

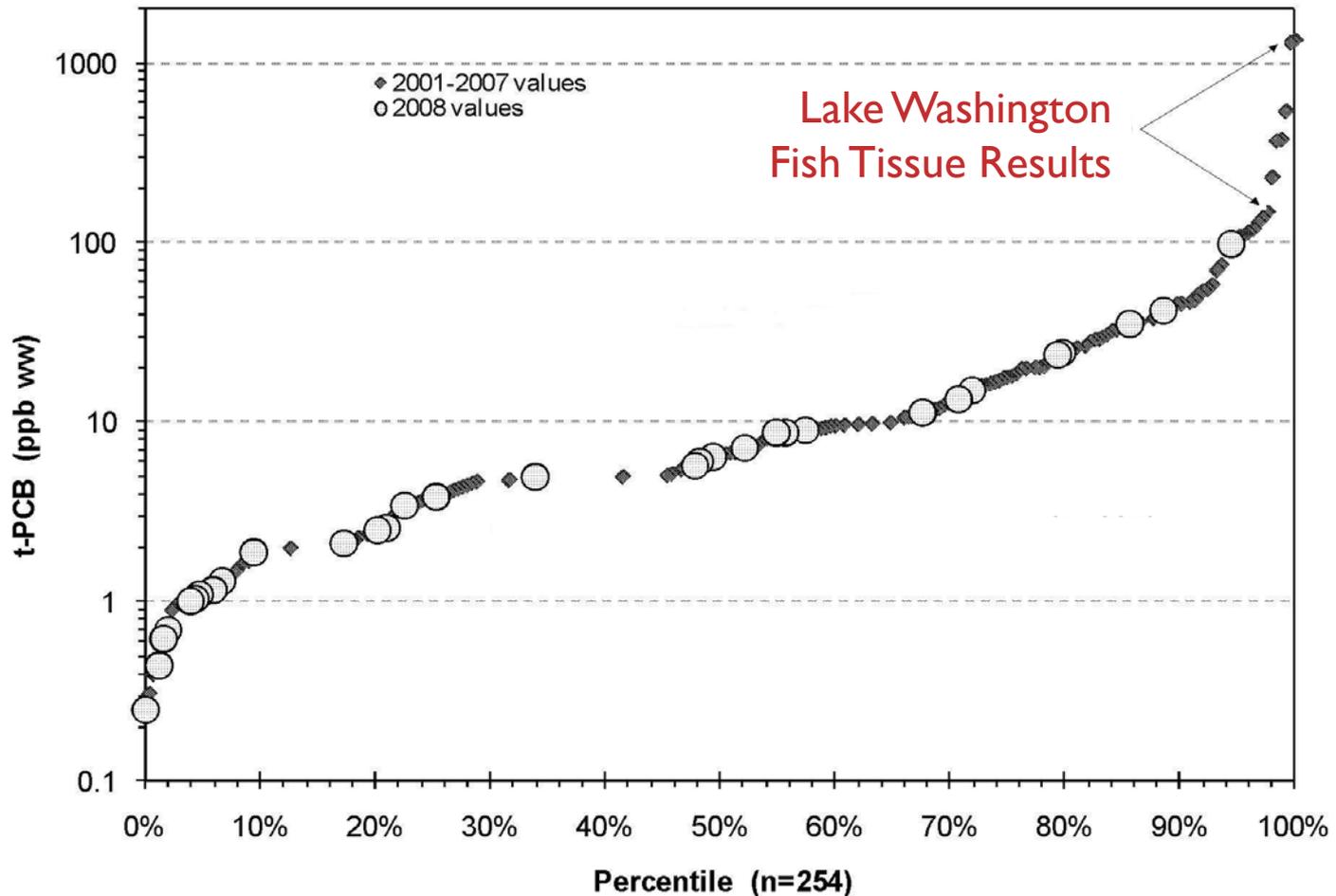
# The Lake Washington PCB/PBDE Study: Concentrations Measured in Stormwater and Other Major Pathways to the Lake Washington Watershed

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# Problem: Lake Washington Fish are Contaminated



**PCB Concentrations in Freshwater Fish Across Washington State**

Modified from Ecology (2010)

# Lake Washington PCB/PBDE Loadings Study

- Objectives
  - Estimate PCB and PBDE loadings to Lakes WA and Union, to Puget Sound
  - Determine key pathways (CSO, stormwater, streams, air, rivers, bridge runoff) to Lakes
  - Model response time from any total PCB load reduction
  - What total PCB load reduction is needed to reach safe levels in Lake WA fish?

# Lake WA Project Components

- Field study (Pathway sampling of PCB and PBDE congeners)
- Loadings estimates (PCBs & PBDEs)
- PCB modeling
- PCB load scenarios for Lake WA
- Findings and recommendations



# Lake WA Advisory Panel

- Fred Bergdolt, WA Dept. of Transportation
- Betsy Cooper, King County Wastewater Treatment Division
- Jonathan Frodge, Seattle Public Utilities
- Jenny Gaus, City of Kirkland
- Joan Hardy, WA Dept. of Health
- Rachel McCrea, WA Dept. of Ecology
- Doug Navetski, King County Stormwater Management
- Andy Rheume, City of Redmond
- Ronald Straka, City of Renton
- Heather Trim, People for Puget Sound/FutureWise
- Bruce Tiffany, King County Industrial Waste
- Patrick Yamashita, City of Mercer Island



# FIELD STUDY

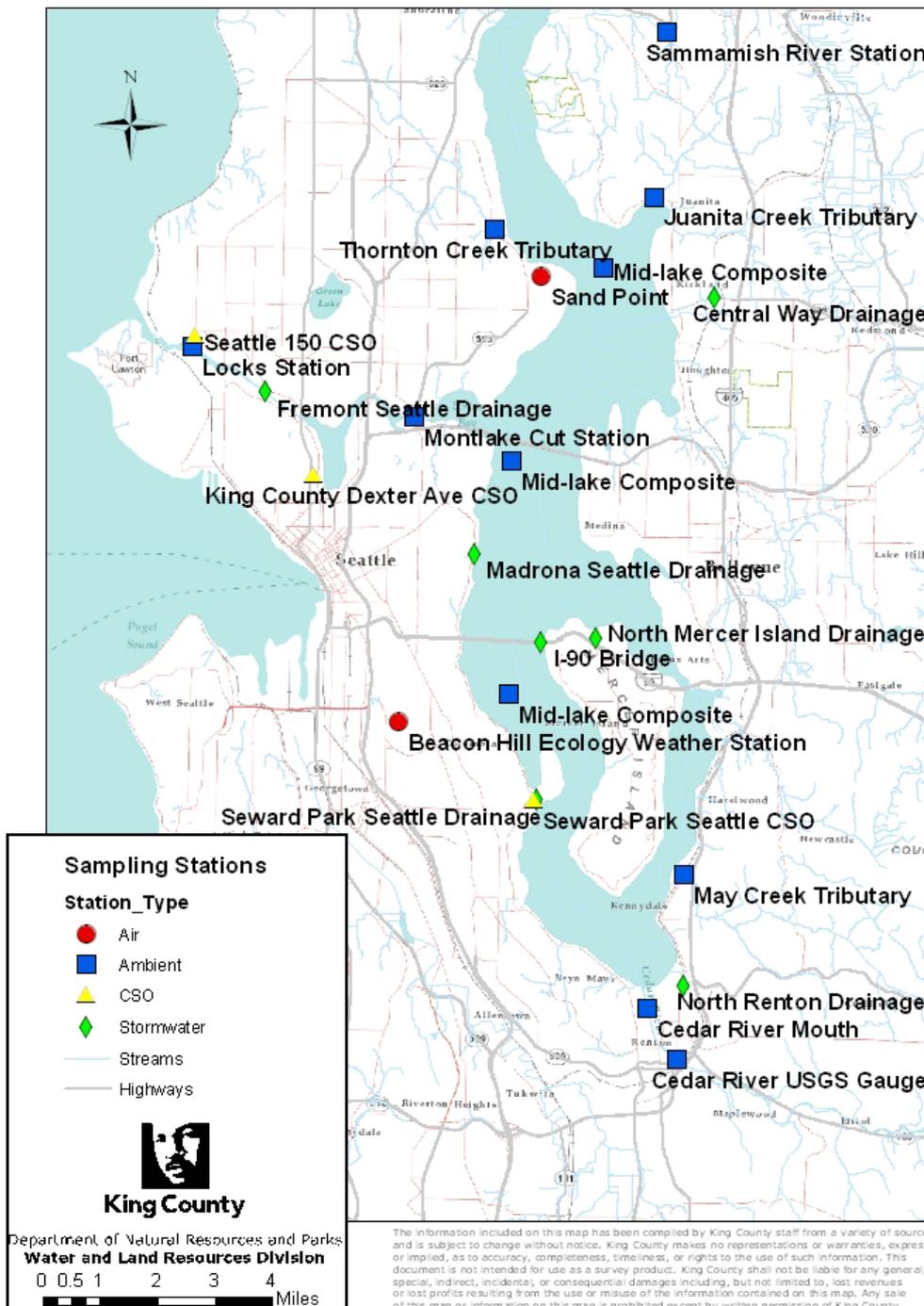


Air deposition sampler

# Field Study

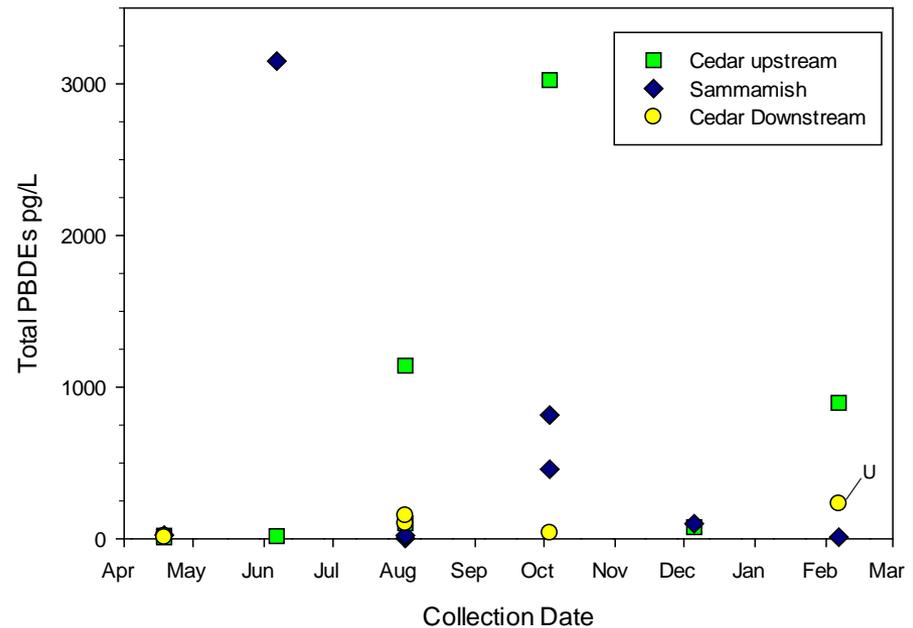
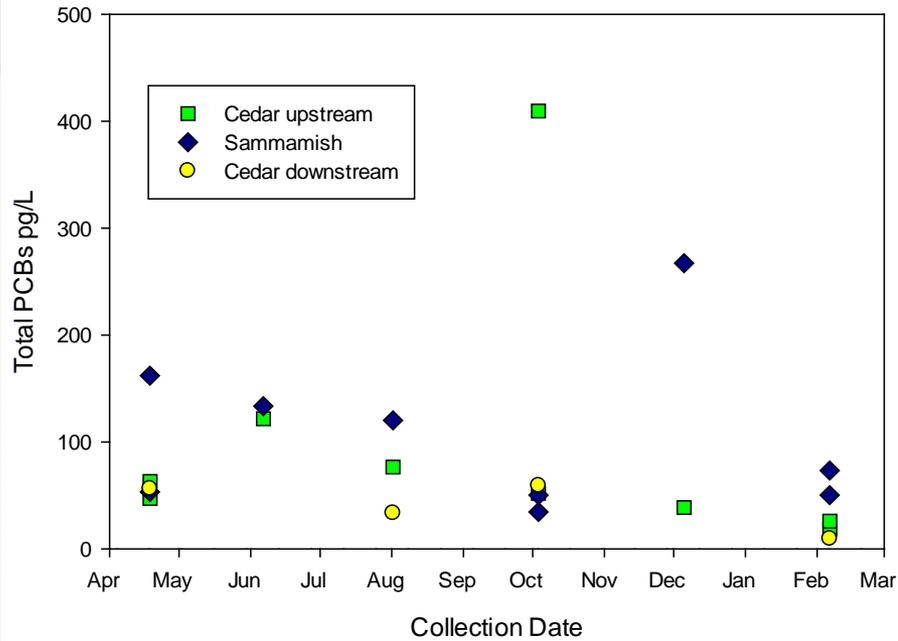
- Sampled one year (2011/2012)
- 209 PCB and 9 PBDE congeners in
  - CSOs (1 King County, 2 Seattle)
  - Stormwater (storm and baseflow, 6 stns)
  - Streams (storm and baseflow, 3 stns)
  - Sammamish and Cedar Rivers (3 stns)
  - I-90 Bridge runoff
  - Atmospheric deposition (wet and dry, 2 stns)
  - Lake Washington and Ship Canal inlet and outlet

# Sampling Stations

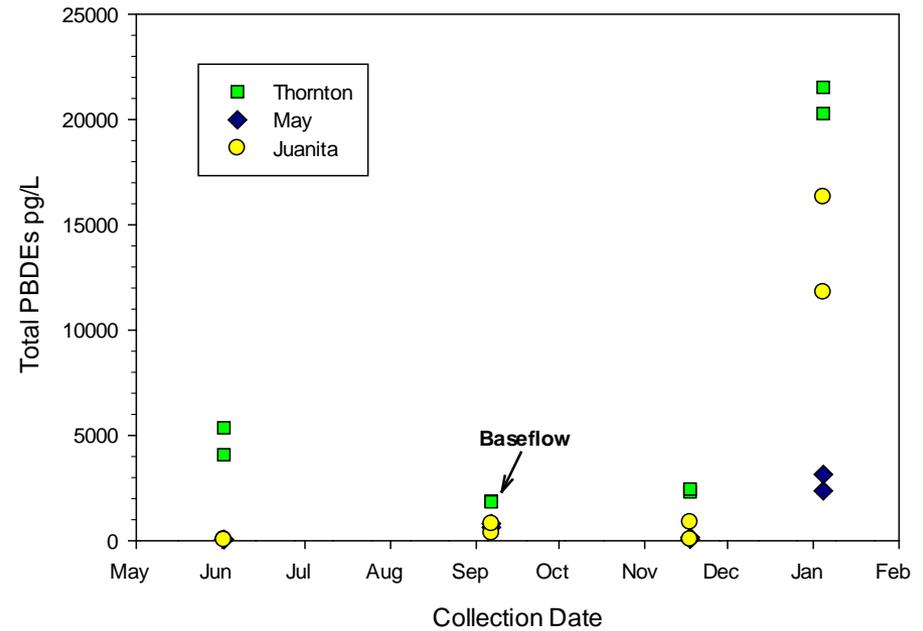
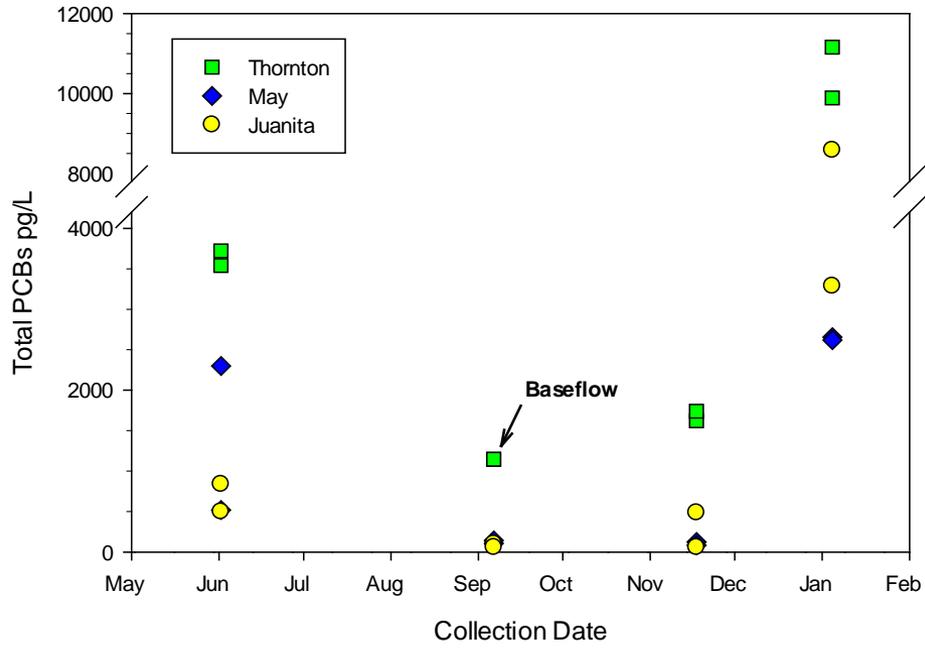


# Concentrations in Rivers

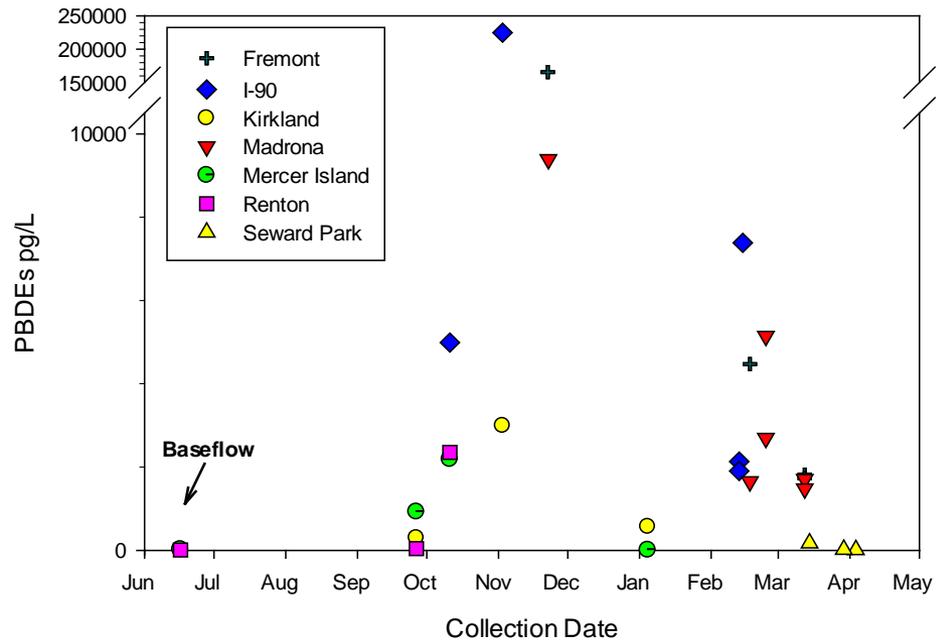
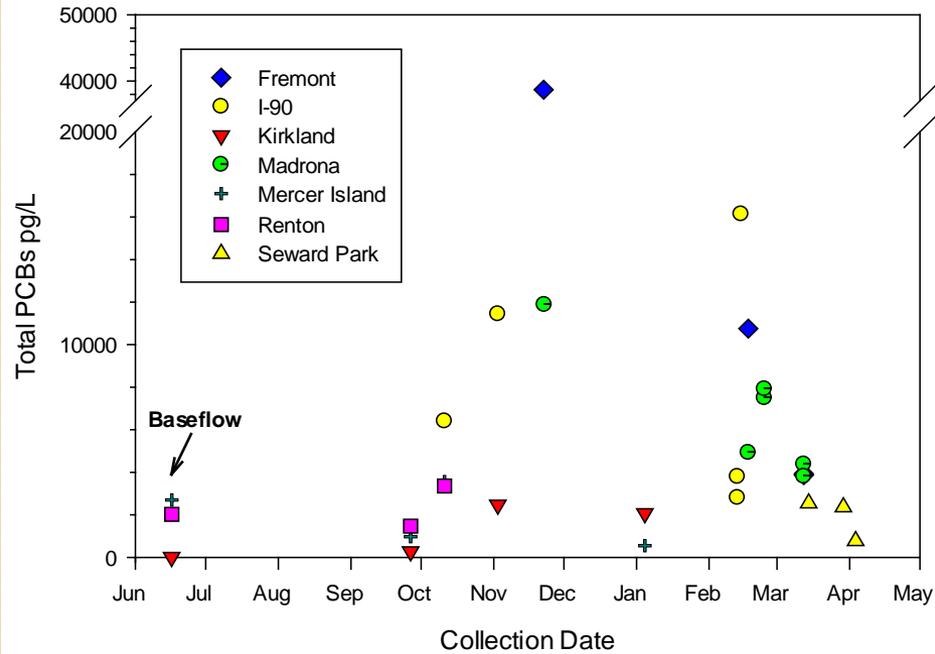
Base and storm flows not specifically targeted



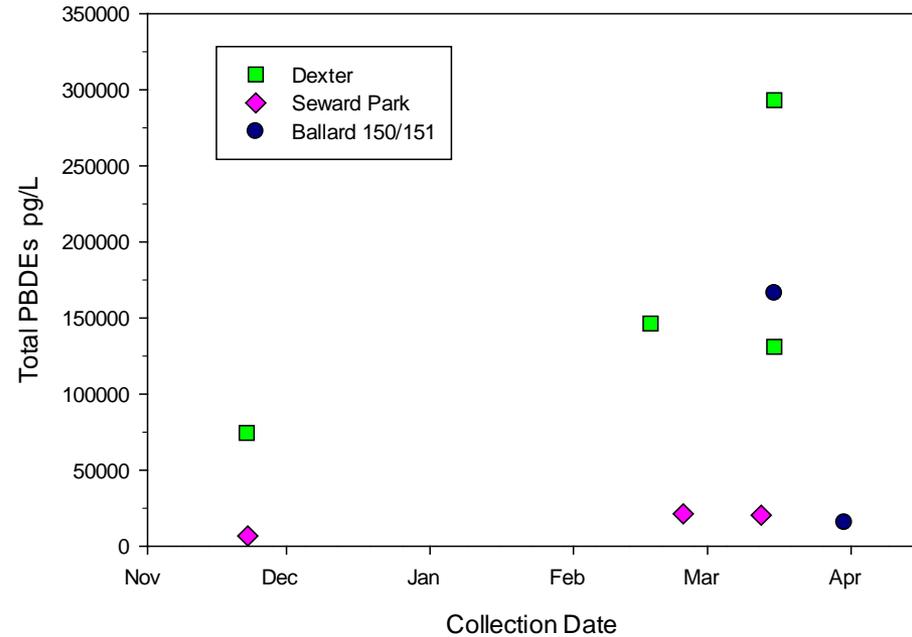
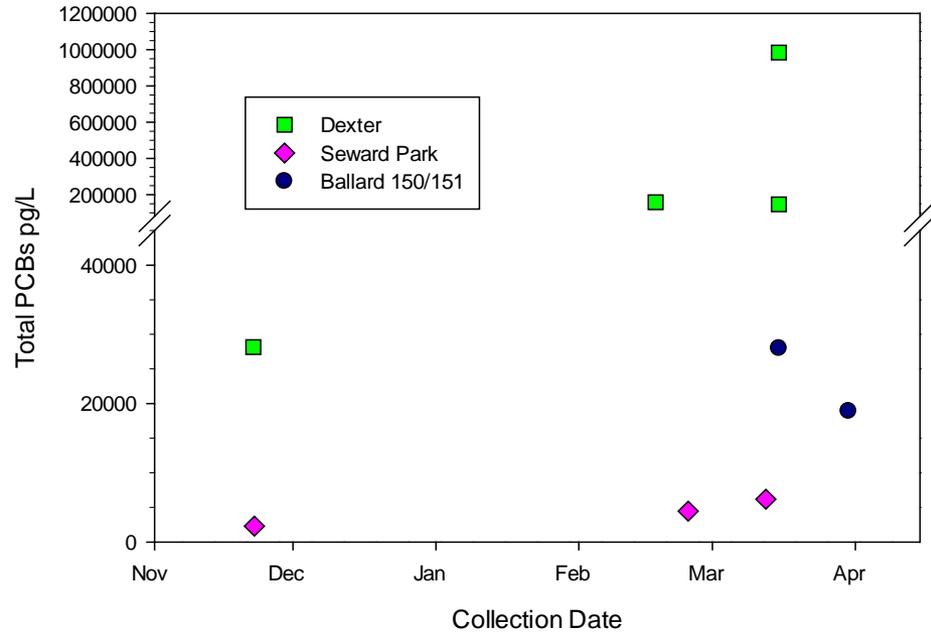
# Concentrations in Tributaries



# Concentrations in Stormwater

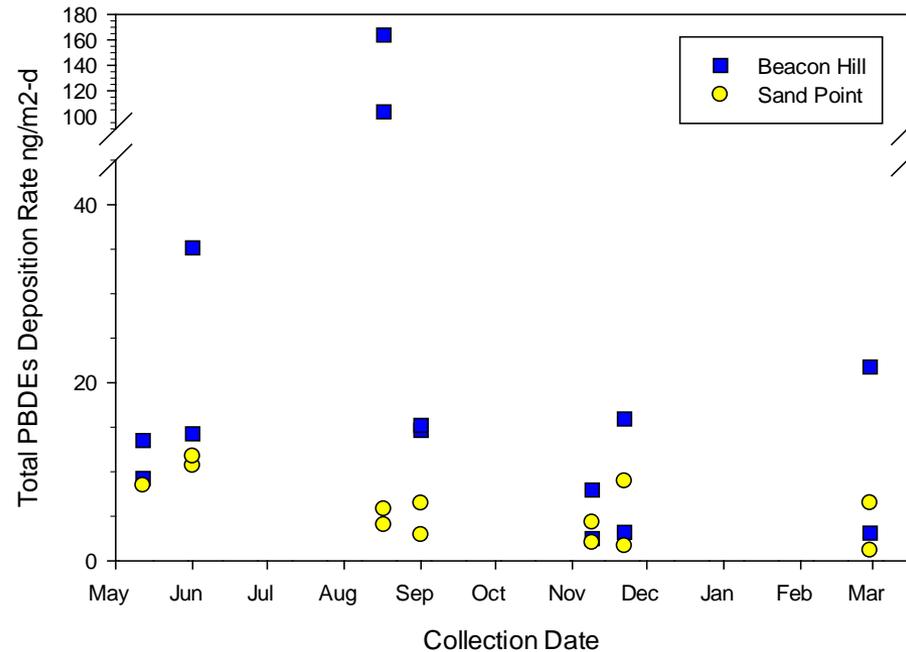
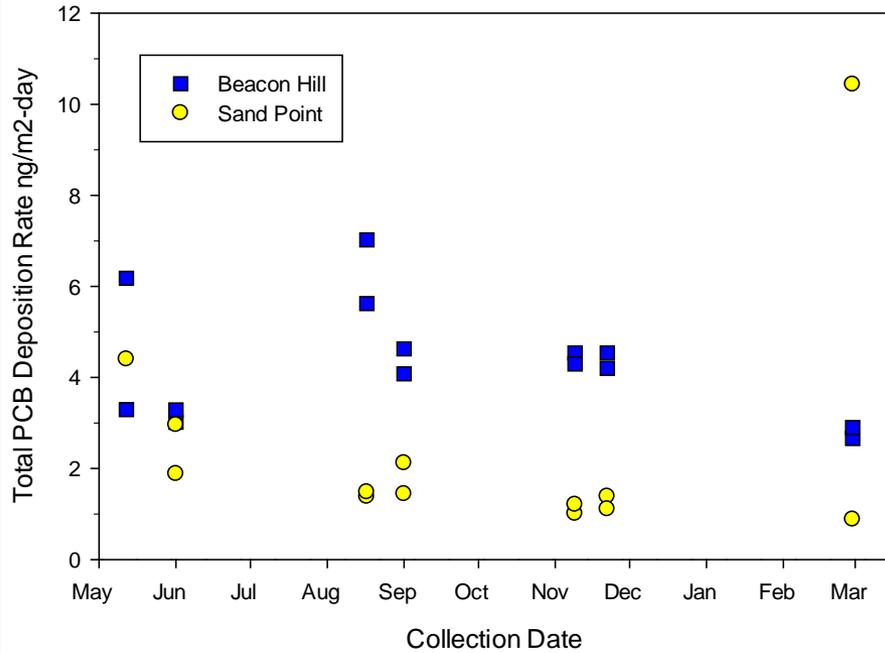


# Concentrations in CSOs

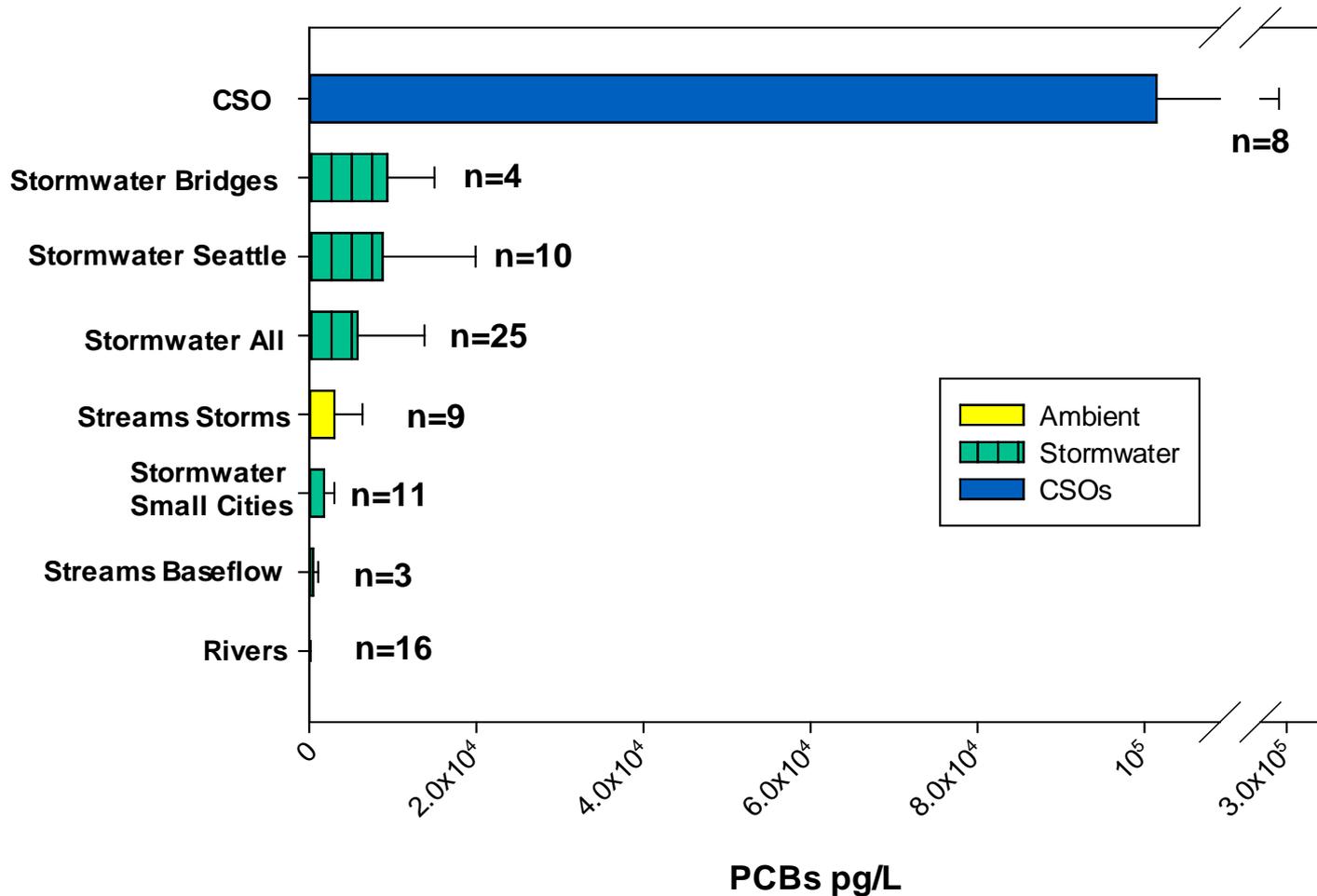


# Atmospheric Deposition Rates

Units are  $\text{ng}/\text{m}^2/\text{day}$



# Measured Water Concentrations



# Conclusions

- CSO concentrations highest, up to order of magnitude
- River concentrations lowest
- Seattle stormwater concentrations higher than smaller cities
- Use these data to estimate loadings to Lakes Washington and Union

