



State of Oregon
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ODEQ PCB Water Quality Monitoring Programs

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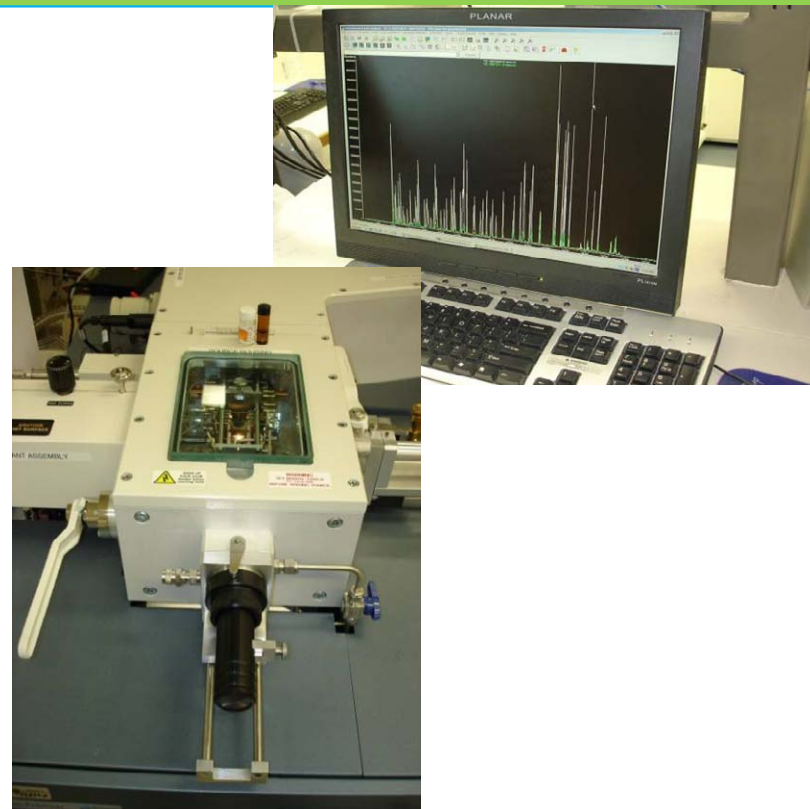
OAR Division 41, Table 20

			Micrograms Per Liter for Protection of Aquatic Life				Nanograms per Liter for Protection of Human Health		
	Priority Pollutant	Carcinogen	Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria	Water and Fish Ingestion	Fish Consumption Only	Drinking Water M.C.L.
PCBs	Y	Y	2	0.014	10	0.03	0.079	0.079	

- The current PCB human health water quality criteria is 0.079 ng/L or **79 pg/L**, based on a fish consumption rate of 6.5 g/day.
- When the criteria are revised based on our new fish consumption rate (175 g/d), the criteria will be **6.4 pg/L**.



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The Oregon Legislature provided funding to DEQ to acquire a new High Resolution Mass Spectrometer / High Resolution Gas Chromatograph

This instrument will enhance DEQ's ability to measure a variety of contaminants (PCDD/DFs PCBs PBDEs) at environmentally relevant levels

Minimum Reporting Levels for select PCB congeners is 20 ng/l



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Purpose

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



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Spatial Scope

Initial / Ultimate

- **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)



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Toxic Pollutants of Interest

- **Rationale for 2008 target analytes**
 - Included toxic pollutants likely to:
 - be present in Oregon's surface waters
 - pose the greatest threat to human health and the environment
 - List included pollutants measured by DEQ Drinking Water Protection Program and many pesticides measured by Pesticide Stewardship Partnership
 - Future monitoring to include toxic persistent and bioaccumulative pollutants recommended by SB 737 Workgroup



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Toxic Pollutants of Interest (Continued)

Water

PAHs

PCBs

PBDEs

Metals

Current-use & Legacy Pesticides

Industrial Materials & Solvents

Contaminants of Emerging Concern

- pharmaceuticals, personal care
products, plasticizers

Fish

Dioxins/ Furans

OC Pesticides

PCB Congeners

PBDE Congeners

Mercury

Environmental Media of Interest



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Water

- Grab samples
 - “Low-Flow” – September 2008
 - Just prior to scheduled dam releases
 - “Rising-Flow” – December 2008
 - Relatively light precipitation

Environmental Media of Interest (Continued)



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Fish tissue (fillet)

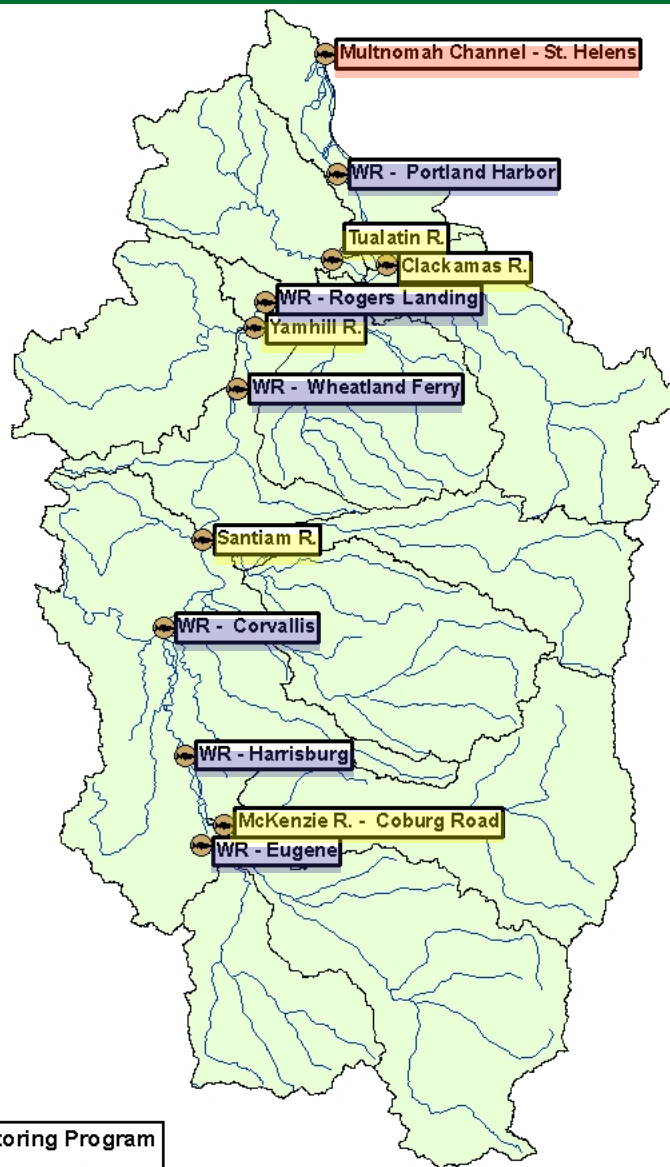
- 12 Sites
- 5 adults / site
- Organic analyses performed on composites
- Species
 - Smallmouth Bass (Northern sites)
 - Northern Pikeminnow (Southern sites)

Sampling Locations - Fish



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Multnomah Channel (1)

6 Mainstem (6)

Major Tributaries (5)



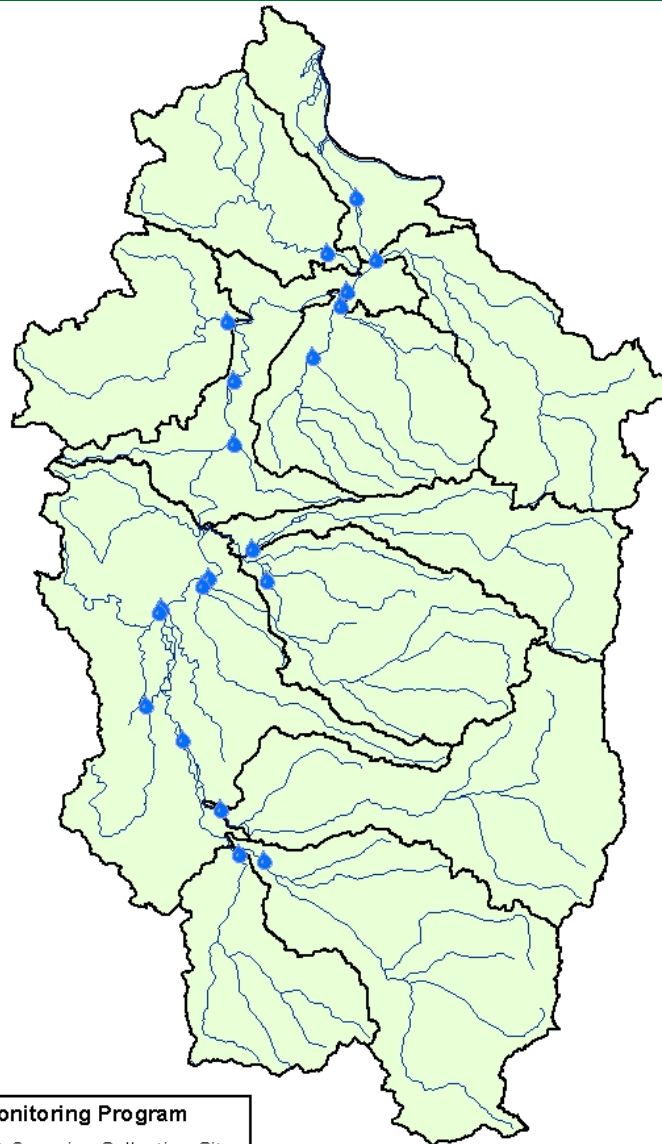
0 10 20 40 Miles

Sampling Locations – Water (Organics)



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• 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

Toxics Monitoring Program
• 2008 Organics Collection Sites



0 10 20 40 Miles



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PCB – Related Findings

- Not detected in water (MRL: 20 ng/l)
- Congeners detected in fillets at all WRB sites sampled
- Congener “fingerprints” appear to be somewhat different between species
- Total PCB concentrations at or above EPA recommended human health “Screening Value” for subsistence fishers at all sites
- Total PCB concentrations at or below EPA recommended Screening Values for recreational fishers at all but two sites



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Columbia River Ecological Condition and Contaminant Source Assessment

- \$384,000 EPA Regional Environmental Monitoring and Assessment Program (**REMAP**) Grant awarded to Oregon DEQ in 2008
- Monitoring began in Summer 2009



REMAP Project Objectives:

1. Do priority contaminants identified by the EPA's Columbia River Toxics Reduction Working Group pose a human health or ecological risk?
2. What are contaminant background levels in the water column, common food-fish fillets, and small prey fish?
3. Are tributary fish and water contaminant levels similar to the mainstem?
4. Are contaminant levels near The Dalles wastewater treatment plant or the Boardman coal-fired power plant higher than in other areas?



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Building on the following Lower Columbia River Studies:

- Coastal EMAP, 1999-2000 (ODEQ, w/EPA-ORD funding)
- Lower Columbia River and Estuary Ecosystem Monitoring: Water Quality and Salmon Sampling Report , 2007 (USGS/ NOAA/ LCREP)
- PBDE Flame Retardants in Washington Rivers and Lakes: Concentrations in Fish and Water, 2005-6 (WDOE)
- Concentrations of 303(d) Listed Pesticides, PCBs, and PAHs Measured with Passive Samplers Deployed in the Lower Columbia River, 2005 (WDOE)



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31 Sites (23 probabilistic / **8 targeted**)





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- Columbia River Toxics Reduction Working Group Tier 1 Pollutants
- **Water Column:**
 - Mercury
 - Methyl Mercury
 - General Water Quality
 - E. coli
- **SPMDs:**
 - DDT & Metabolites
 - PCB Congeners**
 - PBDE Congeners
 - PAHs
 - Chlorinated Pesticides
- **Fish Fillets:**
 - DDT & Metabolites
 - PCB Congeners**
 - PBDE Congeners
 - Chlorinated Pesticides
 - Mercury
 - Smallmouth Bass
 - Largemouth Bass
 - Northern Pikeminnow
 - Walleye



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Thank you....

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PCB Congeners (Tissue & SPMDs)

BZ No.	Compound Name
8	2,4'-dichlorobiphenyl
18	2,2',5-trichlorobiphenyl
28	2,4,4'-trichlorobiphenyl
44	2,2',3,5'-tetrachlorobiphenyl
52	2,2',5,5'-tetrachlorobiphenyl
66	2,3',4,4'-tetrachlorobiphenyl
77	3,3',4,4'-tetrachlorobiphenyl
101	2,2',4,5,5'-pentachlorobiphenyl
105	2,3,3',4,4'-pentachlorobiphenyl
110	2,3,3',4',6-pentachlorobiphenyl
118	2,3',4,4',5-pentachlorobiphenyl
126	3,3',4,4',5-pentachlorobiphenyl
128	2,2',3,3',4,4'-hexachlorobiphenyl
138	2,2',3,4,4',5'-hexachlorobiphenyl
153	2,2',4,4',5,5'-hexachlorobiphenyl
170	2,2',3,3',4,4',5-heptachlorobiphenyl
180	2,2',3,4,4',5,5'-heptachlorobiphenyl
187	2,2',3,4',5,5',6-heptachlorobiphenyl
195	2,2',3,3',4,4',5,6-octachlorobiphenyl
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl

PBDE Congeners (Tissue & SPMDs)

BZ No.	Compound Name
28	2,4,4'-Tribromodiphenyl ether
47	2,2',4,4'-Tetrabromodiphenyl ether
66	2,3',4,4'-Tetrabromodiphenyl ether
85	2,2',3,4,4'-Pentabromodiphenyl ether
99	2,2',4,4',5-Pentabromodiphenyl ether
100	2,2',4,4',6-Pentabromodiphenyl ether
138	2,2',3,4,4',5'-Hexabromodiphenyl ether
153	2,2',4,4',5,5'-Hexabromodiphenyl ether
154	2,2',4,4',5,6'-Hexabromodiphenyl ether
183	2,2',3,4,4',5',6-Heptabromodiphenyl ether
209	Decabromodiphenyl ether

PAHs (SPMDs)

Anthracene
Benz(a)anthracene
Dibenz(a,h)anthracene
Biphenyl
Chrysene
Fluoranthene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Fluorene
Acenaphthene
Naphthalene
Acenaphthylene
1-methylnaphthalene
2-methylnaphthalene
2,6-dimethylnaphthalene
2,3,5-trimethylnaphthalene
Benzo(g,h,i)perylene
Phenanthrene
1-methylphenanthrene
Pyrene
Benzo(a)pyrene
Indeno(1,2,3-c,d)pyrene
Dibenzothiophene

**DDT & Metabolites
(Tissue & SPMDs)**

2,4'-DDD
4,4'-DDD
2,4'-DDE
4,4'-DDE
2,4'-DDT
4,4'-DDT

Chlorinated Pesticides (Tissue & SPMDs)

Aldrin
Alpha-Chlordane
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Lindane (gamma-BHC)
Mirex
trans-Nonachlor
cis-Nonachlor
oxychlordane
alpha-Chlordane

Water Analytes

Ammonia
Nitrate + nitrite
Phosphorus (Total & Filtered)
Chlorophyll - a
Phaeophytin
E. coli
Total Suspended Solids
Arsenic (Total)
Selenium (Total)
Copper (Total)
Lead (Total)
Mercury (Total & Filtered)
Methyl Mercury (Total & Filtered)
Sulfate (Total)
Total Organic Carbon
Dissolved Organic Carbon
Hardness

Tissue On

% Lipids
% Solids