

PCBs and Public Health

Toxicity and Exposure

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We're Concerned Because...

PCBs can cause cancer, immune toxicity, neurological and behavioral problems, and reproductive effects.

We're all exposed to PCBs

- PCB detected in serum of 100% of U.S. population sampled 2003-04 by CDC

Cancer

- Clear evidence that commercial PCB mixtures cause cancer in animals (liver, thyroid).
- Studies in workers (commercial mixtures)
 - Liver, bile-duct cancers
 - Melanoma

Immune

Animals

- Reduced antibody response (monkeys)

Humans:

- Elevated ear and lower respiratory infections
- Reduced vaccination response

Learning and Behavior

fetal/infant exposures to PCBs...

Animals (rodents and monkeys)

- hyperactivity, slower adaption to new challenge, learning and memory impairments

Children (PCB exposure during fetal period)

- Abnormal infant reflexes, reduced IQ, learning and memory impairments

Reproductive effects

Animals (rodents, monkeys)

- Lower birth weight, fewer live births, lower conception rates

Humans

- Longer time-to-pregnancy
- Reduced growth at birth and into puberty

Interaction with Hormone systems

Strongest evidence - Disruption of thyroid hormone levels

More recent evidence—

- Binding to estrogen receptor
- PCBs induce enzymes that alter estrogen metabolism

Human exposure to PCBs

- PCBs in our diet
- PCBs are widely dispersed in human environment (air, water, soil, building materials, house dust)
- PCB levels in breast milk, blood have declined dramatically since ban in late 1970s.
 - ~80% drop in blood serum of US Population since 1980
- PCB body burden is higher in older individuals

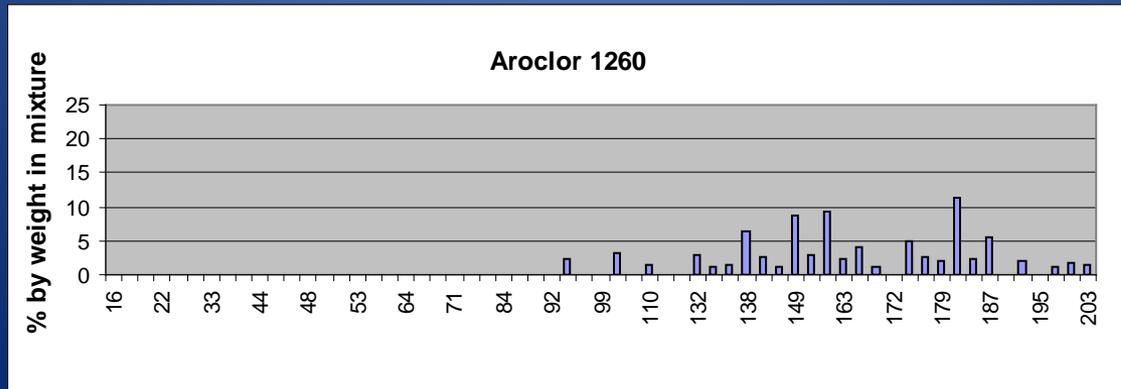
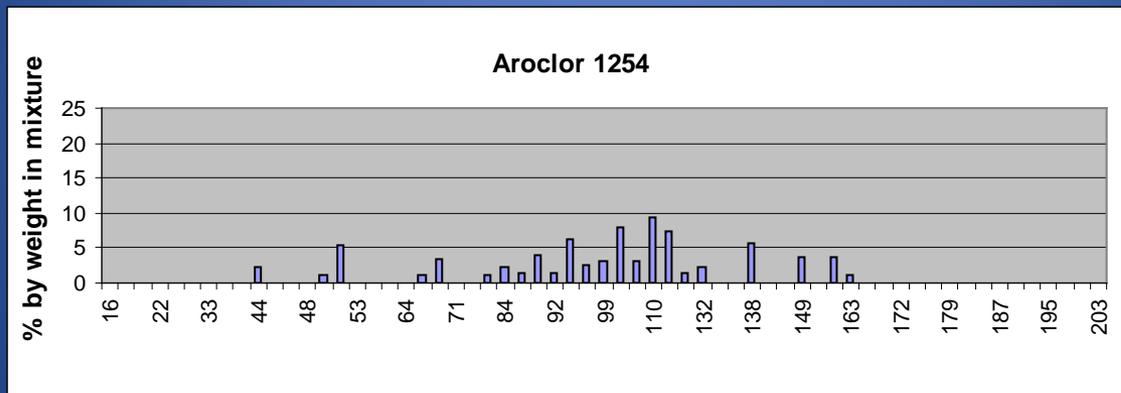
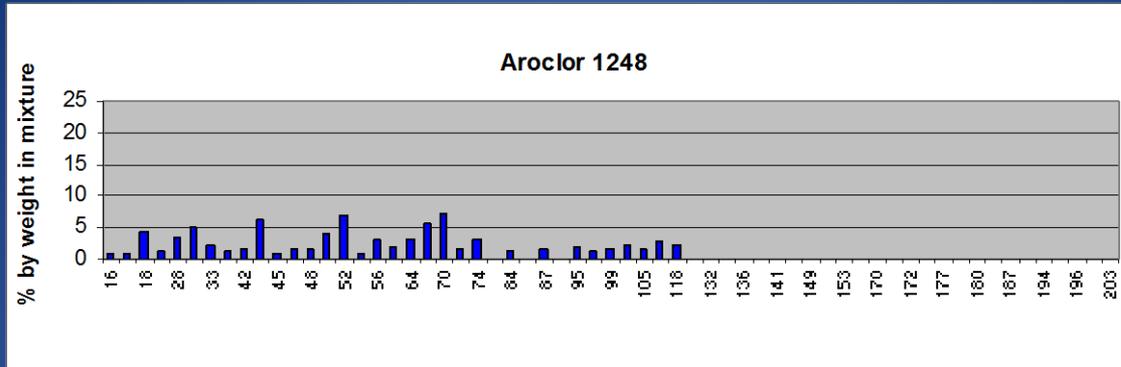
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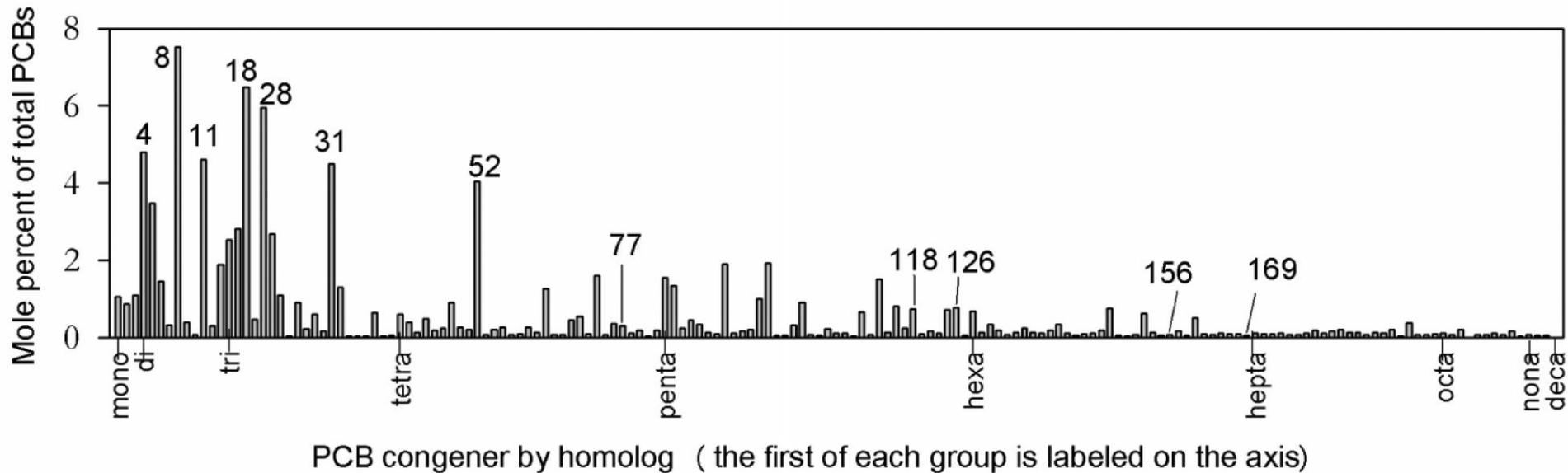
Peoples' Exposure Varies

- Some people have more exposure than others to PCBs
 - Fish consumers
 - Consumers of marine mammals
 - Living/working in contaminated buildings
- More exposure = More risk of harm
- Possible environmental justice issues

PCB Exposure is to Mixtures

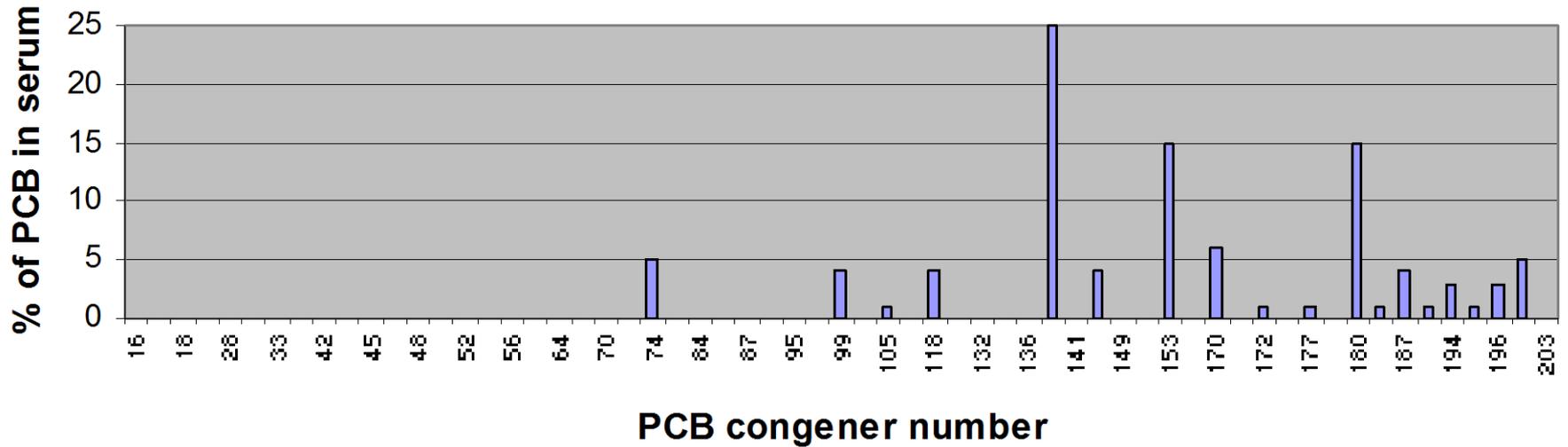


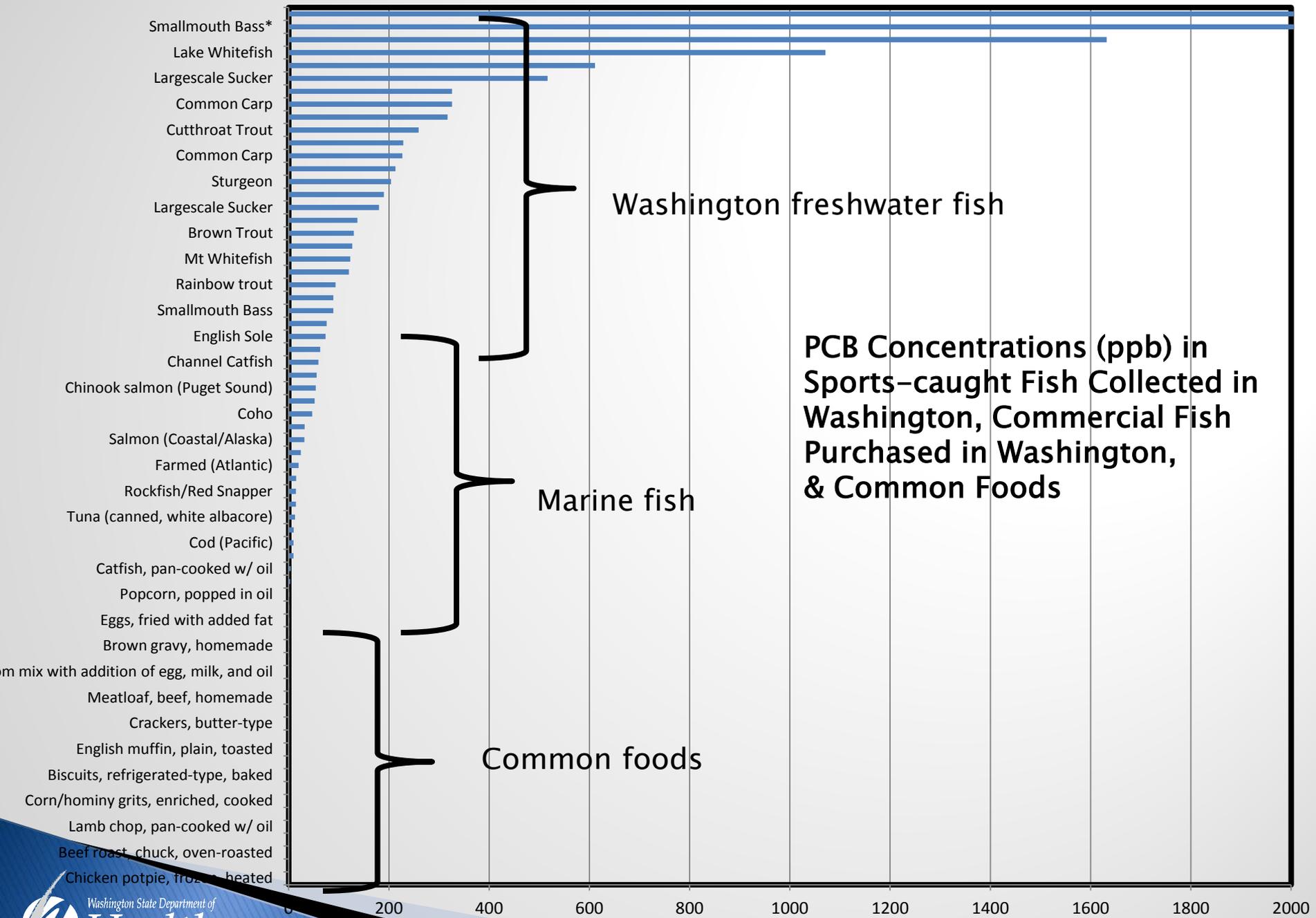
PCBs in urban air (Chicago)



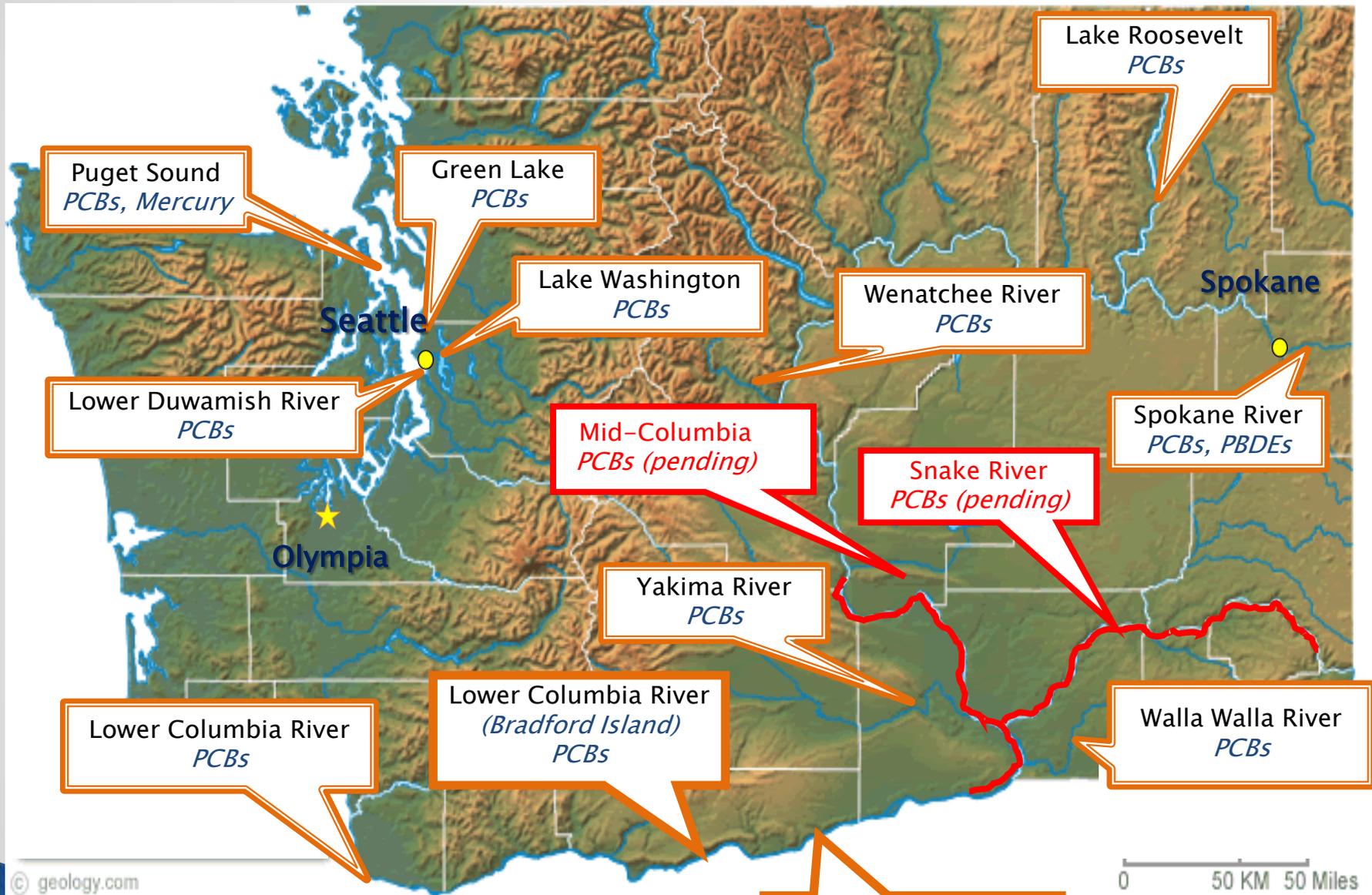
Fish Consumers

Lake Michigan Fish Consumers





WASHINGTON FISH ADVISORIES DUE TO PCBs



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0 50 KM 50 Miles

PCB Advisories

- ▶ Fish advisories attempt to balance risks associated with PCB exposure with the known benefits of fish consumption
 - PCBs often associated with bottom-feeding fish
 - Local sources can greatly increase resident fish PCB concentrations
 - Anadromous fish typically have much lower PCB burdens
- ▶ While infants can be exposed to PCBs via breast milk, DOH continues to recommend that mothers breast-feed their babies.