



Apr 5th, 10:25 AM - 10:30 AM

PCBs in Lower Green River juvenile Chinook salmon

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PCBs in Green-Duwamish Juvenile Chinook

By Jenée Colton, Chris Gregersen, Kollin
Higgins, and Richard Jack

2018 Salish Sea Environmental Conference

April 4-6
Seattle, WA



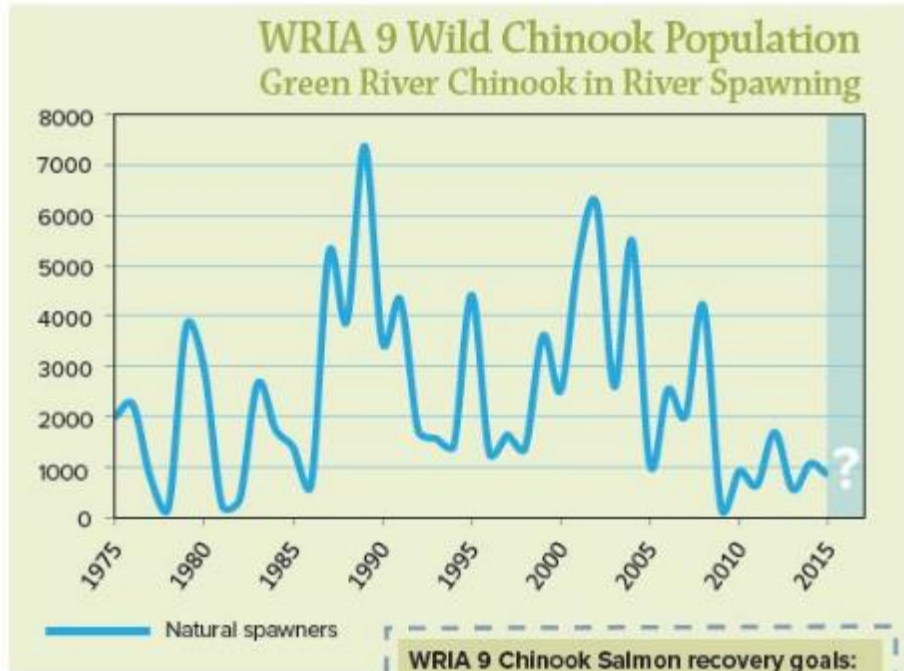
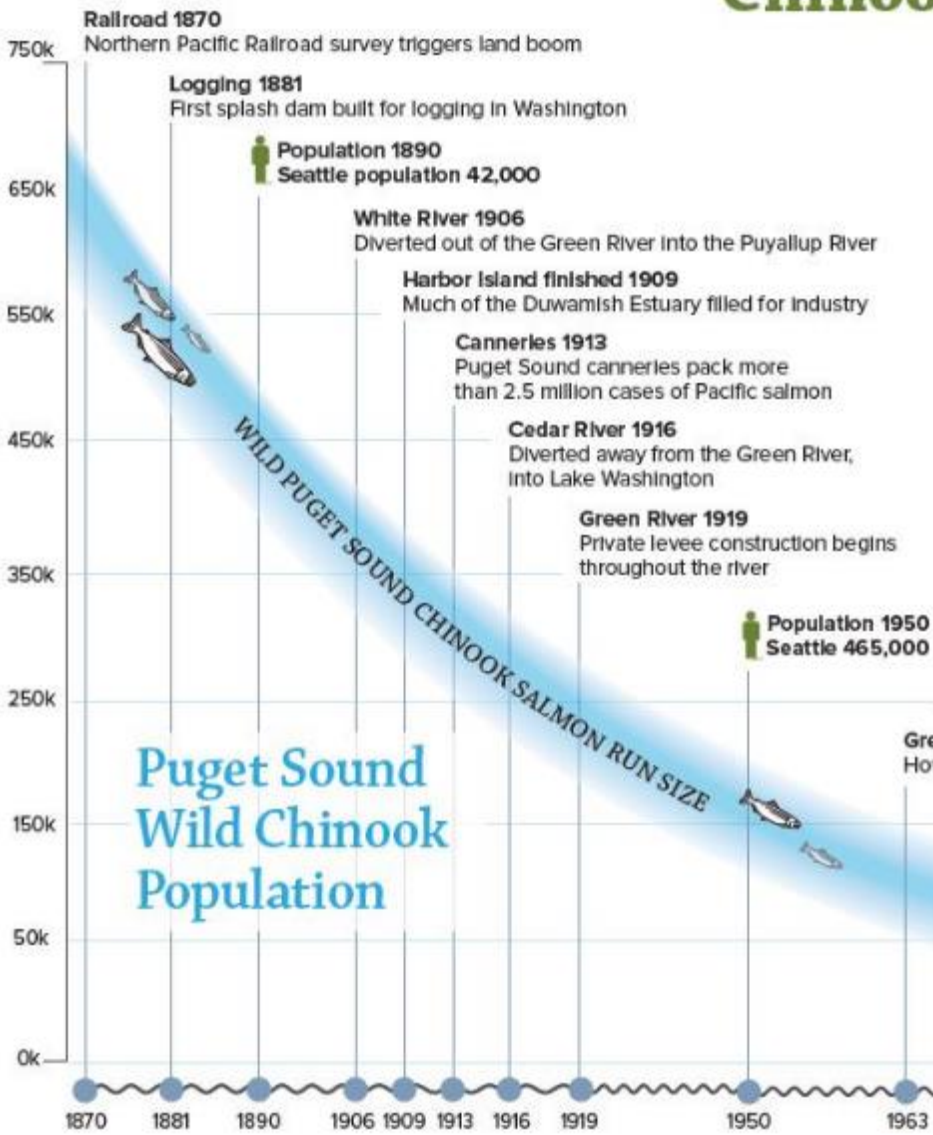
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Chinook Salmon Recovery Timeline



Puget Sound Wild Chinook Population

Why does the data on salmon abundance begin to improve in 1975?

The quality of data on annual salmon population runs improves starting in 1975, when the Washington Department of Fisheries (predecessor to Department of Fish and Wildlife) initiated data collection in response to the federal court mandate to develop and share annual abundance of salmon returning to individual rivers in Puget Sound.

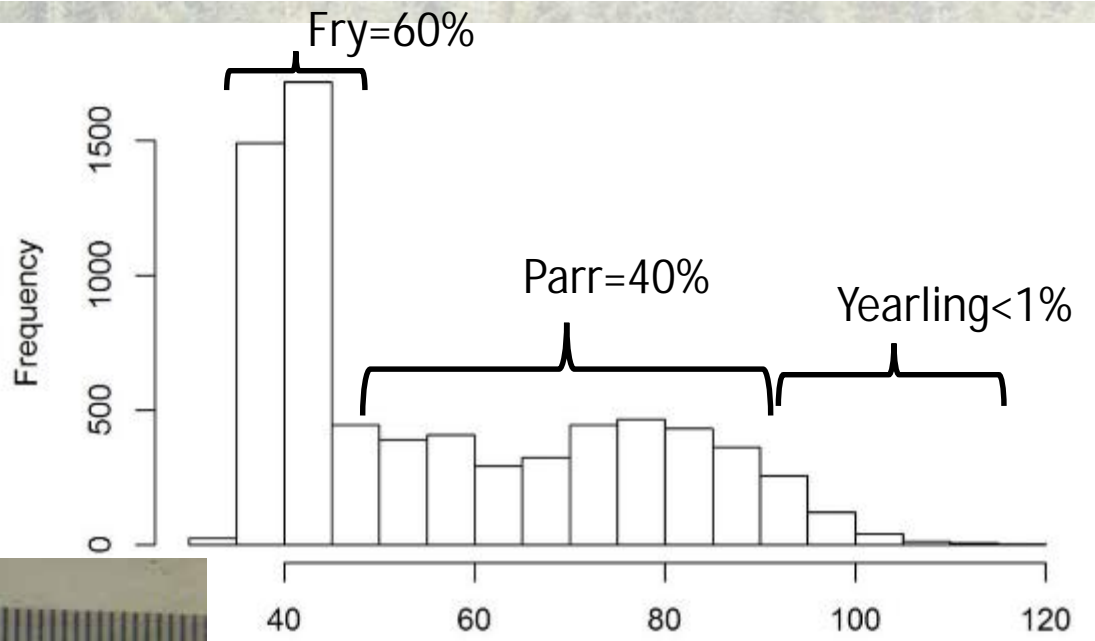
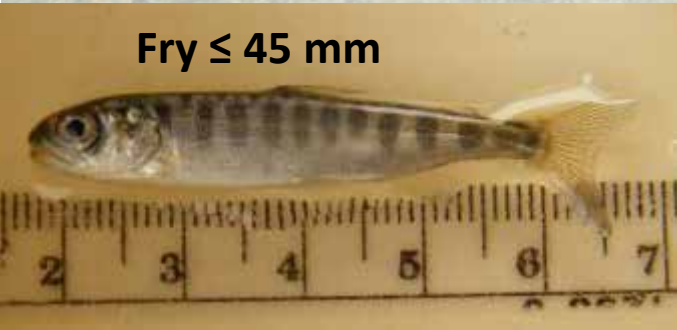
Puget Sound Chinook listed as threatened species

Lowest number of natural origin spawners (182 fish) recorded in the Green River

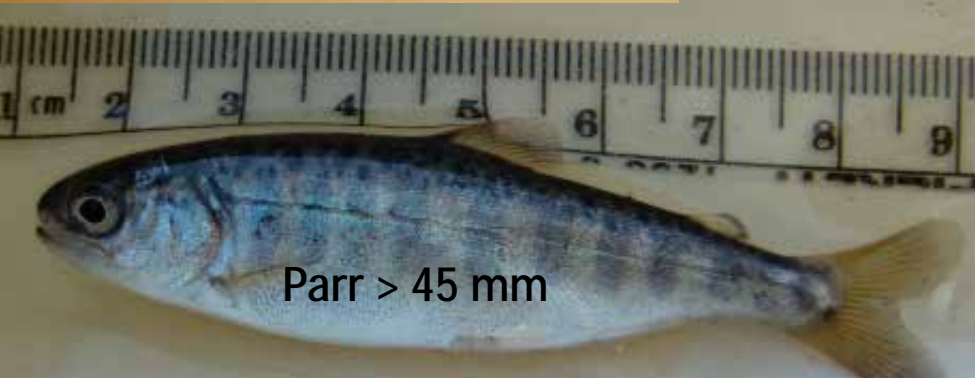
Population 2016
Seattle 689,000

Green Juvenile Chinook Lifestages

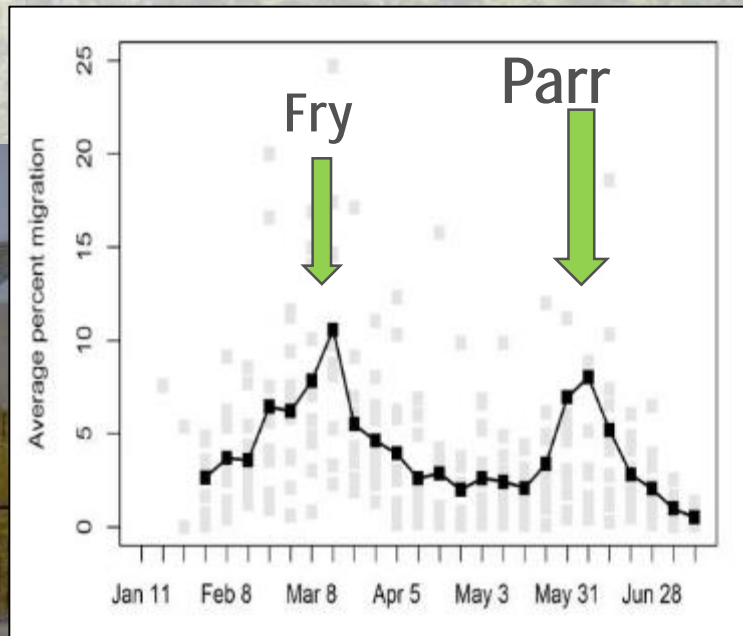
Fry ≤ 45 mm



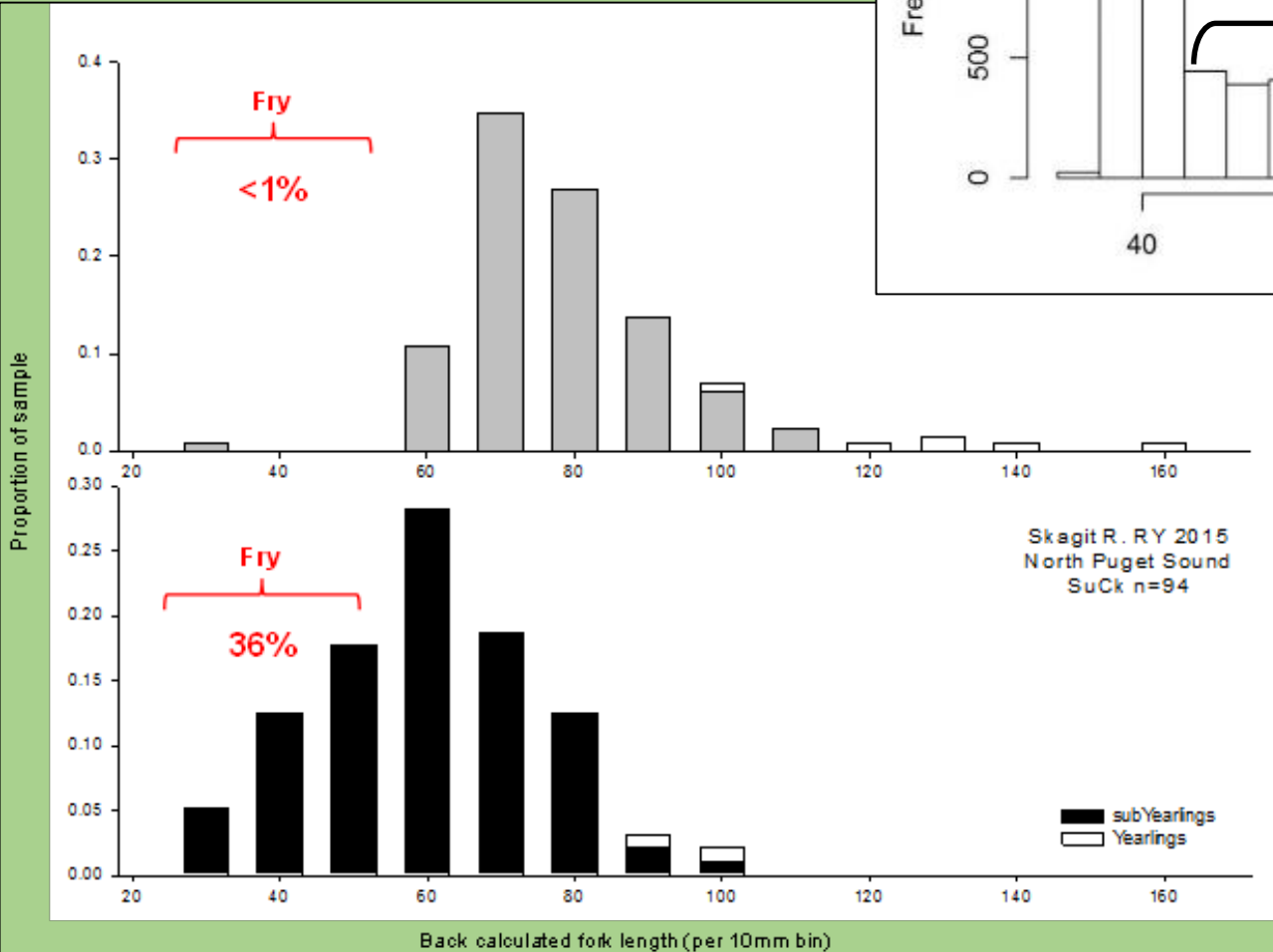
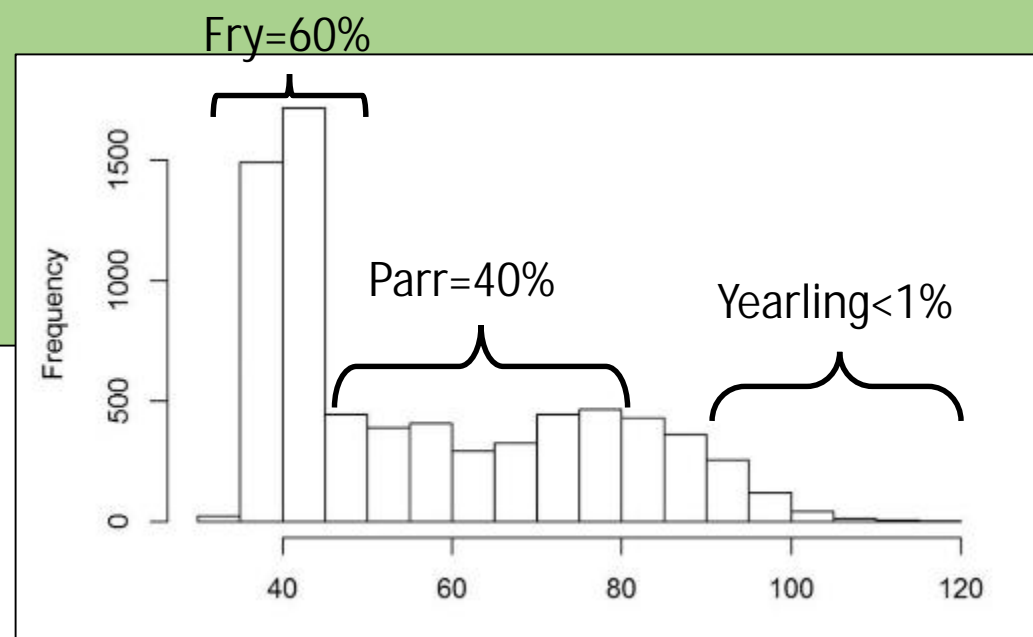
Parr > 45 mm



Yearling > 80 mm



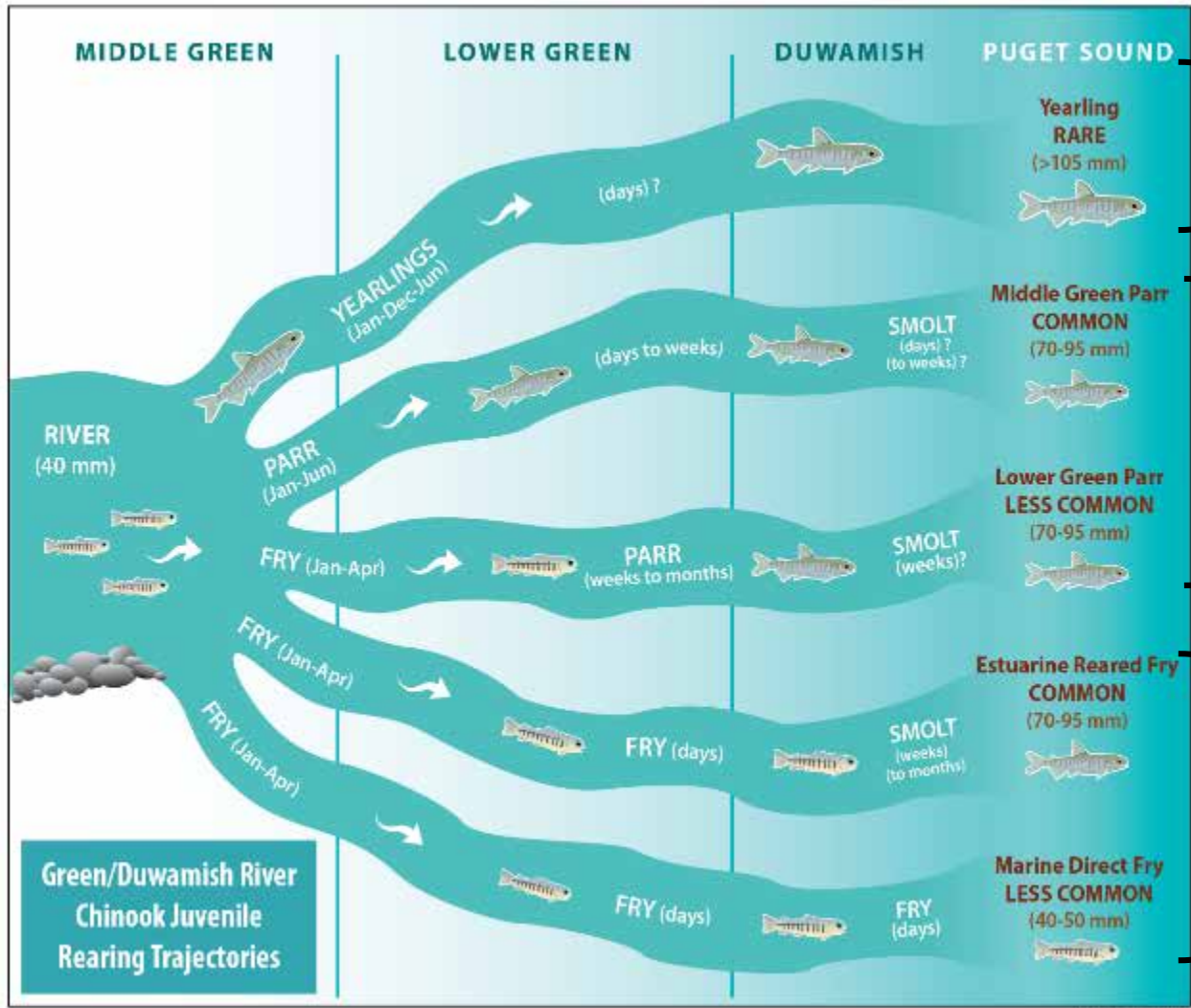
Productivity and Survival



Green River

Skagit River

Figure 4.1.2. Length frequency histogram of back calculated size (fl-mm) at estuary/ocean entrance of returning adult Chinook salmon from the Green River (gray bars) and Skagit River (black bars). Yearlings from each population in clear bars.



Least abundant juvenile, but highest survival to adulthood

2nd most abundant juvenile, high survival to adulthood

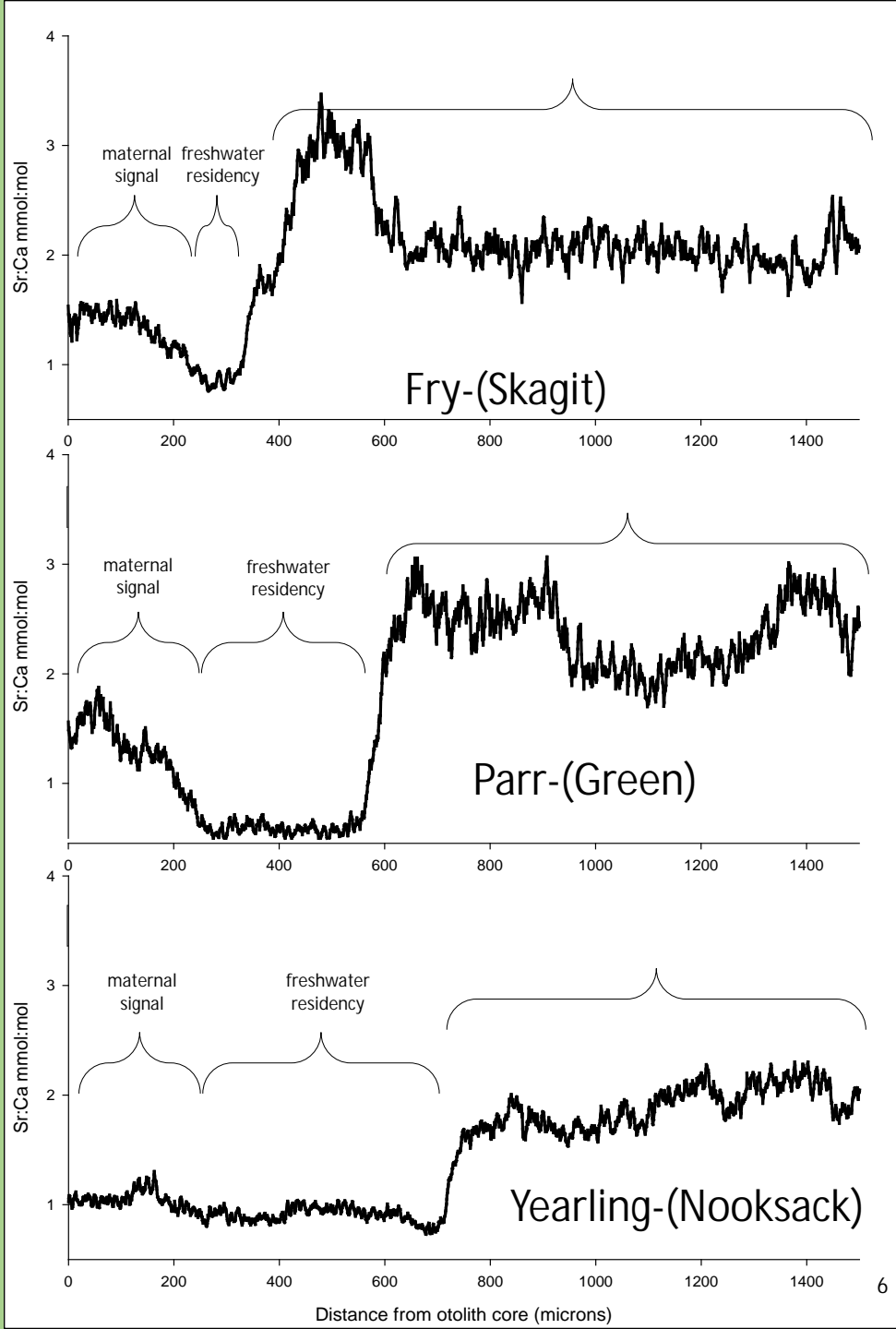
Most abundant juvenile, but extremely low survival to adulthood

Last updated Feb 2017

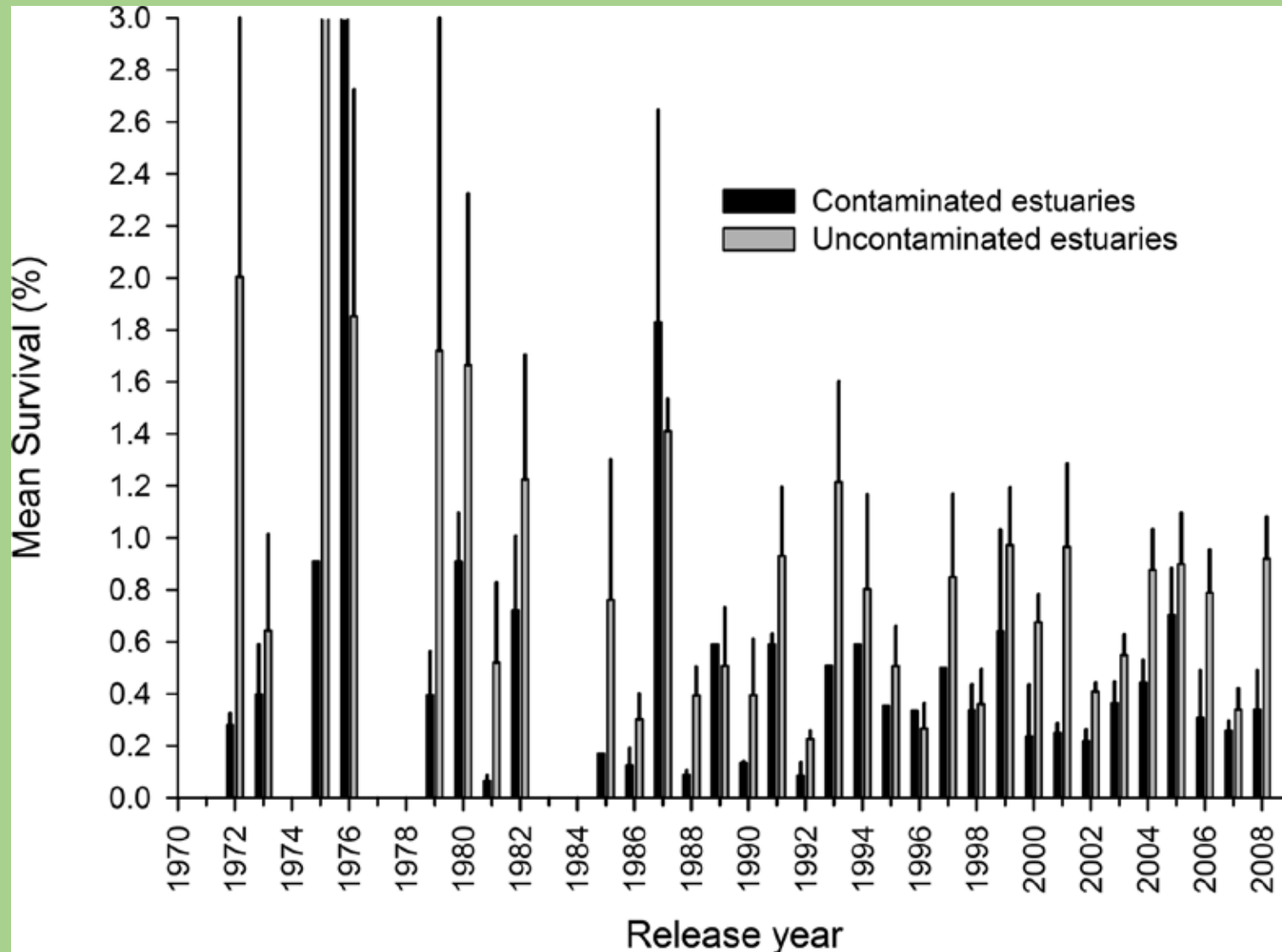
Identifying Life History with Otoliths



Courtesy of Lance Campbell WDFW



Smolt – Adult – Returns

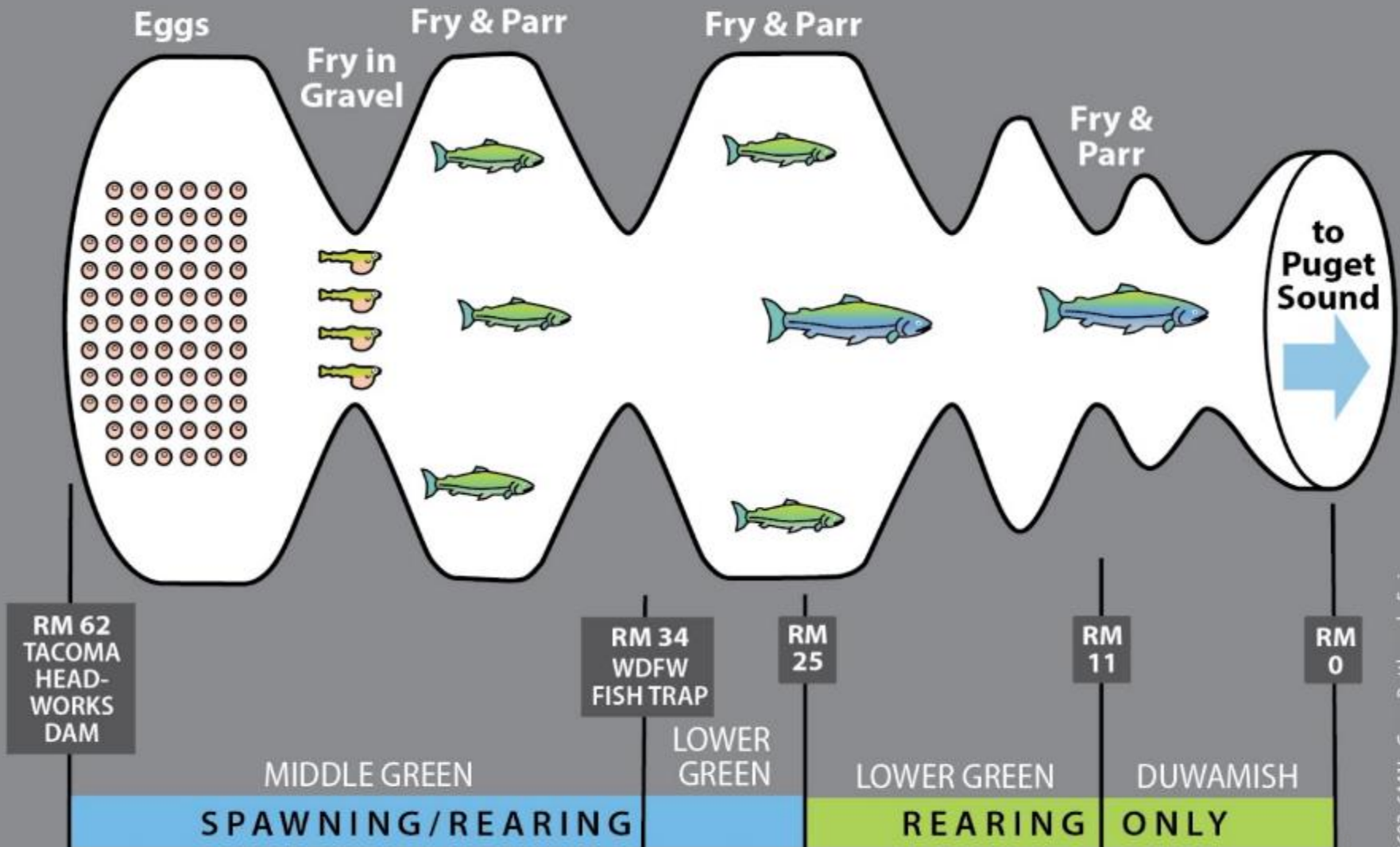


45% Lower Adult Return Rates for Chinook from Contaminated (including Duwamish) vs Uncontaminated Estuaries

Meador (2014)

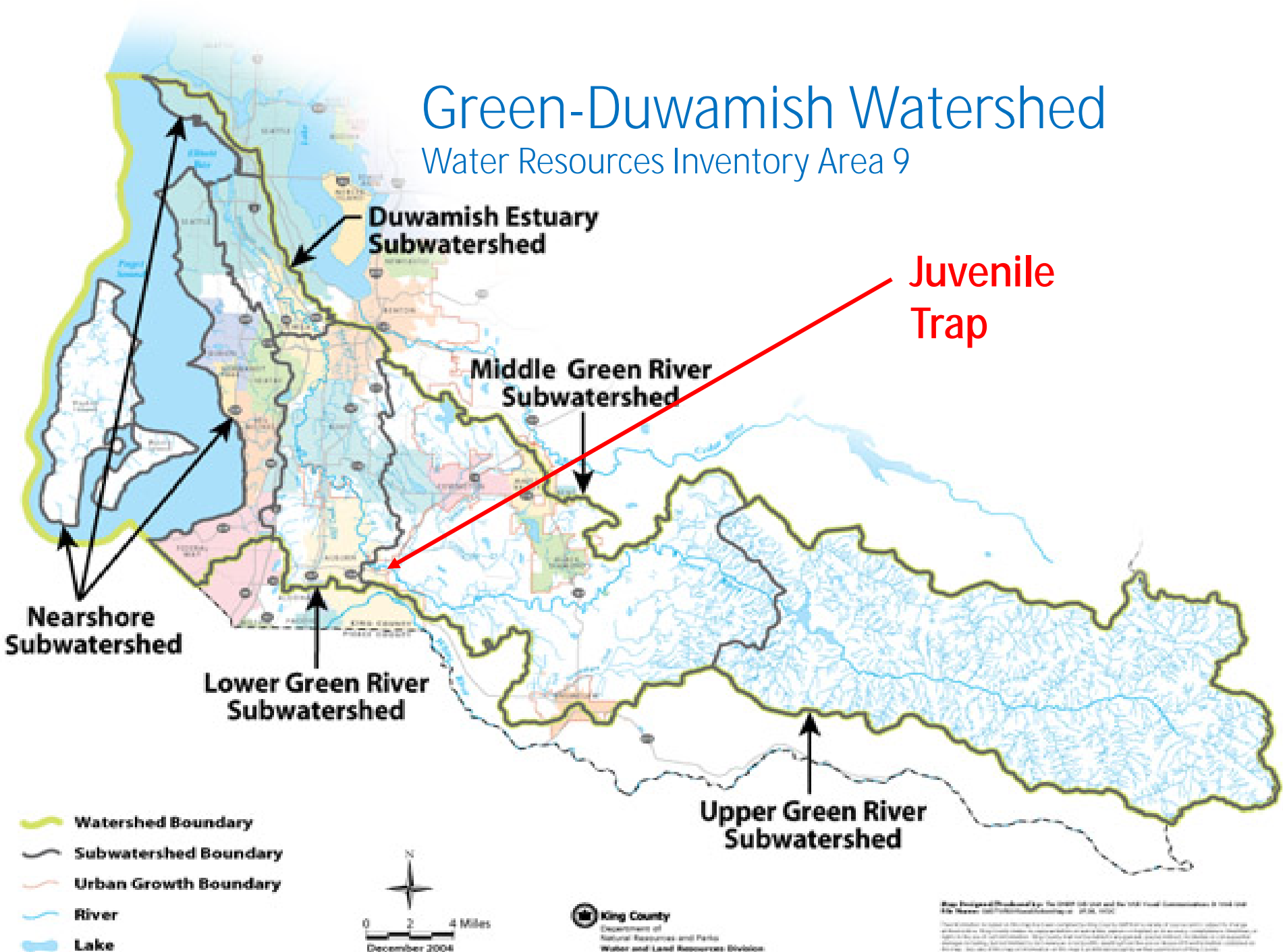
CONTAMINANT AND/OR

HABITAT BOTTLENECKS ?



Green-Duwamish Watershed

Water Resources Inventory Area 9



Juvenile Trap

Nearshore Subwatershed

Lower Green River Subwatershed

Duwamish Estuary Subwatershed

Middle Green River Subwatershed

Upper Green River Subwatershed

- Watershed Boundary
- Subwatershed Boundary
- Urban Growth Boundary
- River
- Lake



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2017 King County Analysis

- What are [PCBs] in Chinook entering Lower Green River?
- WDFW screw trap
 - Hatchery Chinook = 1 composite of 18 fry (28-30 mm)
 - Wild Chinook = 2 composite samples
 - 69 fry and parr (35-62 mm)
 - 13 parr (62-97 mm)



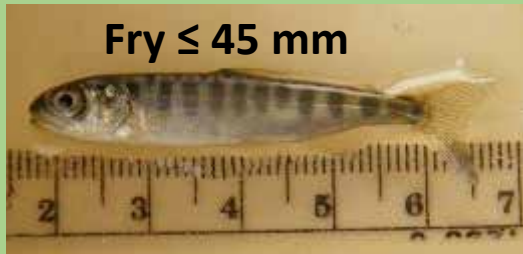
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PCBs in juvenile Chinook leaving Middle Green 2017



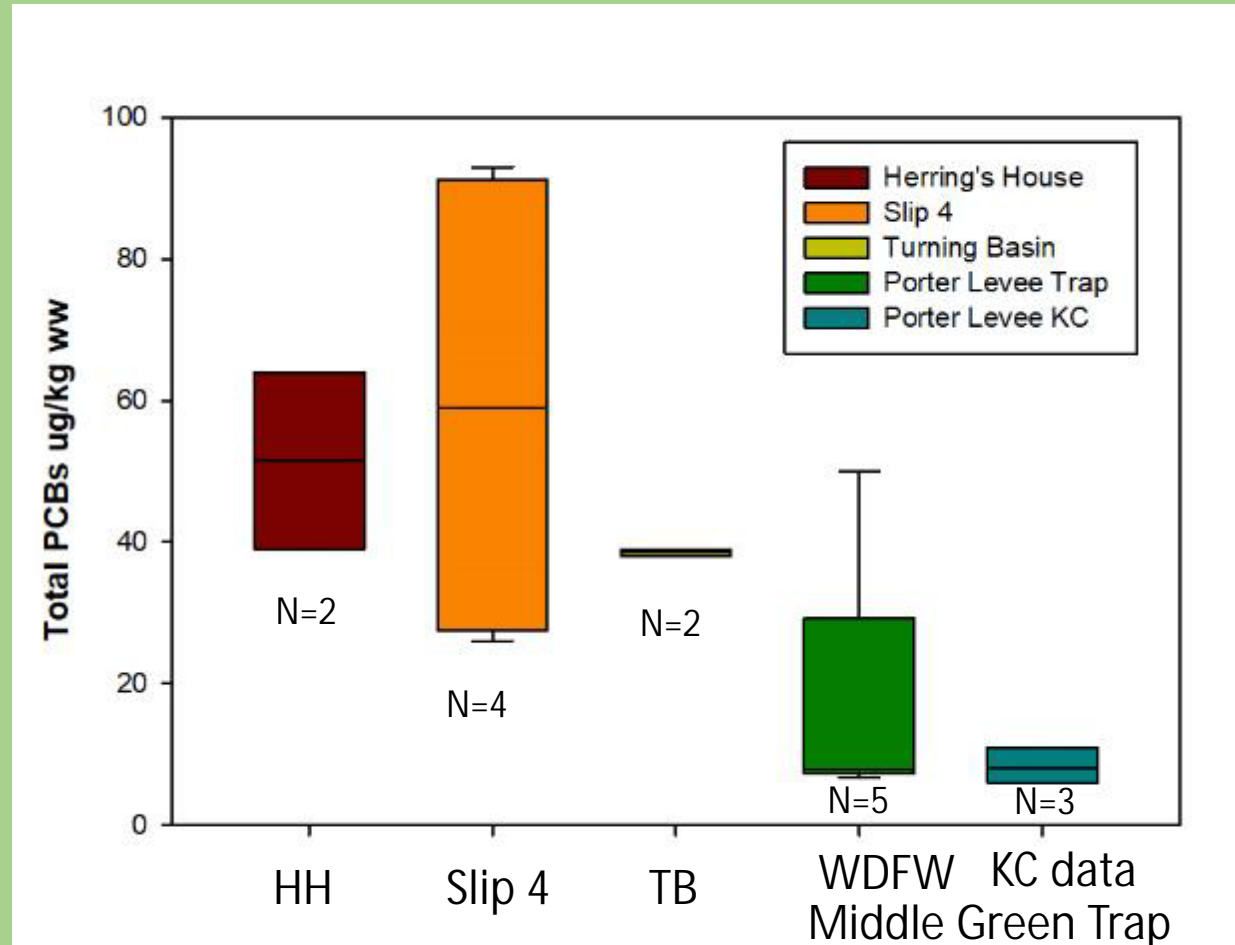
11 ppb (hatchery fry 28-30 mm)
Hatchery food?

8 ppb (wild 35-62 mm)
Maternal transfer?

5.9 ppb (wild 62-97 mm)
Growth dilution?



PCBs in juvenile Chinook – Comparison with 2016 WDFW



Elliott Bay



Middle
Green River

WDFW Data:
Sandie O'Neill

To Be Continued...

- Further Chinook tissue sampling in 2018
 - Led by WDFW
 - Collaboration with WRIA 9, Muckleshoot Tribe, King County, NOAA
- Other contaminants impacting survival?



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