

Polybrominated Diphenyl Ethers in Washington Rivers and Lakes



Douglas
Creek
(1997)

**Washington State
Toxics Monitoring
Program**
(2001 – ongoing)

DOH Lake
Washington Study
(2005)

Organic Trends in SPMDs
(2007 – ongoing)

Spokane River
Fish
(2005)

Spokane River
Fish
(2009)

Chronology of PBDE Data

Spokane River Fish
(1999)

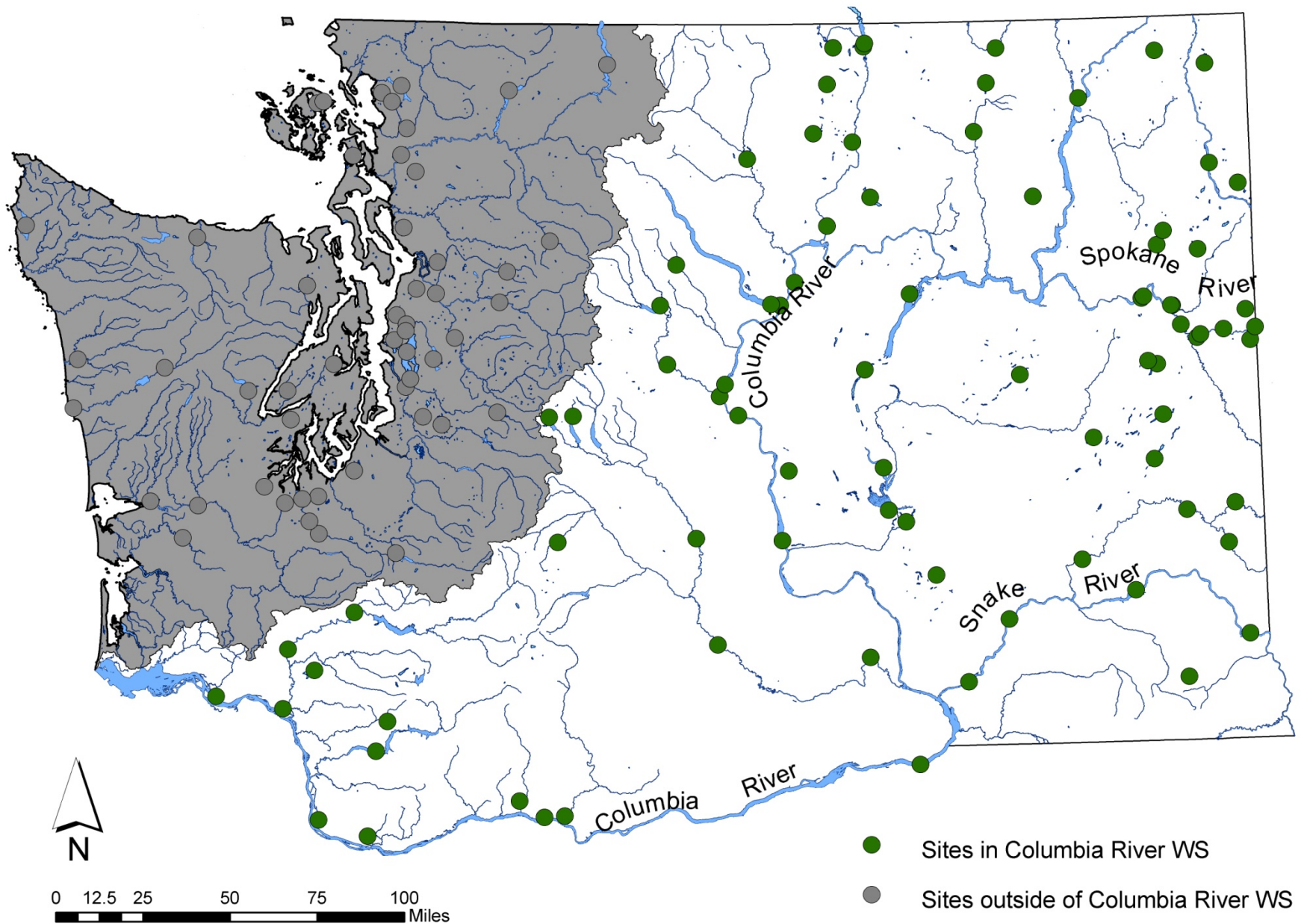
EPA National
Lakes Study
(2002 – 2003)

POP's in
Hatchery Fish
and Feed
(2005)

Yakima River Fish
(2005)

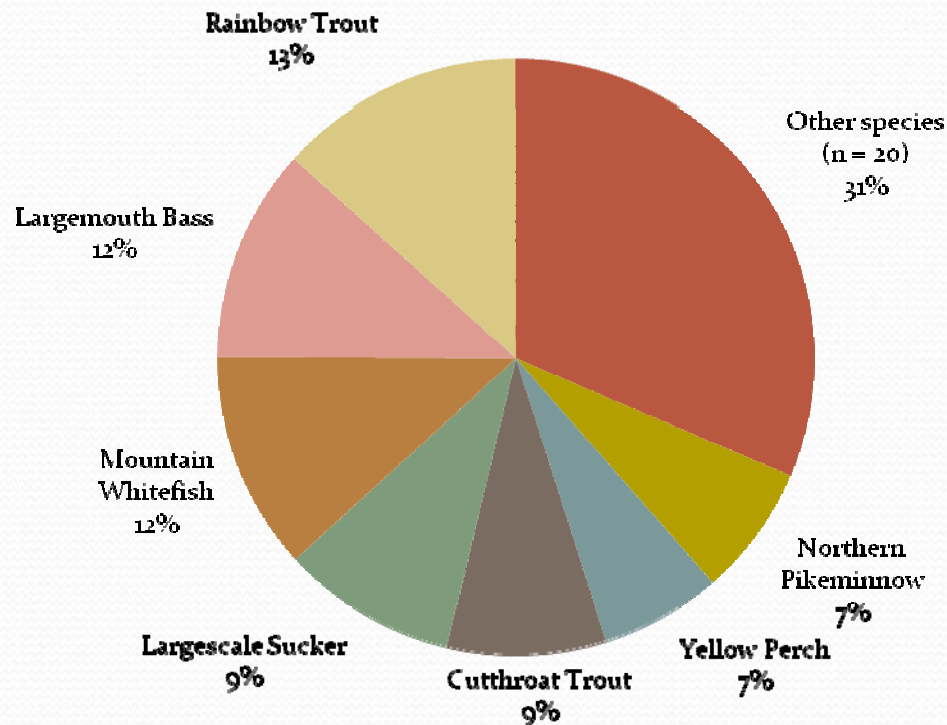
**Statewide
PBDE Study**
(2005 –
2006)

Sampling Locations



2001-2008 Fish Data

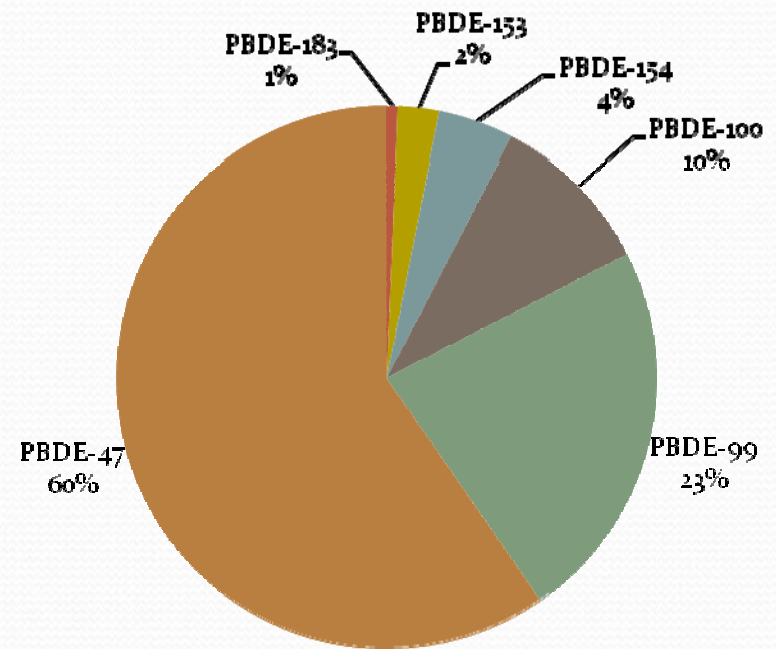
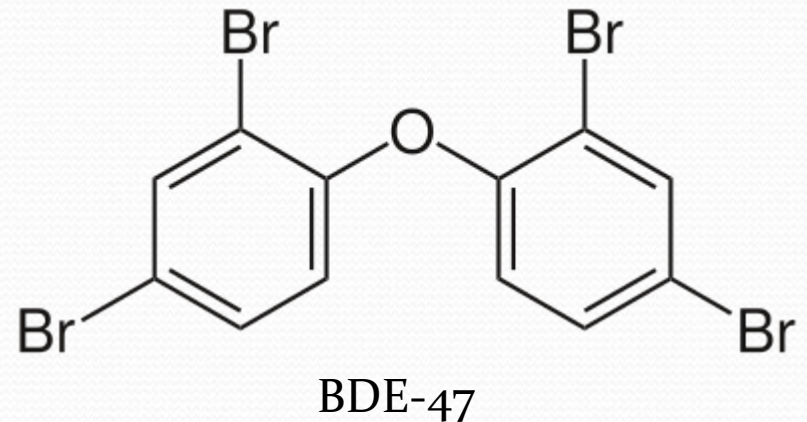
- 337 samples
 - 218 in CR basin
 - 119 outside of basin
- Fillet composites of 3-5 fish, 75% rule, generally fall collection
- Species number = 27
- 15% of data is from the Spokane River



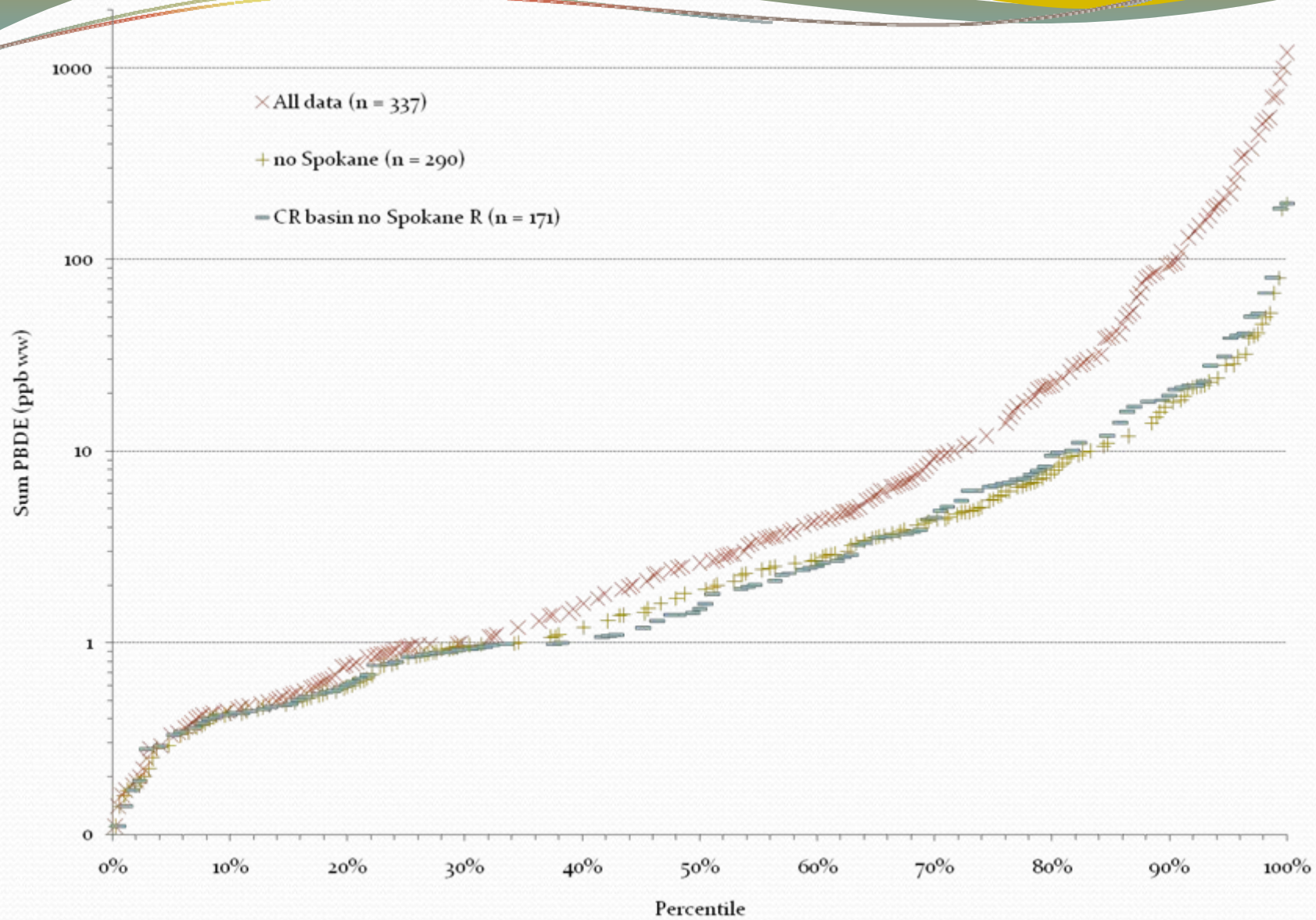
Species Composition

PBDE Congeners

- 209 total congeners
- Congeners presented today: BDE 47, -99, -100, -153, -154, -183 (ppb wet weight)
- 47 > 99 > 100
- all three on average represent > 90% of sum

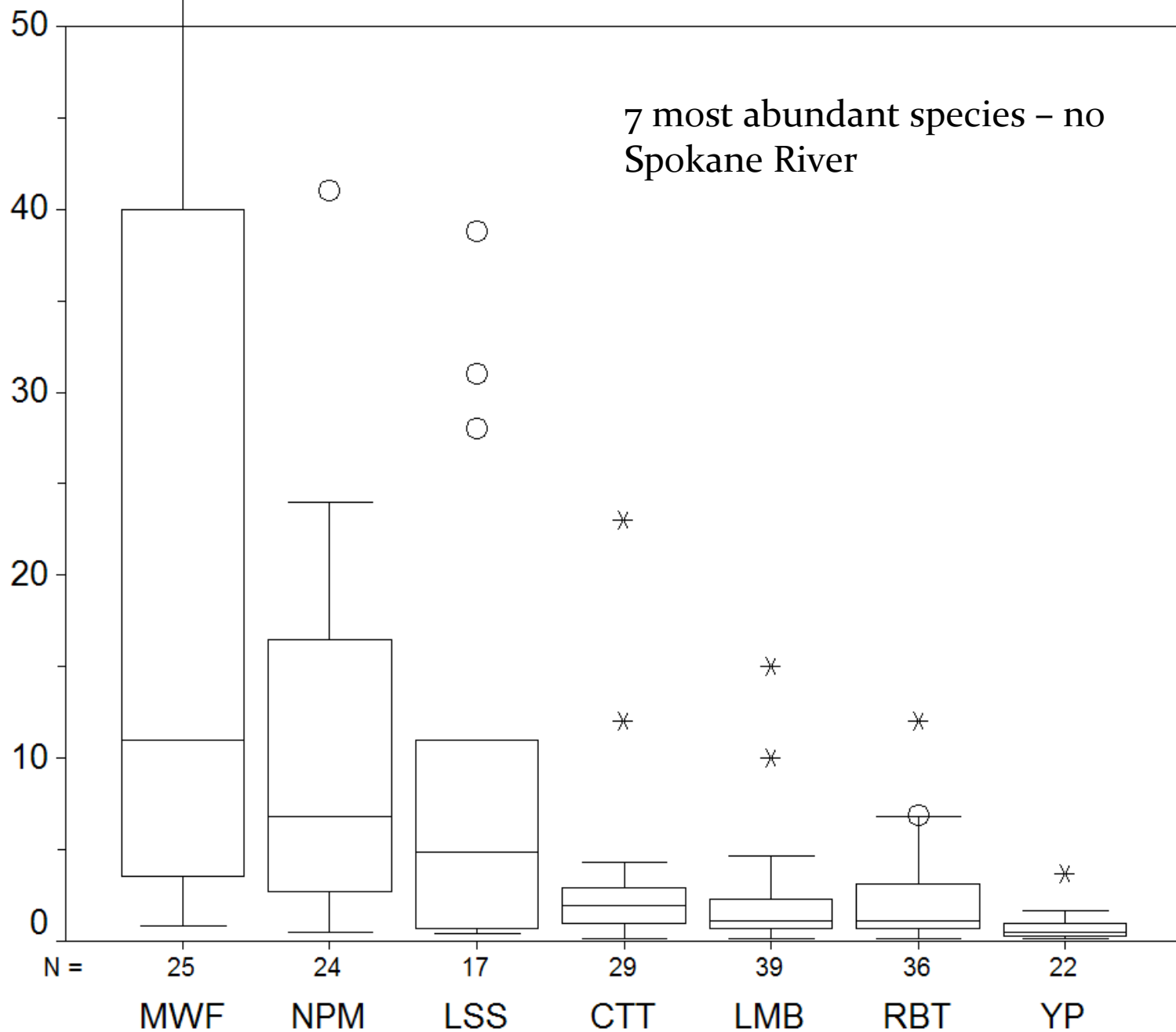


Percent contribution of 6 congeners

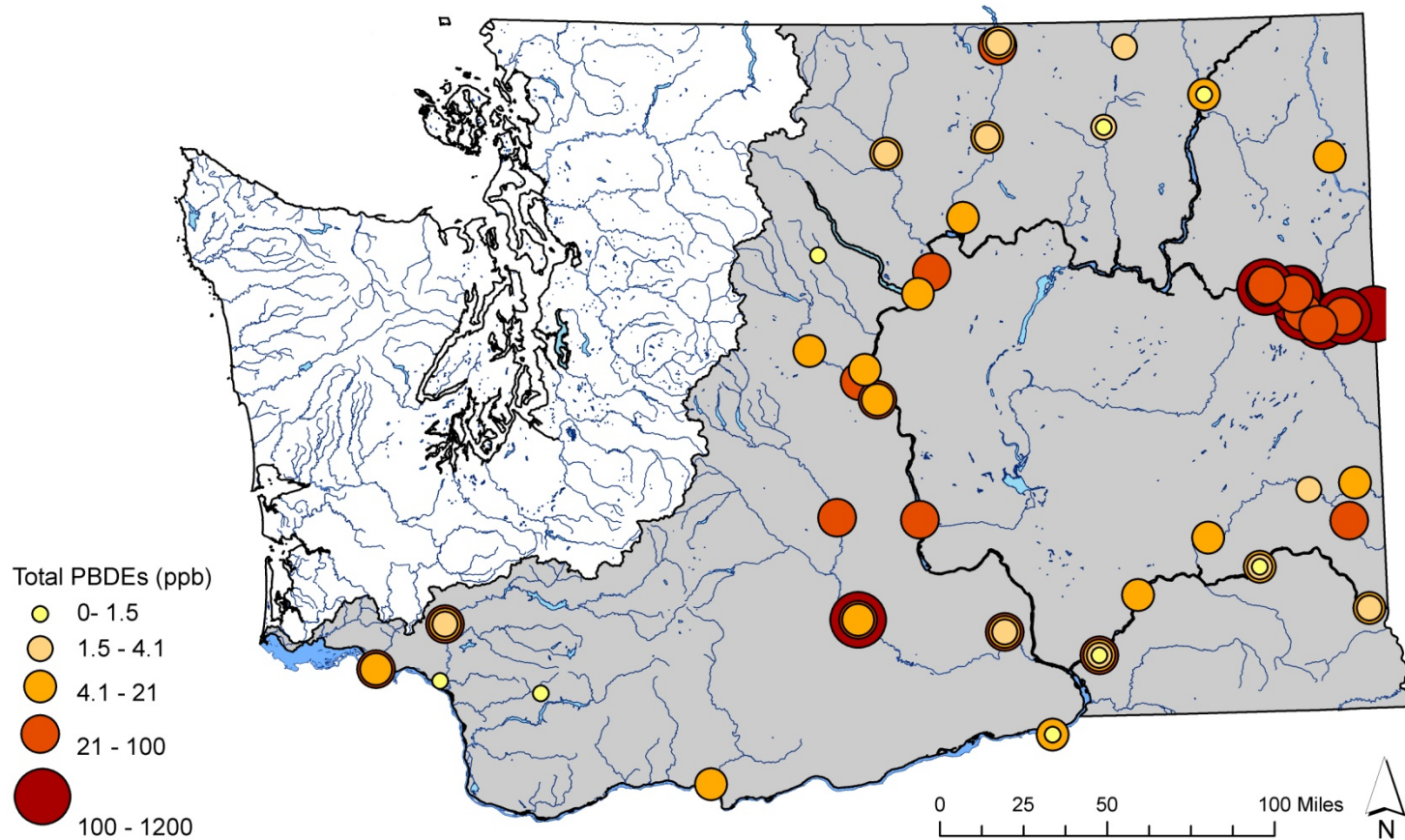


sum PBDE (ppb ww)

7 most abundant species – no
Spokane River



PBDEs in the Columbia Basin



Water - SPMDs

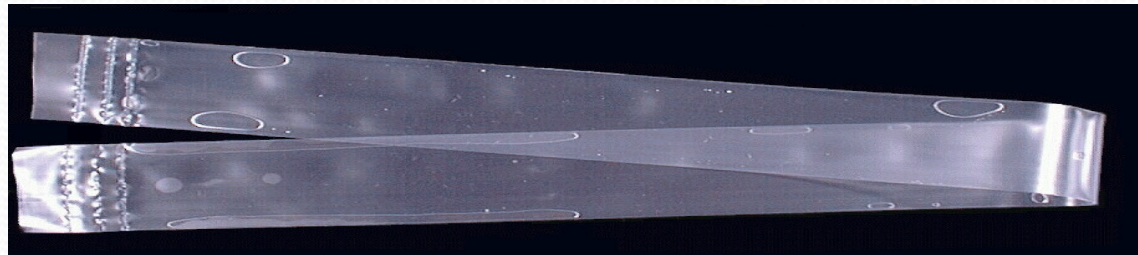
- Deployed approximately 1 month during spring and fall providing time-weighted water column concentrations
- 12 locations statewide
- 8 in CR basin

Shipping and Storage



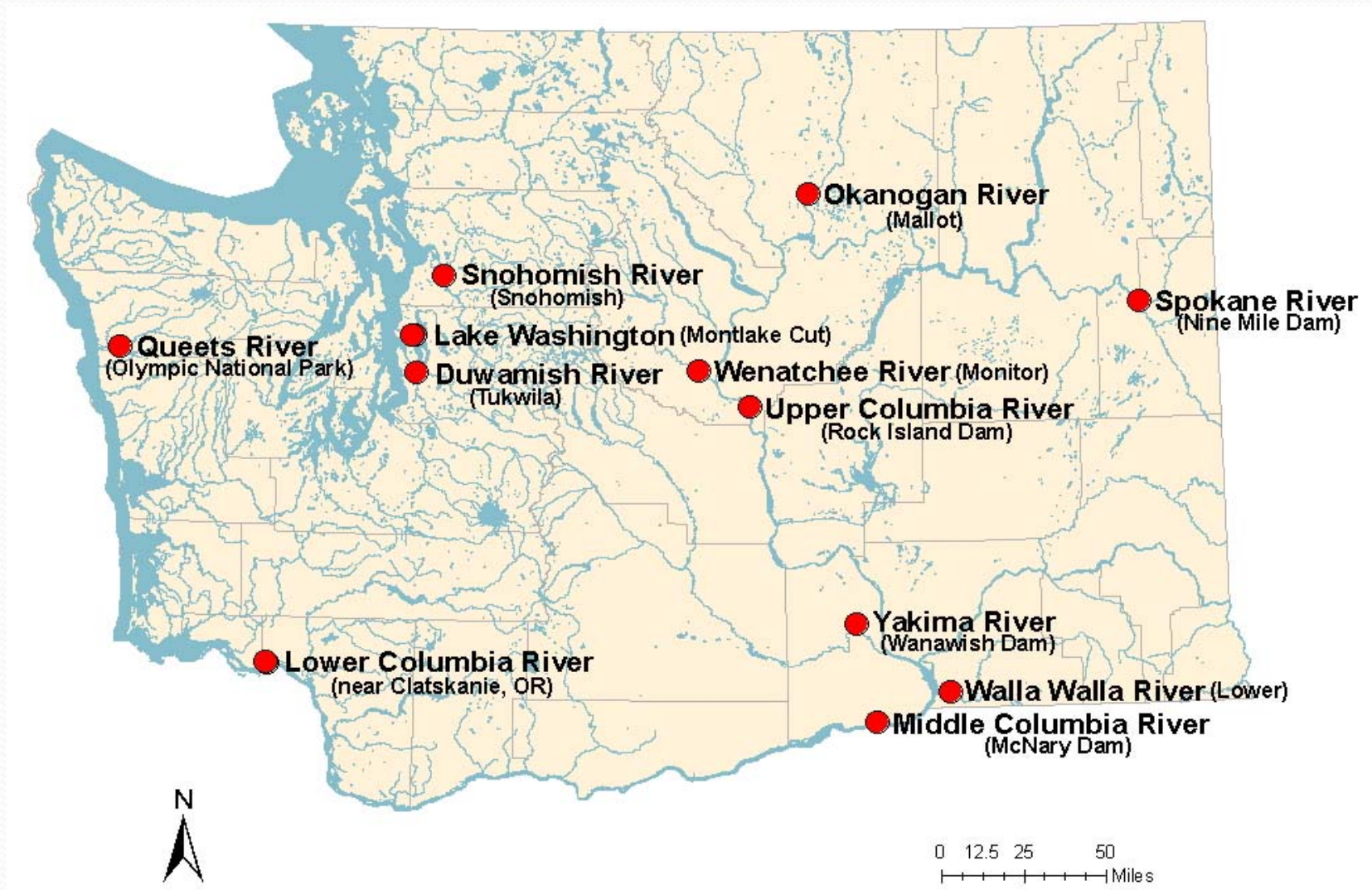
Loading in Canister

Arrays Loaded in Canister

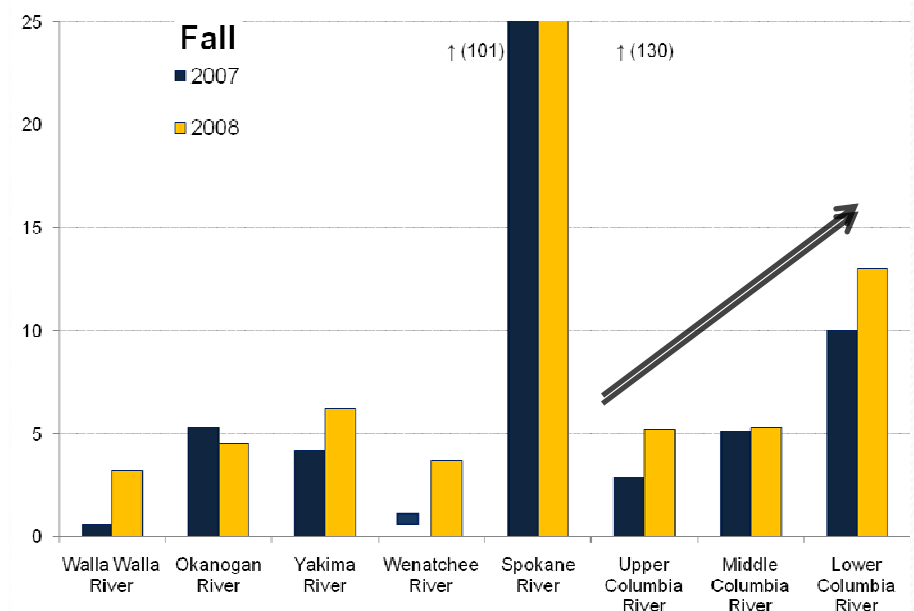
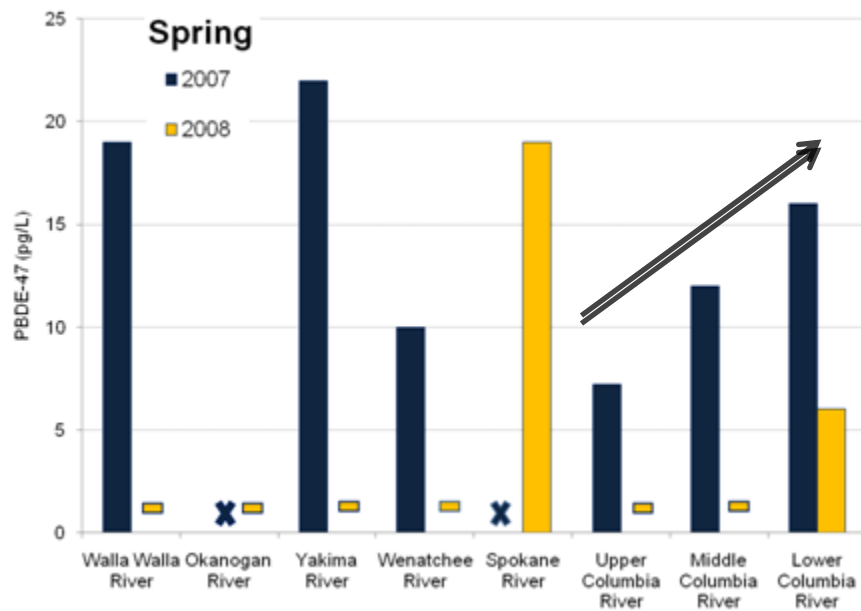


Membrane

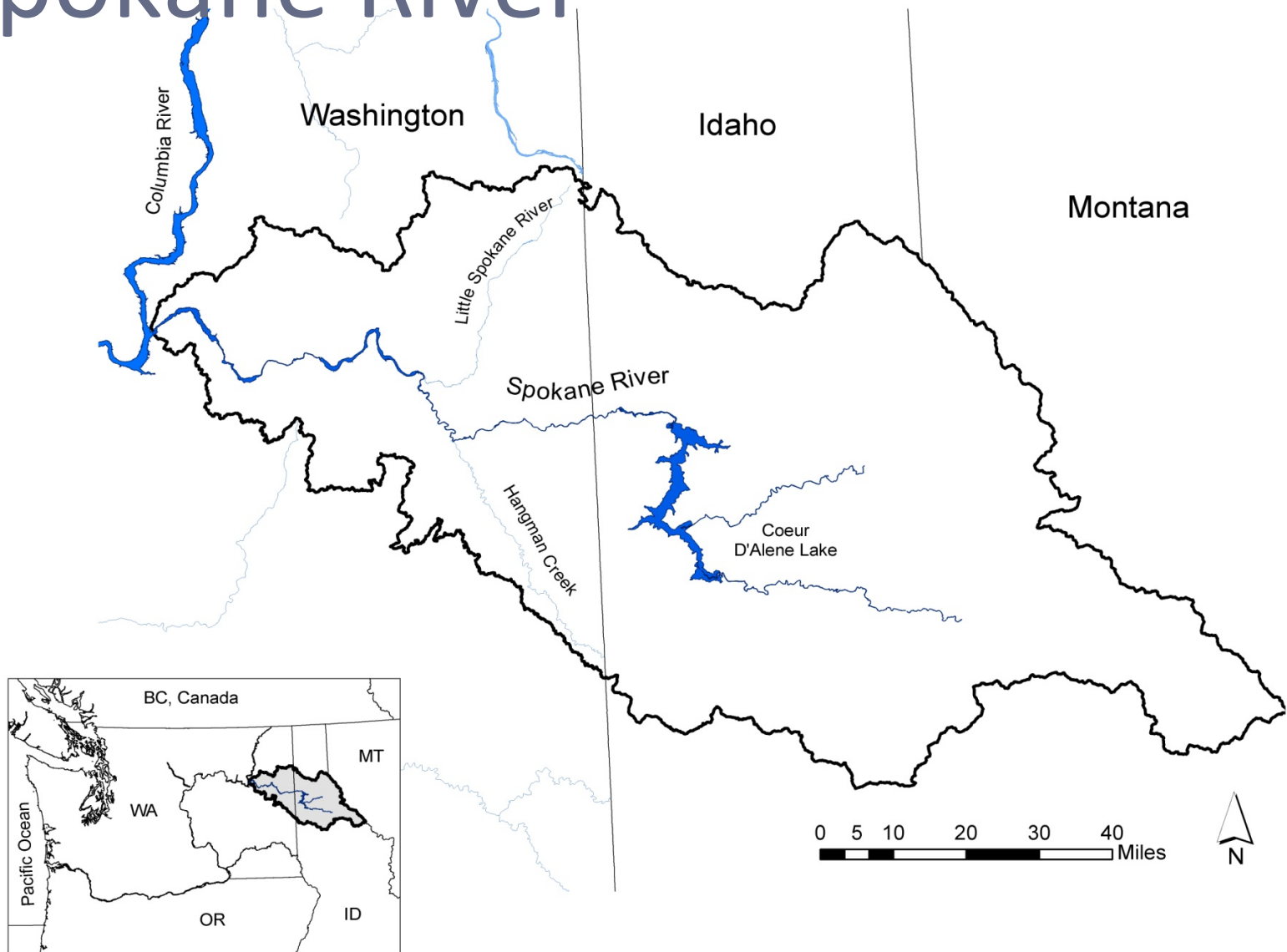
SPMD Locations



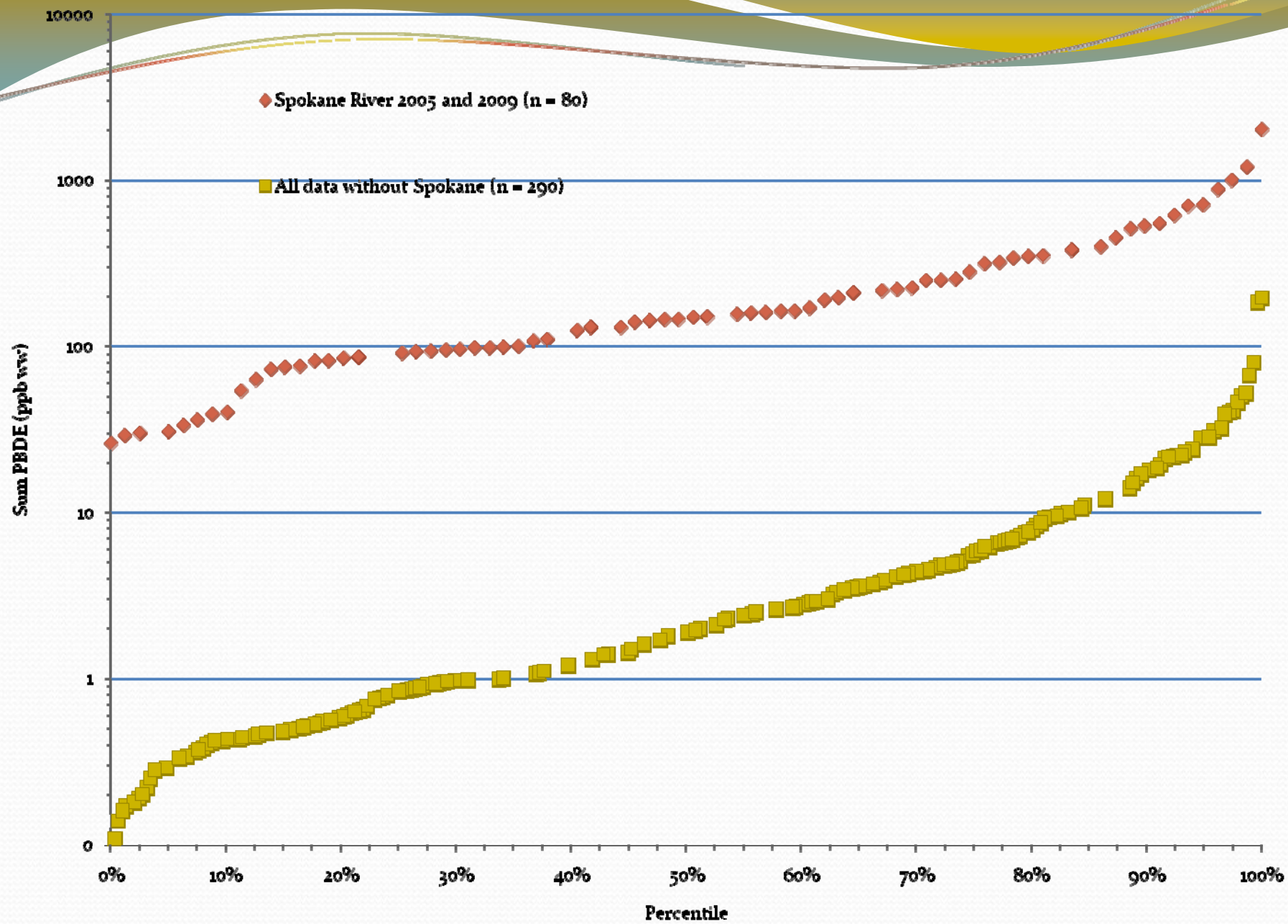
SPMD Results



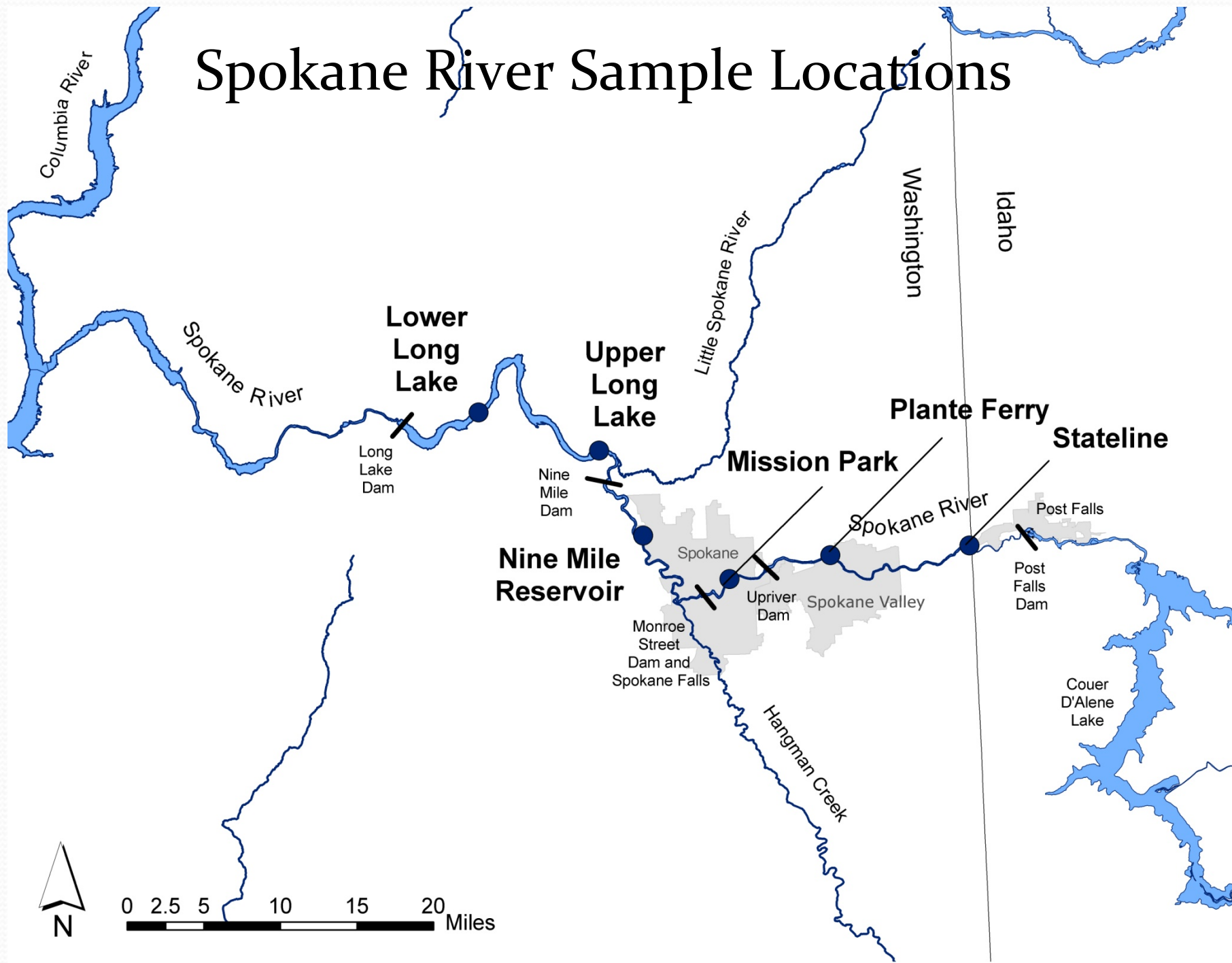
Spokane River



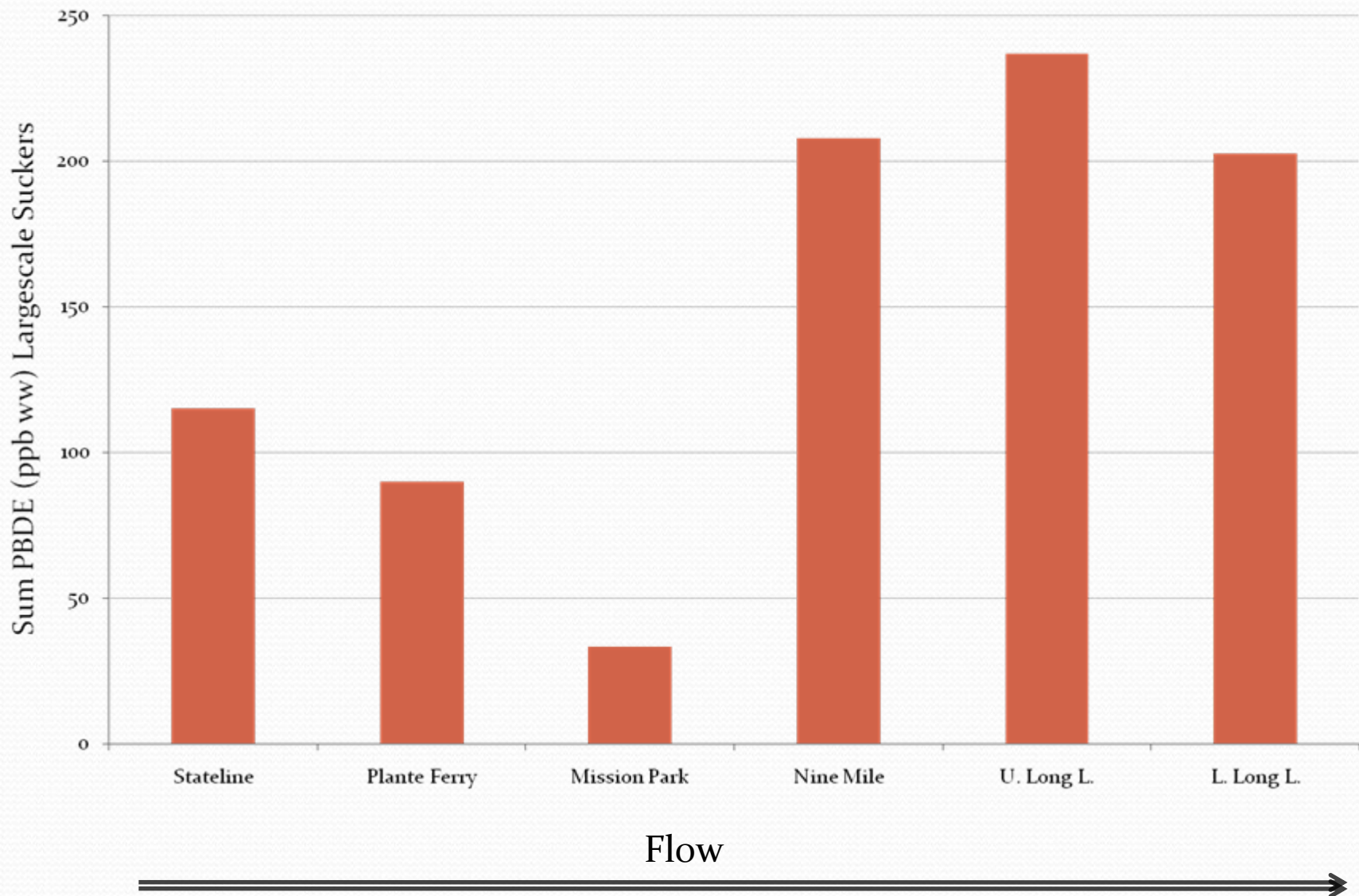
Spokane River Watershed within the Pacific Northwest



Spokane River Sample Locations



Spokane River – Spatial Trends 2009 data



Summary

- PBDEs are widespread in Columbia River basin fish tissues
- Concentrations > 4 ppb in fish tissues are common in tributaries to the Columbia
- SPMD monitoring indicates Lower Columbia River concentrations (BDE-47) are greater than upstream
- Spokane River contains the highest water and fish tissue concentrations statewide

For more on Ecology's toxics monitoring visit:
<http://www.ecy.wa.gov/programs/eap/toxics/index.html>

