Columbia River: State of the River Report for Toxics

Columbia River Toxics Reduction Working Group

Hood River

June 10, 2008

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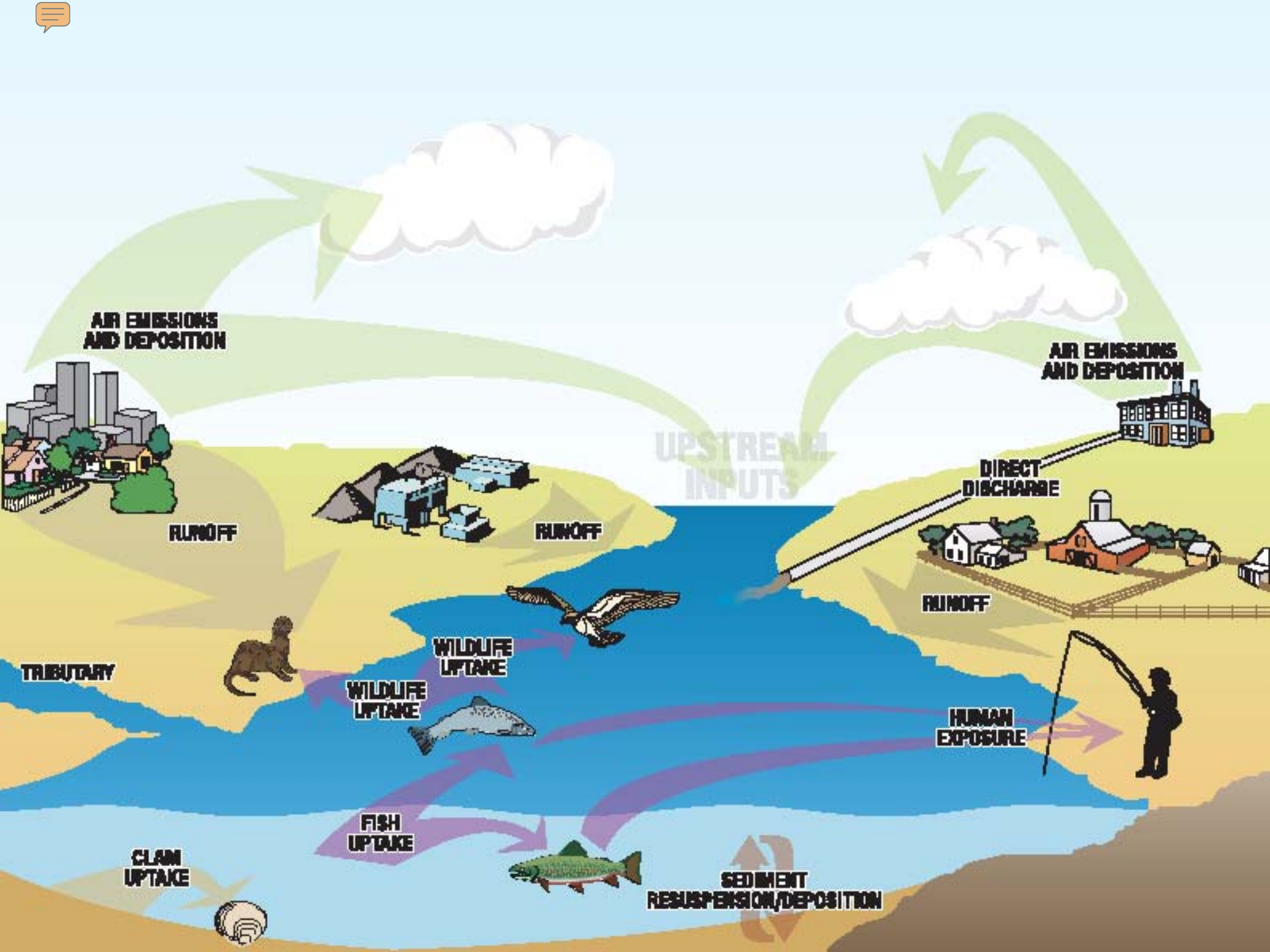
- **USACE -** Mark Siipola
- **USDOE -** John Sands

ALBERTA
SASKA
BRITISH COLUMBIA
Columbia River
Columbia River
N
Vancouver
Trail
Kootenai
Kalispel
Colville
Spokane
Spokane
Seattle
Flathead
Missoula
Coeur D'Alene
WASHINGTON
Columbia River
Snake River
Nez Perce
Cowlitz
Yakama
MONTANA
Portland
Columbia River
Umatilla
Snake River
Grand Ronde
Warm Springs
IDAHO
Boise
OREGON
Fort Hall
Snake River
WYOMIN
0 37.5 75 150 225 300 Miles
Duck Valley
UTAH
CALIFORNIA
NEVADA

What questions does this report begin to address?

- What toxic contaminants are we most concerned about?
- Where are the toxic contaminants coming from?
- What do indicator species tell us about the health of the ecosystem?
- How are we reducing toxic contaminants?
- What are the next steps?


AIR EMISSIONS AND DEPOSITION
RUNOFF
RUNOFF
UPSTREAM INPUTS
AIR EMISSIONS AND DEPOSITION
DIRECT DISCHARGE
RUNOFF
TRIBUTARY
WILDLIFE UPTAKE
WILDLIFE UPTAKE
HUMAN EXPOSURE
FISH UPTAKE
CLAM UPTAKE
SEDIMENT RESUSPENSION/DEPOSITION

What toxic contaminants of concern are the focus of this Report?

- Widely distributed and at level of concern throughout the Basin
- Known or suspected to have adverse effects on wildlife, fish, and humans
- Opportunity to build on current toxic reduction efforts
  - DDT
  - Mercury
  - PCBs
  - PBDEs

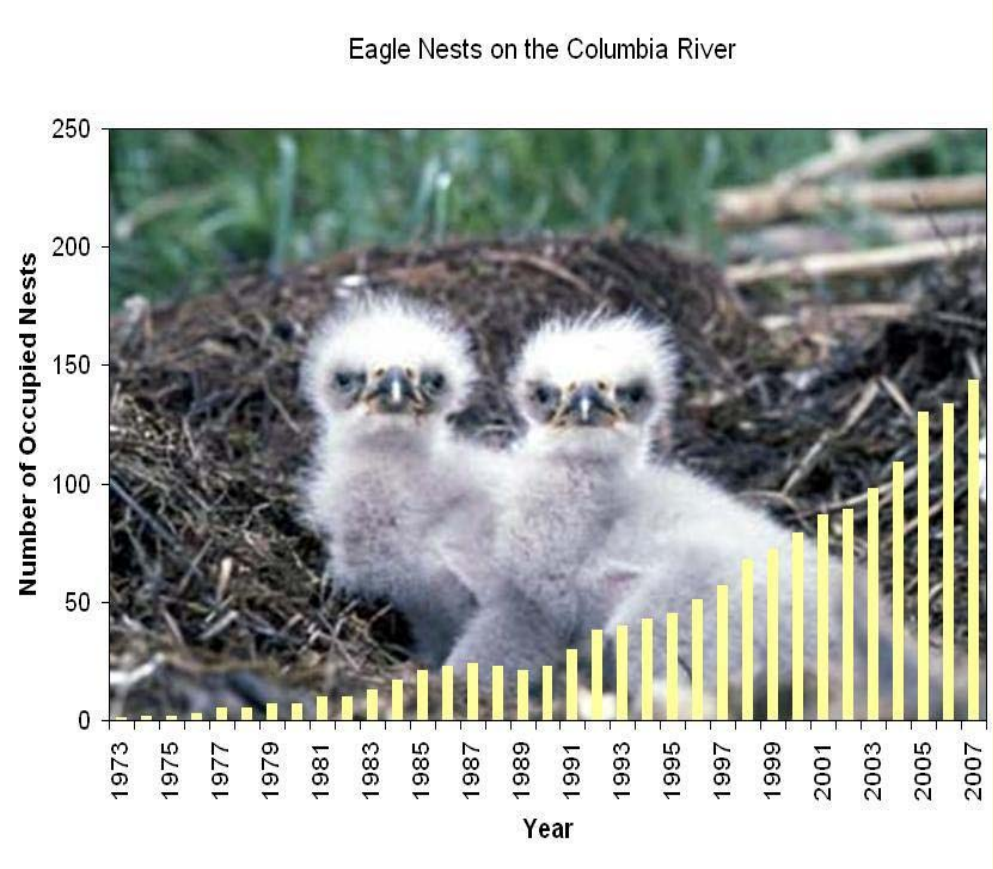
Indicator Species

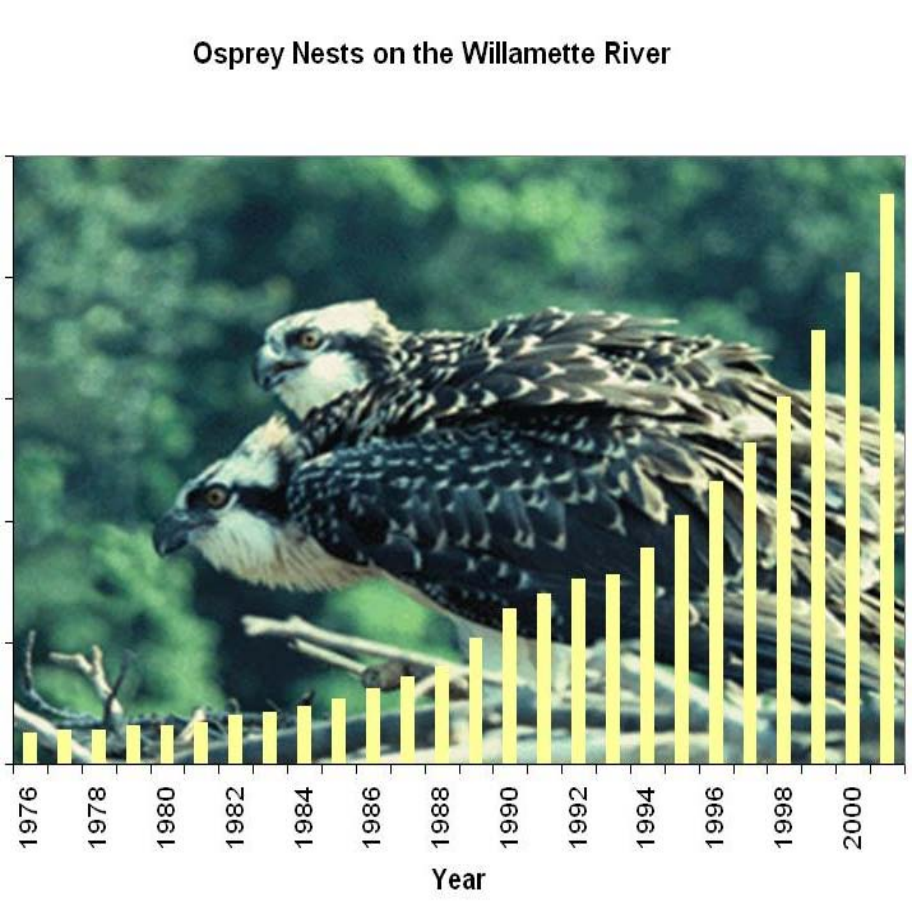
- Species living in the river, or dependent on food from the river, that when studied over time help track changes in ecosystem health
- 1) salmon (juvenile and adult)
- 2) resident fish, both native and introduced (e.g., sucker, bass, and mountain whitefish)
- 3) white sturgeon
- 4) predatory birds (osprey and bald eagles)
- 5) aquatic mammals (mink and otter)
- 6) sediment dwelling shellfish (Asian clams)

DDTs: Banned in 1972 but still persists in the environment

- Primary source is agricultural soils in which DDT accumulated over three decades of regular use
- DDT levels have declined in fish and wildlife but are still above levels of concern in some areas
- Continue to be fish consumption advisories for DDT

Rebound of Osprey and Bald Eagle Populations Since DDT Ban



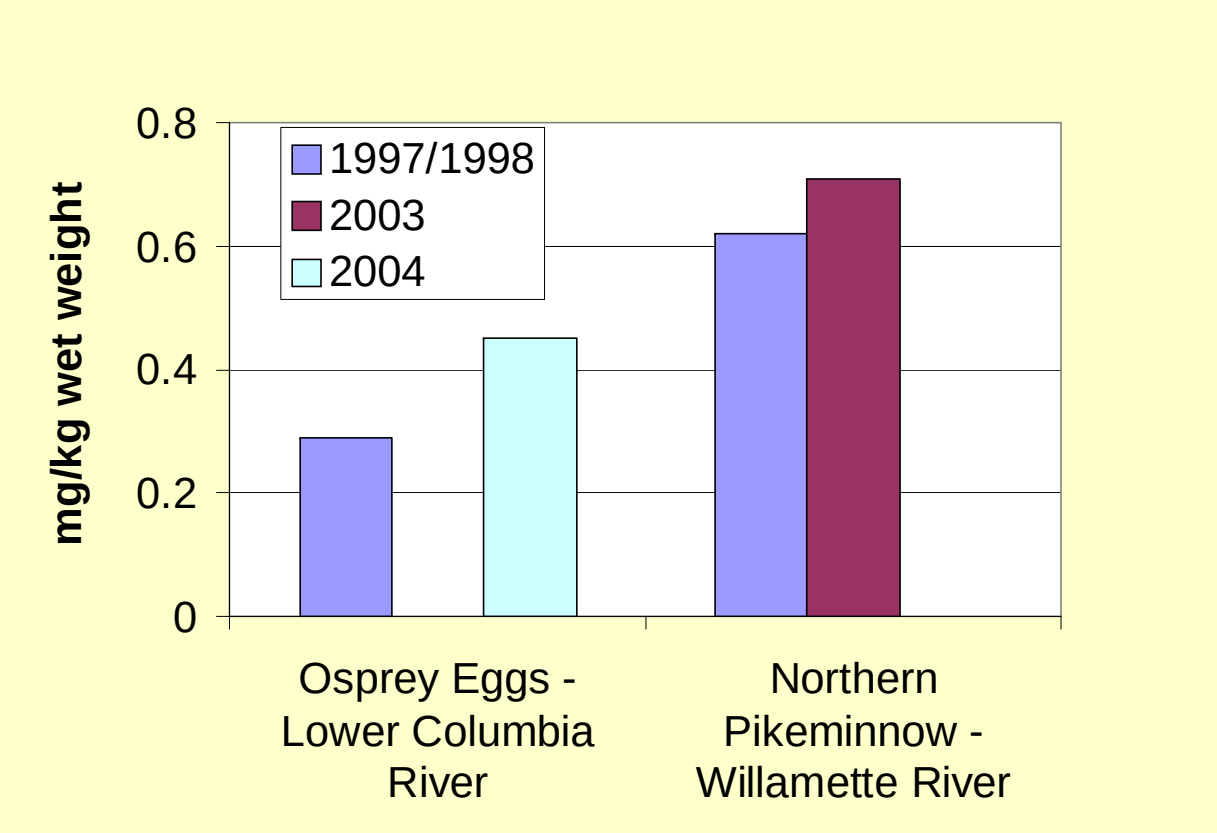


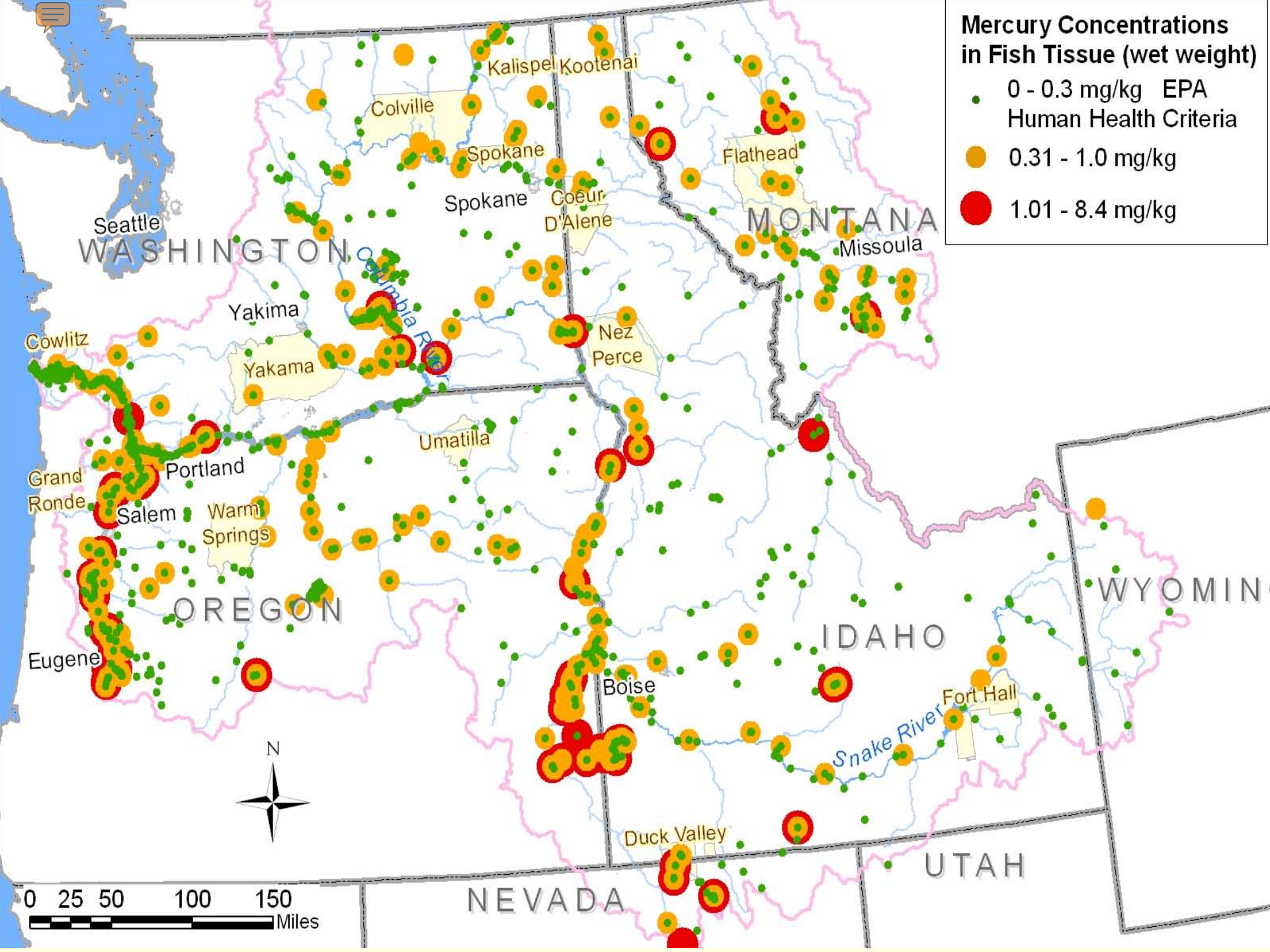
Mercury – Sources & Effects

- Air deposition may be the greatest source to the Basin, primarily from global sources
- There are local and regional sources such as
  - sediments downstream of historic mining
  - current mines air emissions
  - point source discharges to air and water
- Most Fish Consumption Advisories due to mercury

Mercury Time Trends

Increases between 1997 and 2004



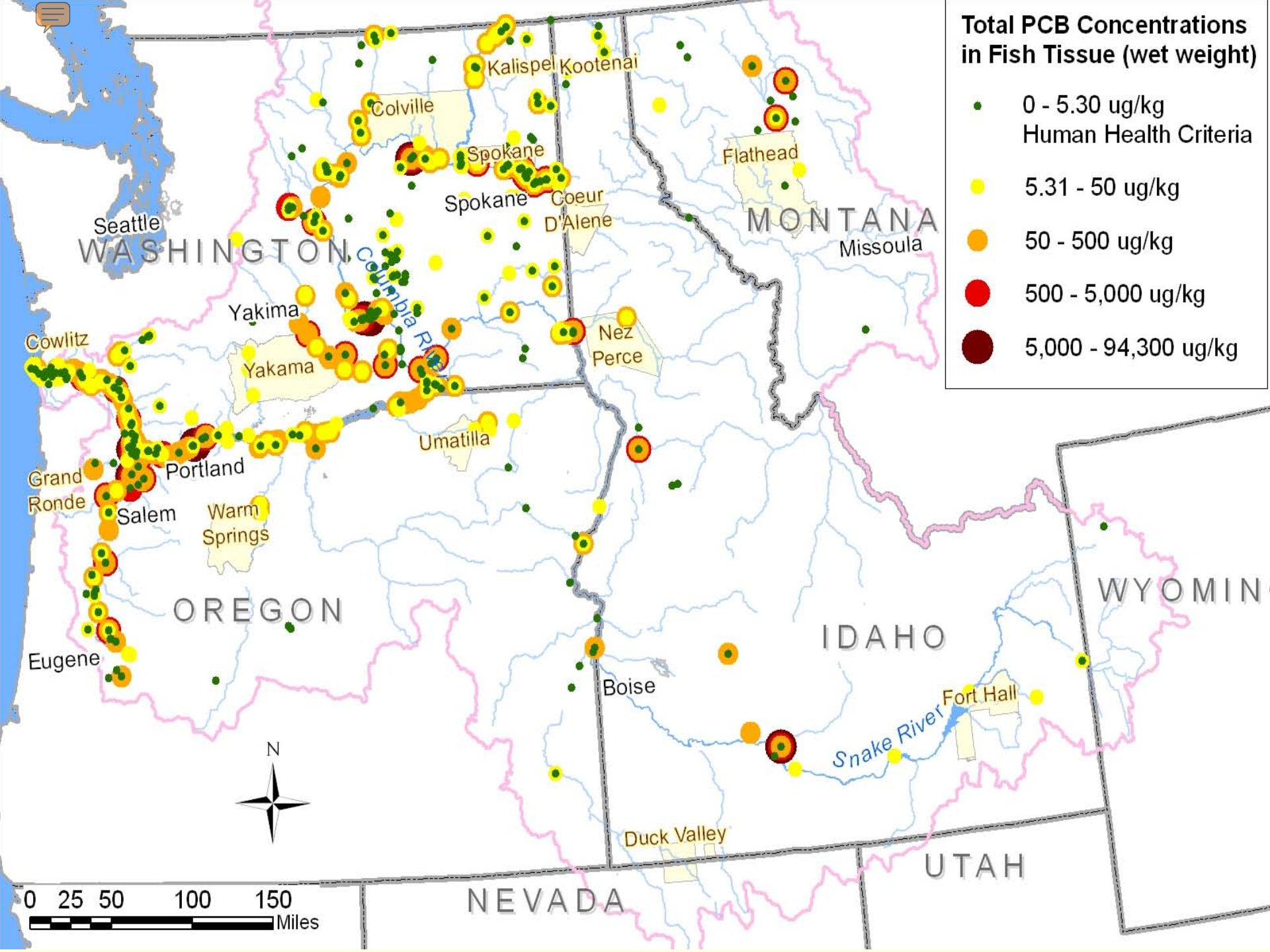

Mercury Concentrations in Fish Tissue (wet weight)
0 - 0.3 mg/kg EPA Human Health Criteria
0.31 - 1.0 mg/kg
1.01 - 8.4 mg/kg
WASHINGTON
OREGON
IDAHO
MONTANA
WYOMING
NEVADA
UTAH
Seattle
Spokane
Coeur D'Alene
Missoula
Yakima
Cowlitz
Portland
Salem
Eugene
Boise
Columbia River
Snake River
Kalispel
Kootenai
Colville
Spokane
Flathead
Yakama
Nez Perce
Umatilla
Grand Ronde
Warm Springs
Fort Hall
Duck Valley
N
0 25 50 100 150
Miles

Mercury – Spatial Distribution

- Areas of elevated concentrations near or downstream of regional sources
  - Willamette River
  - Owyhee River and Brownlee Reservoir in the Snake River
- Reservoirs often have high mercury in fish because of higher methylation potential

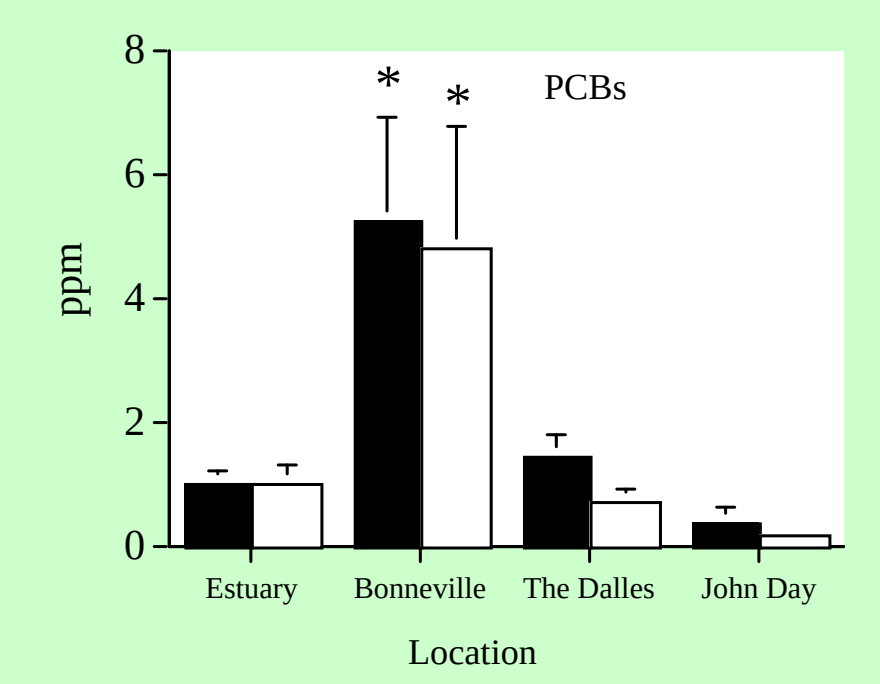
PCBs

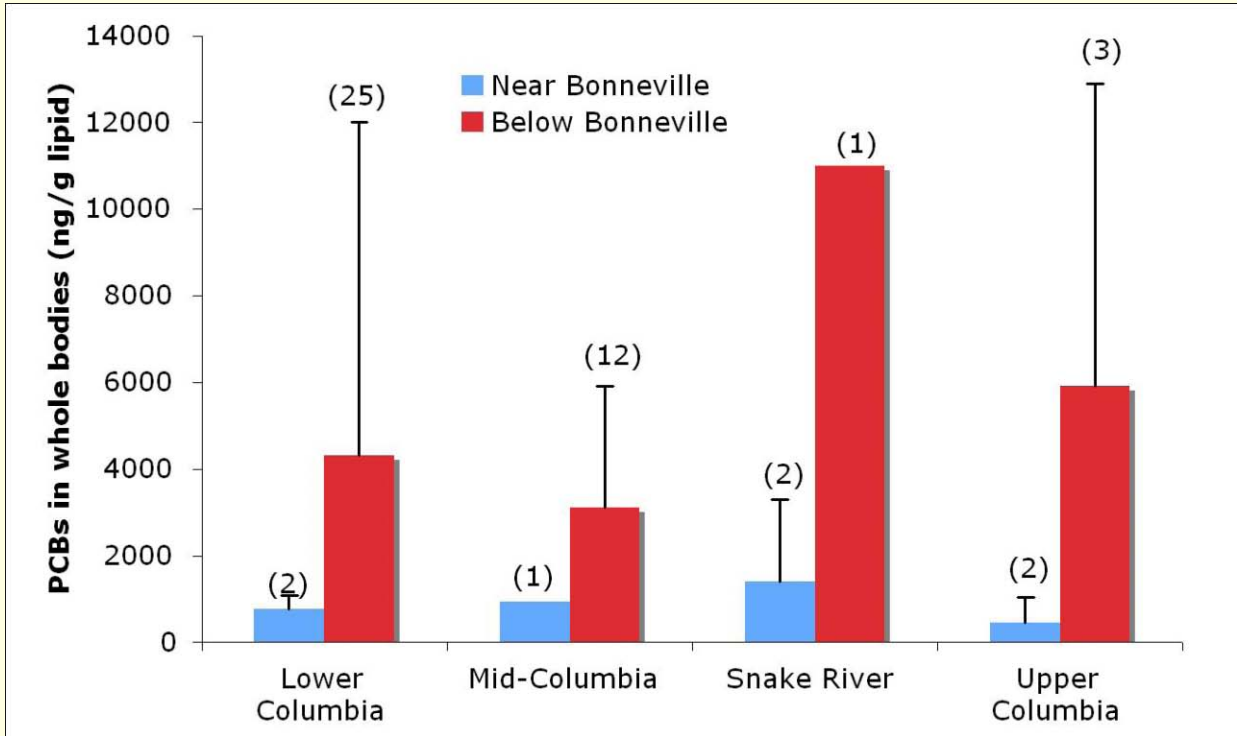
- Main sources: industrial sites and old disposal sites
- Levels have generally declined throughout the Basin
- PCBs persist at levels of concern in many locations
- As data is collected on PCBs contaminated sites are still being discovered
- Large data gaps in the basin


Total PCB Concentrations in Fish Tissue (wet weight)
0 - 5.30 ug/kg Human Health Criteria
5.31 - 50 ug/kg
50 - 500 ug/kg
500 - 5,000 ug/kg
5,000 - 94,300 ug/kg
WASHINGTON
OREGON
IDAHO
MONTANA
NEVADA
UTAH
WYOMIN
Seattle
Spokane
Coeur D'Alene
Missoula
Boise
Portland
Salem
Eugene
Cowlitz
Yakima
Columbia River
Snake River
Kalispel
Kootenai
Colville
Spokane
Flathead
Nez Perce
Yakama
Umatilla
Grand Ronde
Warm Springs
Fort Hall
Duck Valley
N
0 25 50 100 150 Miles

PCB Spatial Trends

- High levels of PCBs in Sturgeon from Bonneville Pool
- Juvenile Salmon Uptake More PCBs Below Bonneville

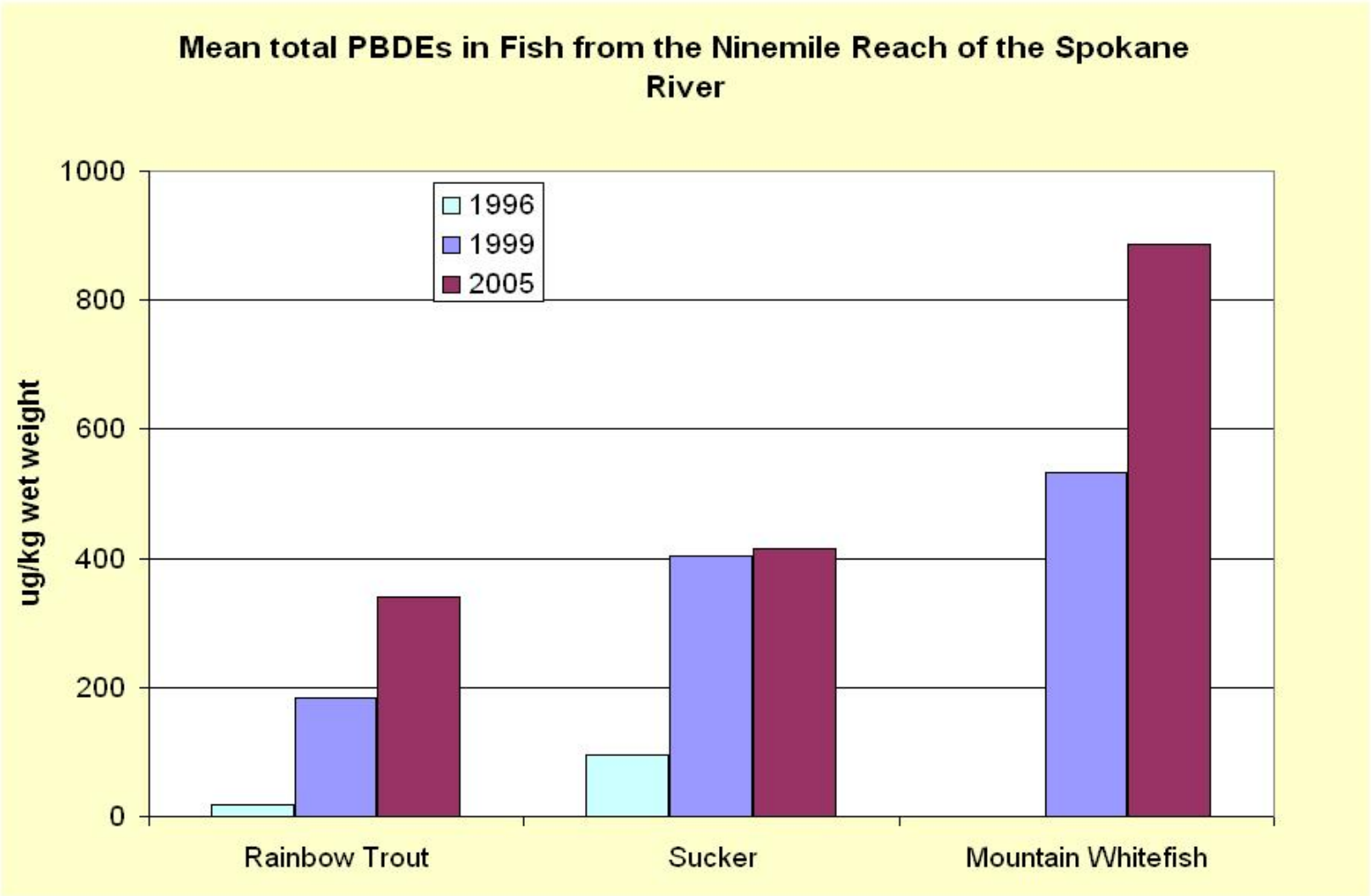




PBDES: Growing concern over flame retardants

- Flame retardants used in furniture and electronics.
- Very little data available on PBDEs
- Municipal wastewater plants are thought to be significant contributors of PBDEs
- PBDEs in dust and air are a direct pathway of exposure to humans
- importance of air and atmospheric deposition?

Levels of PBDEs are Rapidly Increasing in Spokane River Fish



Current and Planned Toxics Reduction

- TMDLs
- Point Source and Stormwater Controls
- State and Federal Cleanup Sites
- Reducing Toxic Runoff from Farmland
- State and Local Reduction Programs
- Industrial Emissions and Air Source Reductions

Key Messages About the Columbia River Basin

- Unique, diverse ecosystem providing cultural, environmental, economic benefits
- System health dependent on many factors including level of toxics
- Reduction efforts have reduced the levels of several toxic contaminants, but they are still above levels of concern in many areas
- Some contaminants are increasing

Key Messages About the Basin *cont'd*

- Additional effort needed to:
  - Further reduce toxics
  - Characterize emerging contaminants
  - Coordinate between groups to leverage limited resources

Recommended Action Agenda – Develop Workplan

- **Develop a Regional Multi-agency Monitoring and Research plan**
  - Develop a long-term monitoring program
  - Continue to evaluate potential indicators
  - Develop a site for sharing information
  - Estimate loadings of toxics into the Basin
  - Assess the health of fish and other aquatic organisms

Recommended Action Agenda – Develop Workplan

- **Expand Toxic Reduction Initiatives**
  - Use existing regulatory authorities and explore expanding authorities to reduce and control toxics
  - Increase the number of voluntary/non-regulatory programs
  - Increase public education about the toxics problem and resource needs

Review Process

- June 5: Register to access secure website for report
- July 31: Provide comments
- September 30: Complete next draft of Report
- December 3: Complete report
- December 30: Final Report