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WILLAMETTE BASIN MERCURY CHARACTERIZATION PROJECT OVERVIEW

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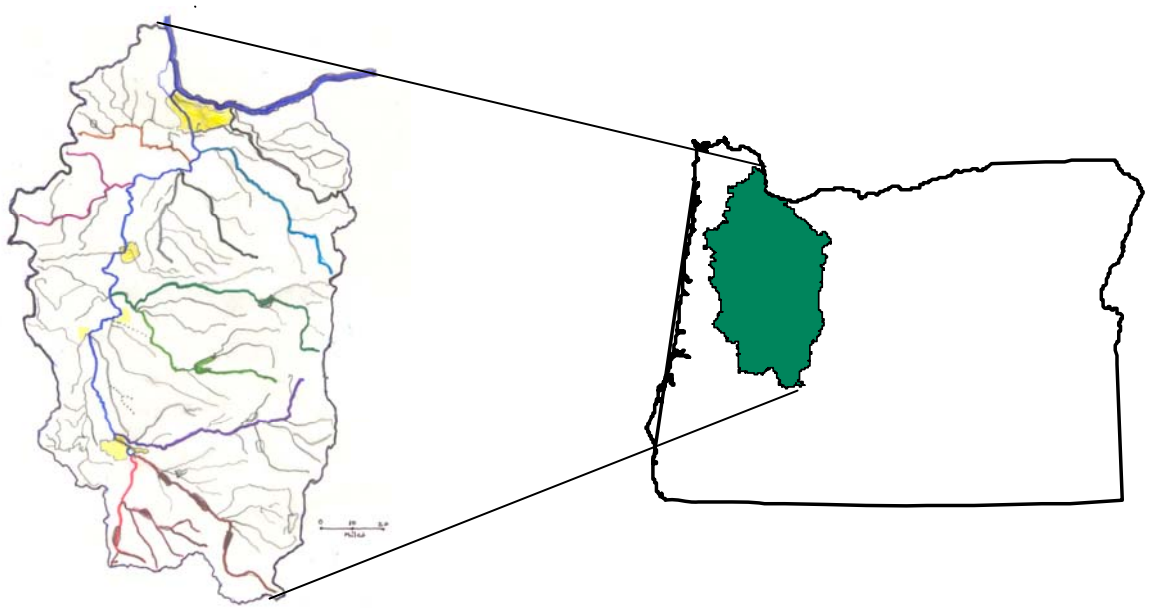
The Willamette River Basin

Willamette River is the 13th largest US river by annual volume

Length - 187 miles

Drainage Area - 11200 sq. mi.

70% of Oregon's population lives in the Willamette basin



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WILLAMETTE BASIN BACKGROUND

DEPARTMENT OF HUMAN SERVICES FISH ADVISORIES

- 1993 Cottage Grove Reservoir
- 1997 Dorena Reservoir
- 1997 Entire Willamette River

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- 1997 Cottage Grove Reservoir
- 1997 Dorena Reservoir
- 1997 Entire Willamette River
- 1997 Coast Fork Willamette
  Mouth to Cottage Grove Res.

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Objectives of Mercury Source Characterization

- Determine key sources of mercury in the Willamette
- Estimate relative contribution from each source category
- Identify knowledge gaps
- Collect data to correlate water column mercury concentrations to fish tissue levels

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Constraints to Characterization Process

- Oregon Department of Environmental Quality lacks the analytical ability to measure mercury at a sufficiently low level.
- Oregon Department of Environmental Quality lacks the analytical ability to measure methyl mercury.

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Constraint - Work Around

- Get analytical assistance from the USEPA Manchester Environmental Laboratory for mercury analysis
- Use USEPA funding to purchase methyl mercury analysis

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ANALYTICAL DATA QUALITY CRITERIA

	Total Mercury	Methyl Mercury
Laboratory	EPA Manchester Environmental Laboratory	Battelle Marine Sciences Laboratory
Method	EPA 1631e	EPA 1630
MDL	0.2 ng/L	0.02 ng/L
Reporting Limit	0.5 ng/L	0.06 ng/L
Matrix Spikes	71 % - 125 %	65 % - 135 %
Lab Duplicates	+/- 24 % RPD*	+/- 20 % RPD*
* For results greater than 5 times reporting limit, otherwise +/- reporting limit		

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2002 – 2003 Work Plan

- Collect and analyze 8 sediment / 210 fish / 32 water samples at 6 mainstem Willamette River, Cottage Grove Reservoir and Dorena Reservoir sites to develop food web model inputs and estimate relative contributions
- Collect and analyze 32 water samples at 4 Coast Fork Willamette, 5 Row River and 2 Middle Fork Willamette sites for determination of legacy mining impacts
- Collect and analyze X samples for 2 storm events (Agricultural – longitudinal, Urban – synoptic)
- Total mercury, Dissolved mercury, Total Methyl Mercury, Dissolved Methyl Mercury, TOC, DOC, TSS, Field Parameters

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2002 – 2003 Outcome

- Determined the Black Butte Mine had an impact on mercury levels in Cottage Grove Reservoir
- Food Web Model and translators were used to determine an interim water column target

  (0.92 ng/L)
- Allowed development of initial relative source contributions

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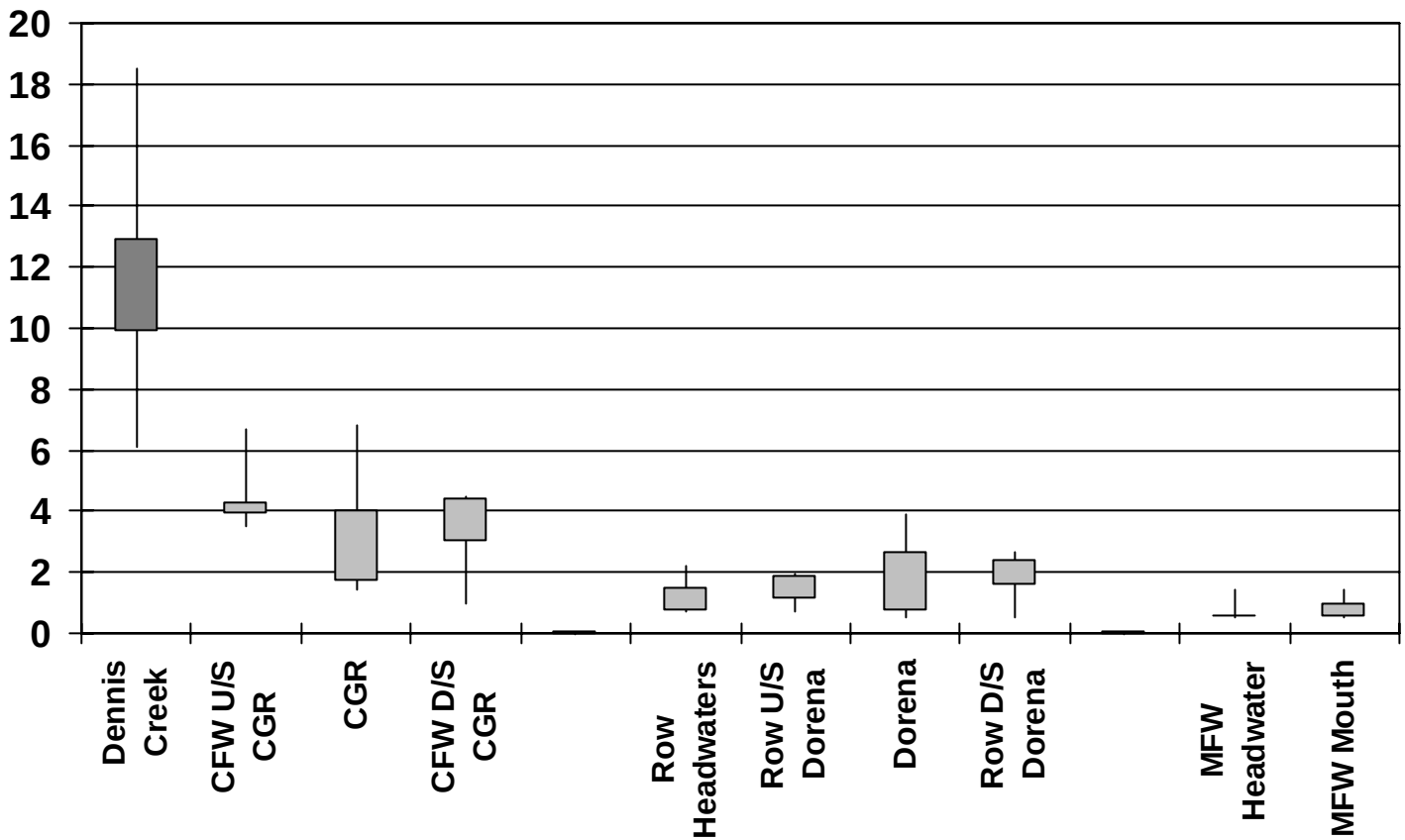
Legacy Mining – Mercury Results (ng/L)



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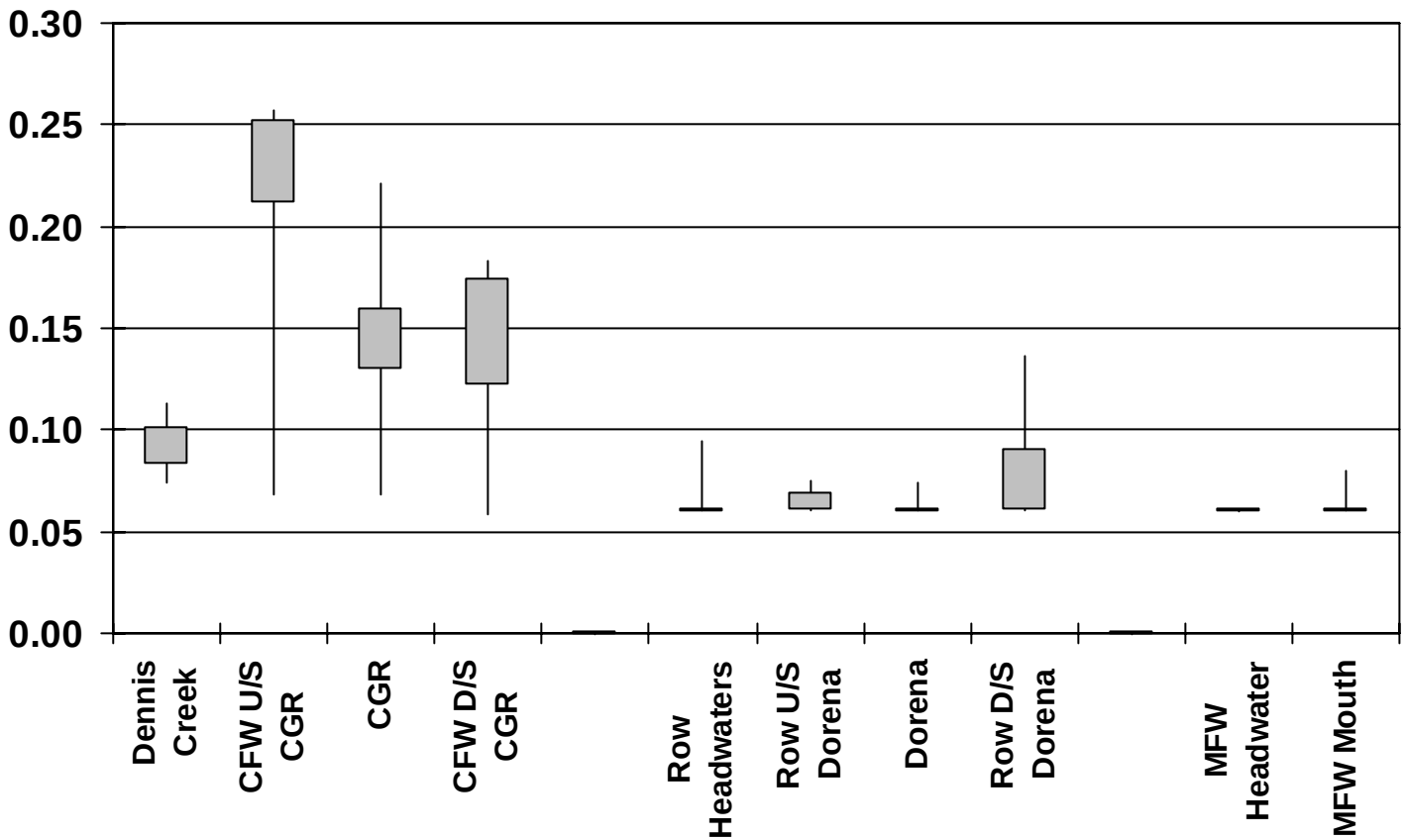
Legacy Mining – Methyl mercury Results (ng/L)



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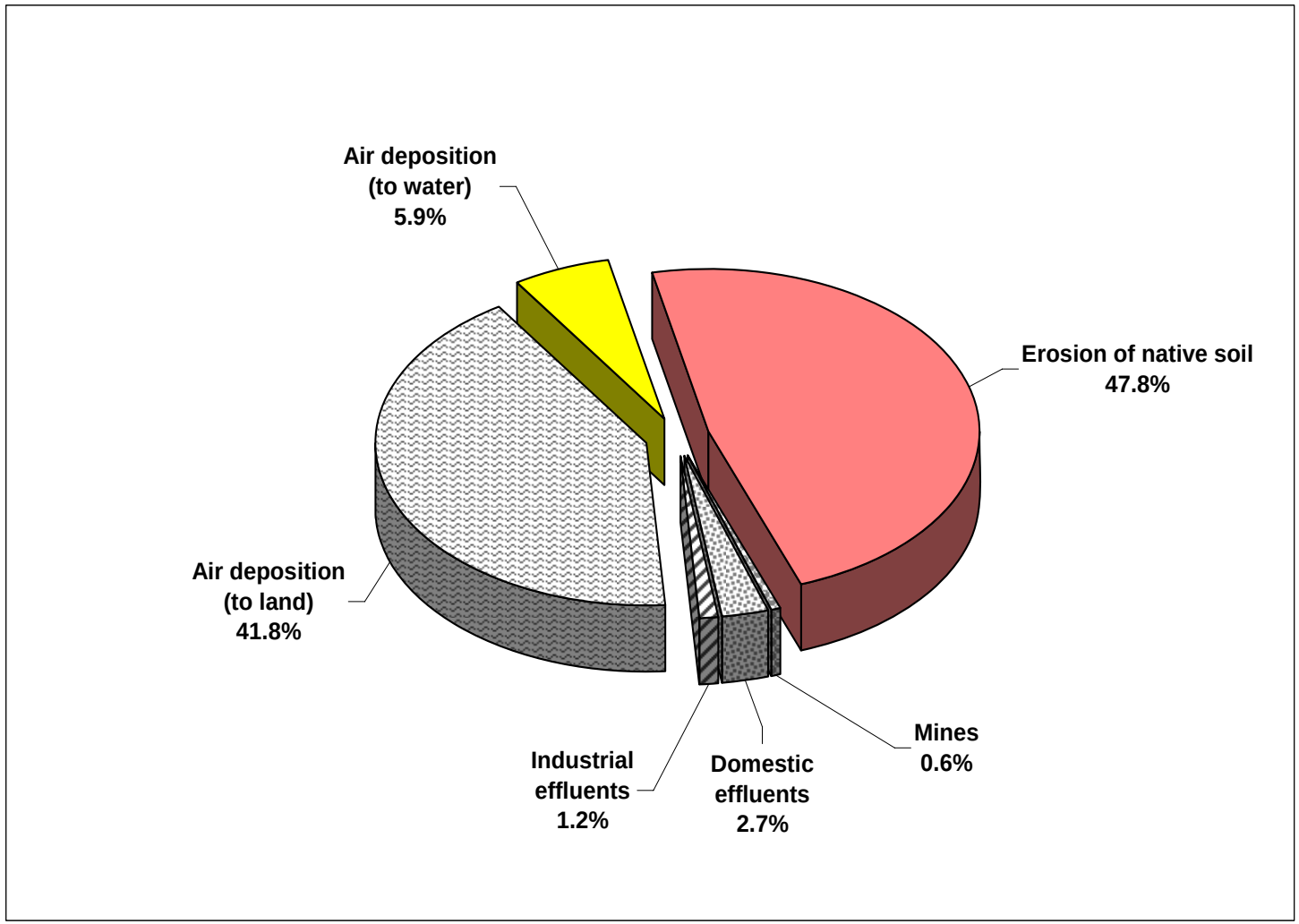
Estimated Relative Contribution



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2004 – 2005 Work Plan

- Compile permitted source discharge data
- Collect and analyze of 80 water samples at 6 mainstem Willamette River and 14 tributary sites
- Collect and analyze 160 effluent samples for 40 permitted point sources
- Total mercury, Total Methyl mercury ,Dissolved Methyl mercury, TOC, DOC, TSS ,Dissolved SO_4 and Field Parameters on River sites
- Total mercury, Total Methyl mercury, TOC, DOC, TSS, SO_4 and Field Parameters at Point Source sites

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2004 – 2005 Outcome

- Compiled mercury and daily discharge quantity data from permitted point source monitoring reports
- Most reported mercury results are not usable for mass balance inputs
- Problem with acid preservative caused delay and the need for increased QA samples – only 2 seasons of river samples and one set of 30 point source sites

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NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
INDUSTRIAL INDIVIDUAL PERMITTED FACILITIES

INDUSTRIAL PERMIT TYPE	COVERED ACTIVITY	NUMBER OF FACILITIES	NUMBER MONITORING MERCURY
B01	Pulp, paper and other fiber pulping	7	2
	Food/beverage processing		
B03	- Small Flow < 0.1 MGD	1	0
B04	- Medium Flow < 0.1 – 1 MGD	3	0
B05	- Large Complex Flow > 1 MGD	1	0
	Primary Smelting		
B07	- Non-ferrous metals utilizing sand chlorination	1	0
B08	– Ferrous and Non-Ferrous not elsewhere	2	0
B10	Cooling water in excess of 20000 BTU/sec	1	0
	Mining operations		
B13	– Small < 100000 cubic yards per year	1	0
	Not elsewhere classified		
B14	- process wastewater	1	0
B15	– process wastewater	20	3
B16	– non process wastewater	20	3
B17	Dairies, fish hatcheries & other CAFO industries	7	0
	Timber and wood products		
B19	- Sawmills, log storage	5	1
B20	– Hardboard, veneer, plywood	7	3
B21	– Wood preserving	4	2

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NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
DOMESTIC INDIVIDUAL PERMITTED FACILITIES

DOMESTIC PERMIT TYPE	COVERED ACTIVITY	NUMBER OF FACILITIES	NUMBER MONITORING MERCURY
A2	Sewage – From 25 to 50 MGD	3	3
A3	Sewage – From 10 to 25 MGD	2	2
Ba	Sewage – From 5 to 10 MGD	7	7
C1a	Sewage – From 2 to 5 MGD	8	8
C2a	Sewage – From 1 to 2 MGD	3	2
Da	Sewage – Less than 1 MGD without Lagoons	19	1
Db	Sewage – Less than 1 MGD with Lagoons	31	2

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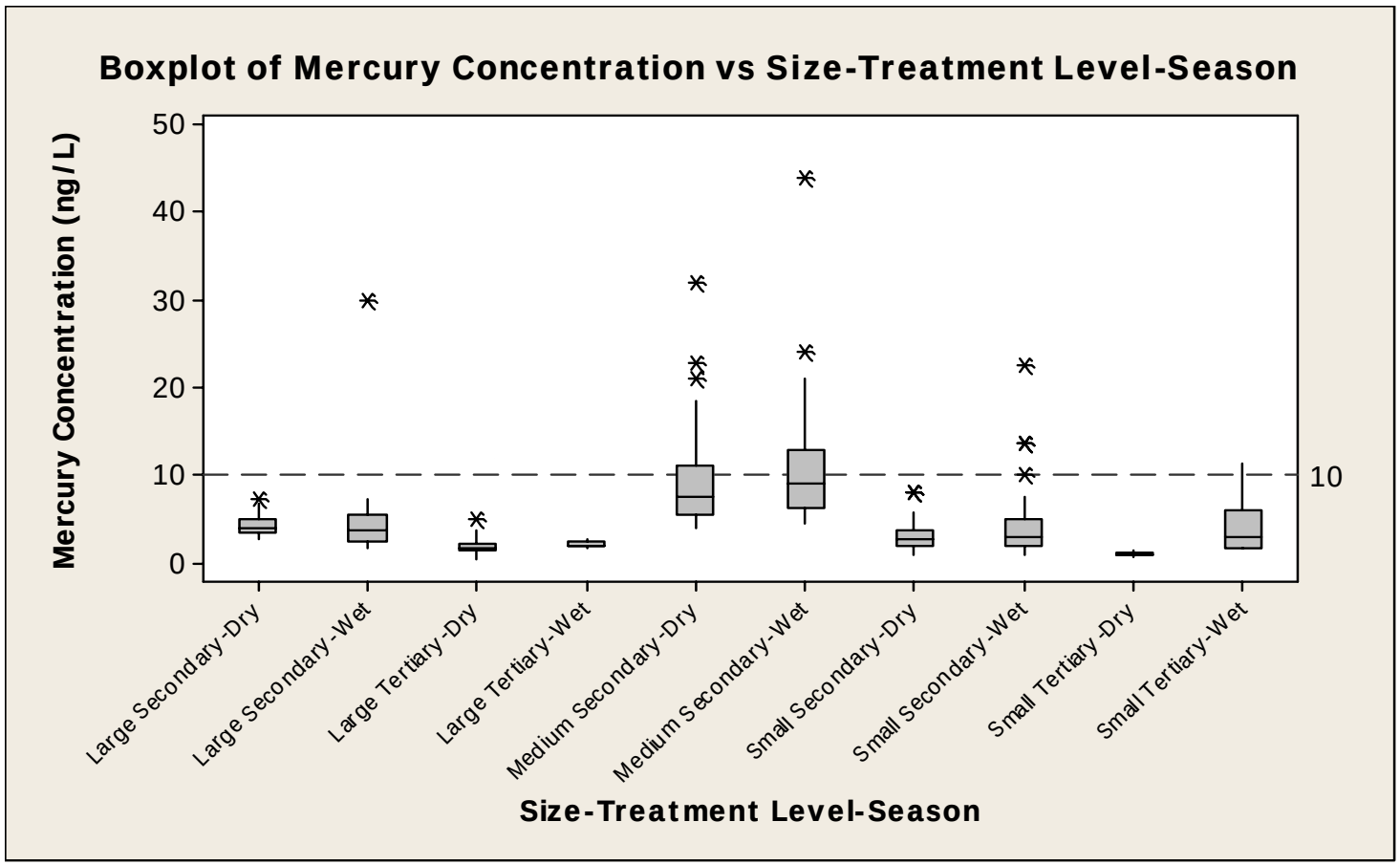
Domestic Effluent Results at Lowered Reporting Limits



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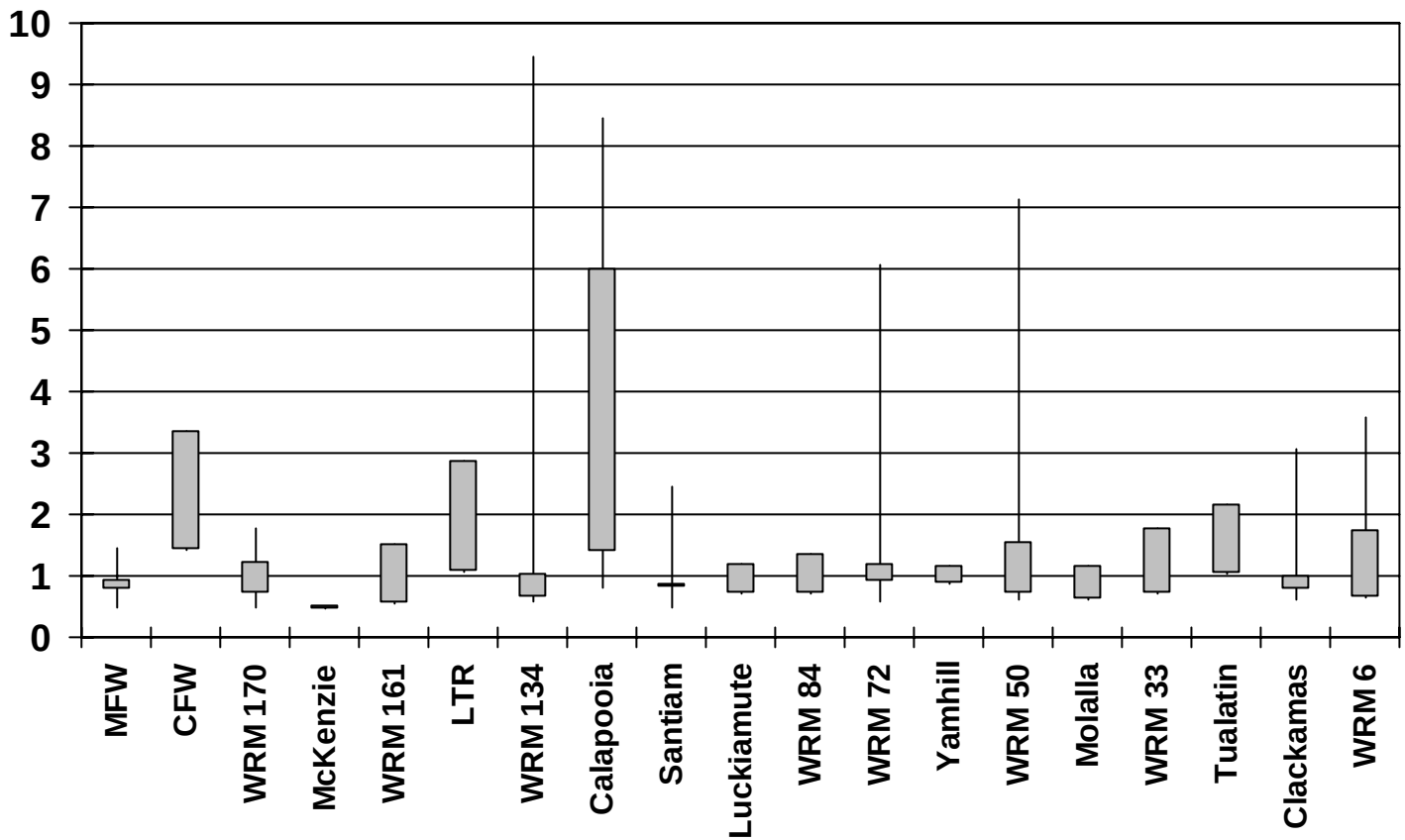
Willamette – Mercury Results (ng/L)



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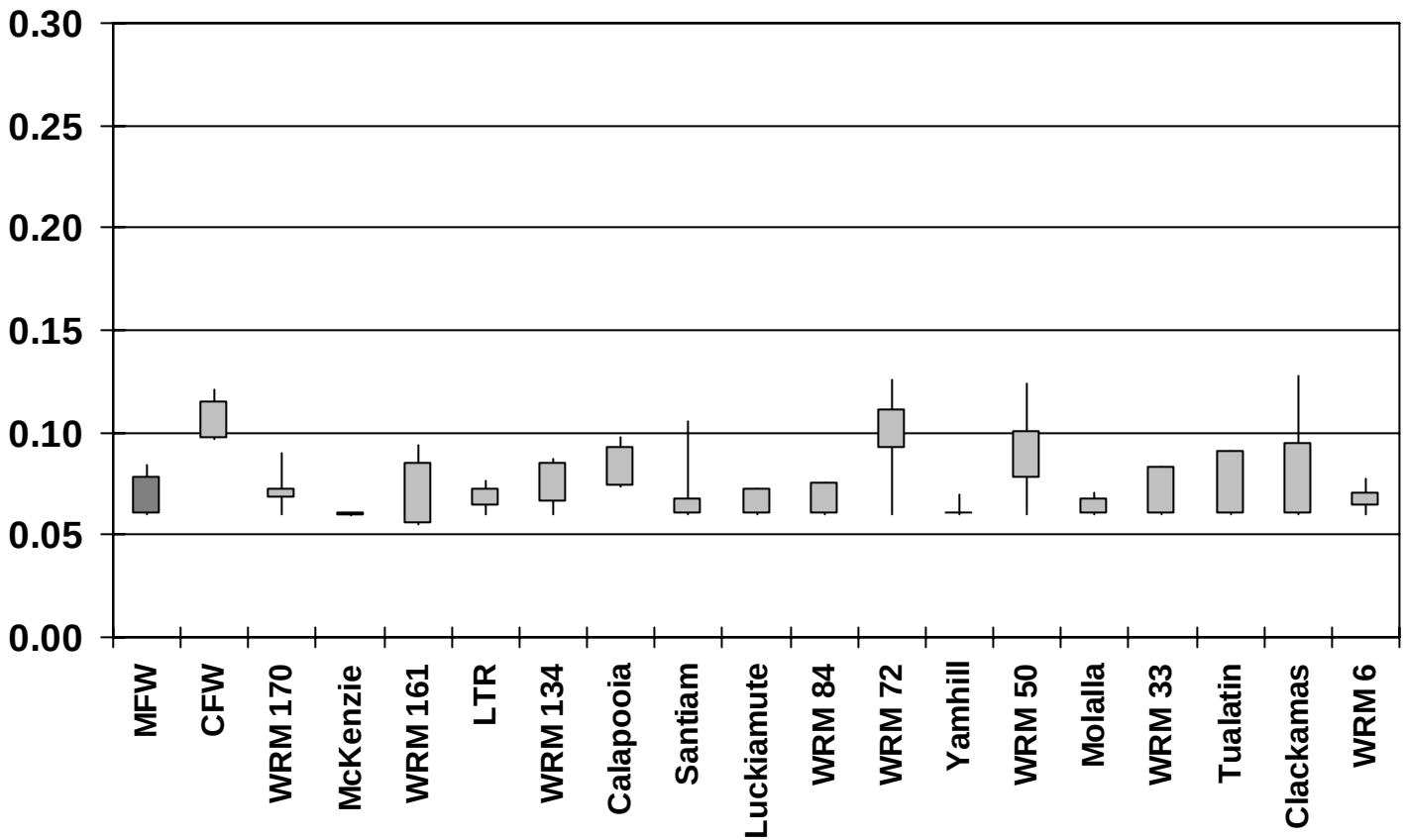
Willamette – Methyl mercury Results (ng/L)



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2007 – 2008 Work Plan

- Collect and analyze of 80 water samples at 6 mainstem Willamette River and 14 tributary sites
- Total mercury, Total Methyl mercury ,Dissolved Methyl mercury, TOC, DOC, TSS ,Total SO_4 and Field Parameters on River sites

Results Not Available Yet

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Future Work

- Planned sampling for 2009-2010
- ODEQ plans to purchase instrumentation to perform EPA method 1631e mercury and 1630 methyl mercury analysis
- Additional monitoring to better understand Methyl mercury production in the Willamette River Basin
- Continue small steps to the goal

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Acknowledgement

Thanks to the

US Environmental Protection Agency
Region 10
For funding and assistance during this project.