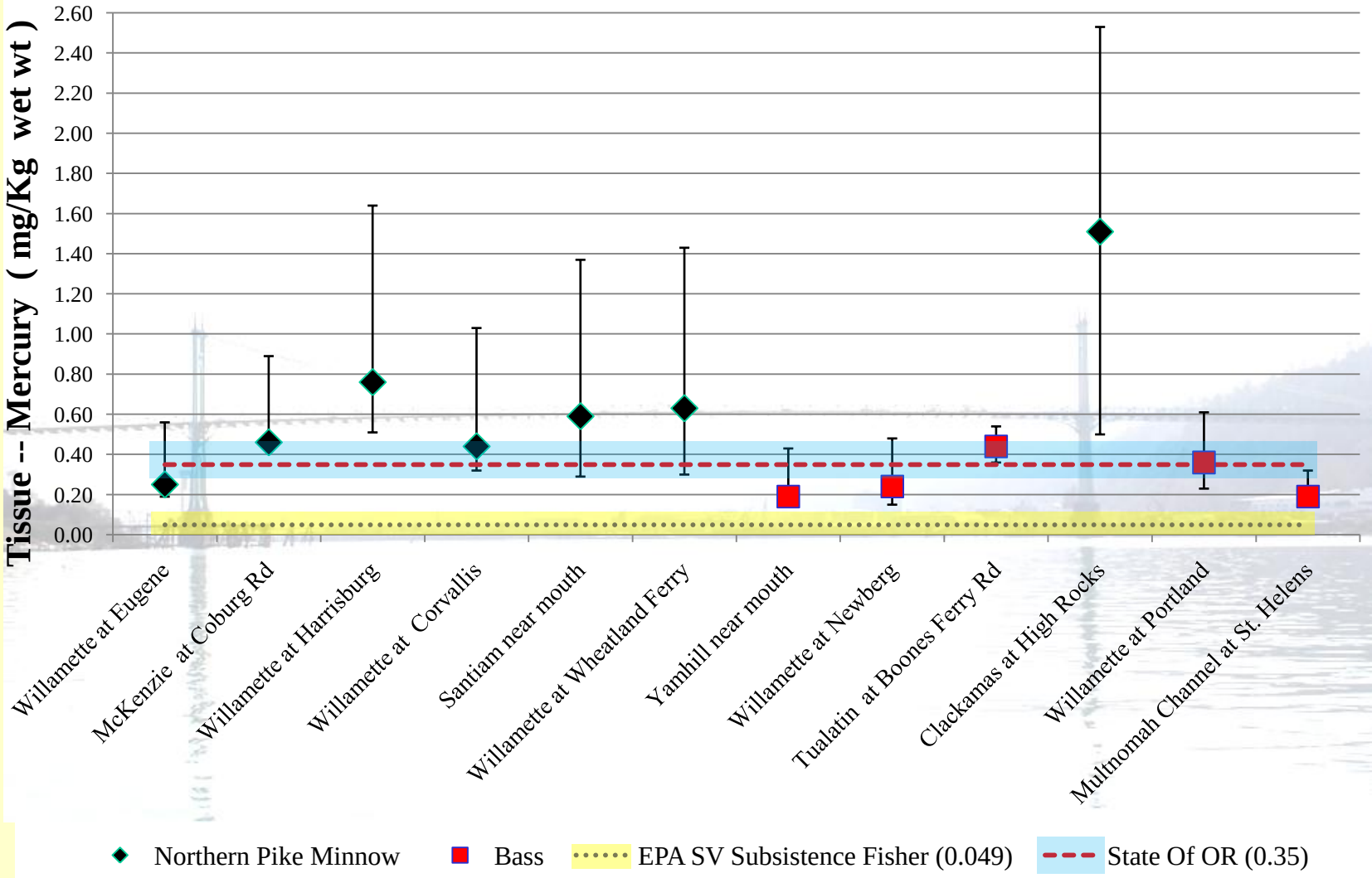
Summary Findings: Fish Tissue *(Continued)*

Total PBDE



Summary Findings: Fish Tissue *(Continued)*

Mercury



Toxics Monitoring Program: Year 1 Executive Summary

2008 Findings

Water Column

Exeedences of water quality criteria for **copper** and **lead**

Herbicides most commonly detected class of pesticides but found at low concentrations

"Emerging contaminants" widespread at low concentrations

Fish Tissue

Legacy pesticides generally below screening level criteria for the protection of human health

Halogenated industrial chemicals remain a concern

Mercury levels remain elevated

Year 1 - Communication / Outreach

Strengthen linkages / relevance to Agency Programs

- Oregon's Toxics Monitoring Program Supports Multiple Agency Priorities
  - Fish Consumption Rate
  - SB 737 recommendations operational
  - Pesticide Stewardship Partnership
  - Drinking Water Source Protection
  - WQ Integrated Report
  - NPDES Permit Program
  - Agency Toxic Reduction Strategy

Year 1 - Communication / Outreach *(Continued)*

Strengthen linkages / relevance to State and external groups

- **State Agencies**
  - Department of Human Services
  - Department of Agriculture (Pesticides of Interest / Concern)
- **External Stakeholders**
  - ACWA
  - Tribes
  - Environmental / Resource Conservation Groups

Next Steps

- **Communication of 2008 findings**
  - Fact Sheet/Web
  - Year One Report
  - Oregon Insider Article
  - Meet with Internal and External Stakeholders
- **Develop 2009 – 2010 monitoring plans**
  - Collect/follow-up samples from upper Willamette sites
  - Confirm 2008 findings
  - Evaluate spatial pollutant distribution patterns in selected watersheds
  - Fish tissue / other media

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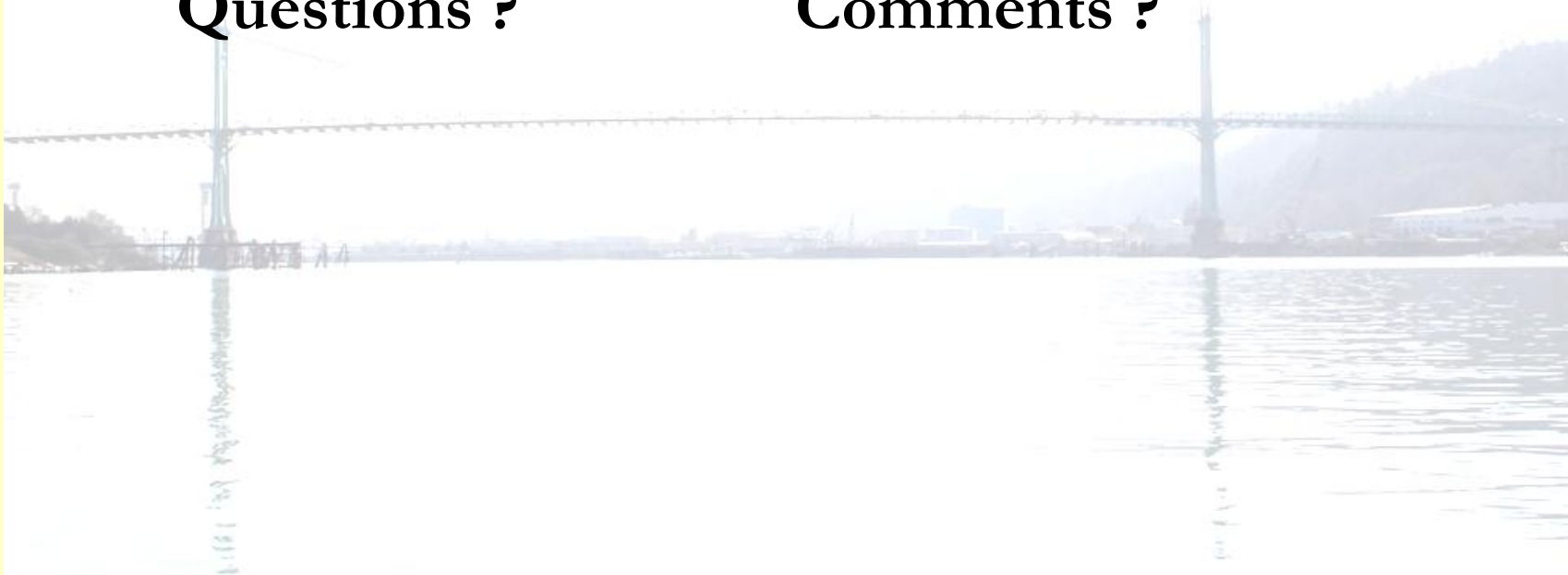
Thanks for your time and interest in Oregon's Toxics Monitoring Program !

Questions ? **Comments ?**



Approach
(Continued)

Toxics Monitoring Targets vs. SB 737 Recommendations

SB 737 list contains roughly **140** chemicals based on **toxicity, bio-accumulation potential**, and **persistence**

TMP analytes includes **274** individual compounds (not including TOC or field-measured constituents)

TMP list incorporates approximately **40%** of pollutants recommended by the SB 737 Wrokgroup