The background of the slide is a close-up photograph of a tree trunk, showing the intricate, concentric growth rings of the wood. The colors range from light tan to dark brown, with the rings creating a complex, textured pattern. The lighting is somewhat dramatic, highlighting the natural grain and knots of the wood.

Identifying overwintering location and natal origin for Snake River fall Chinook salmon

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University of Idaho

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USFWS



Outline

- 1) Overview and previous findings
- 2) 2012 Sampling
- 3) Estuary residence
- 4) Hatchery vs Wild

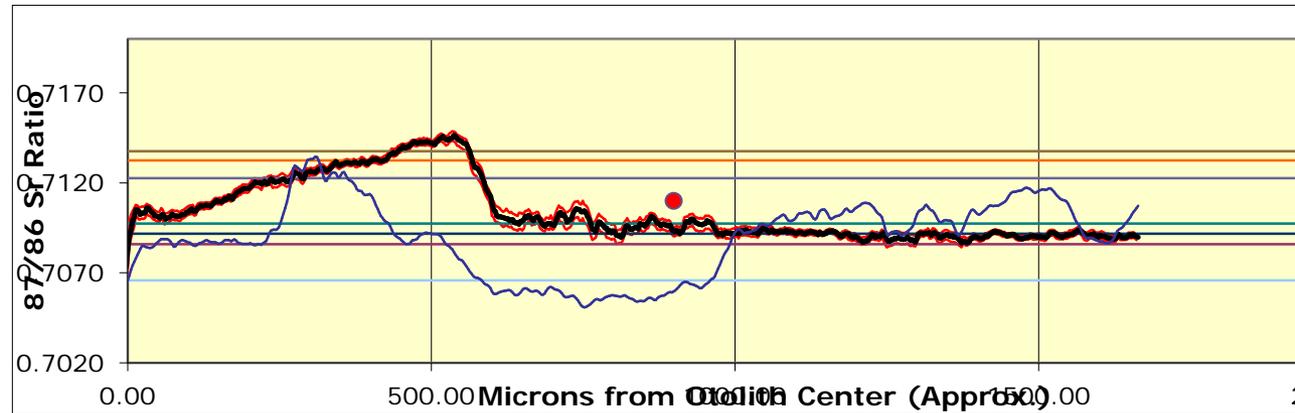
Microstructural Analysis

Identify life-history stages:
hatching, emergence, annuli
Daily growth increments



Microchemical Analyses

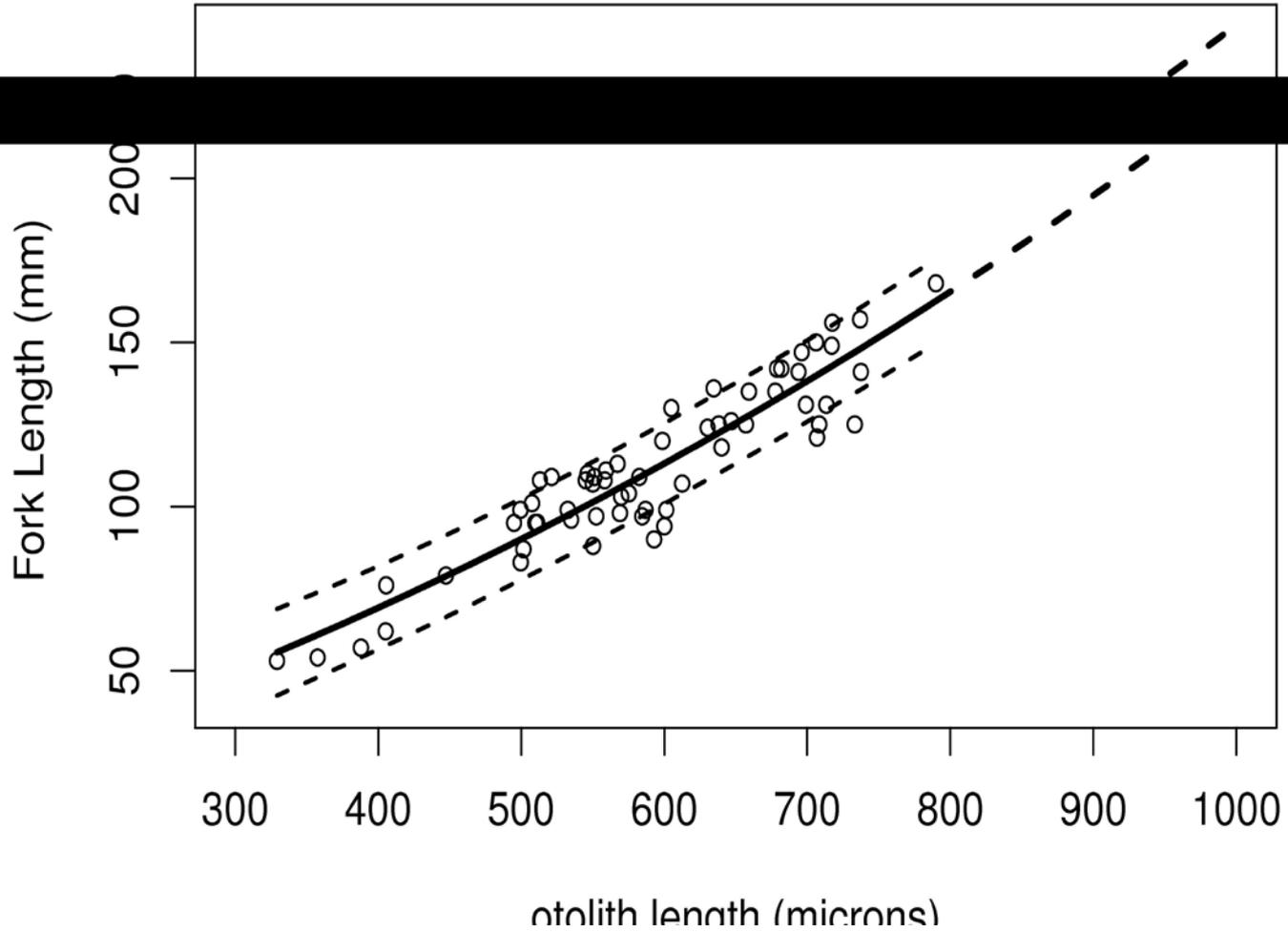
Movement patterns
Residency times



Putting them together

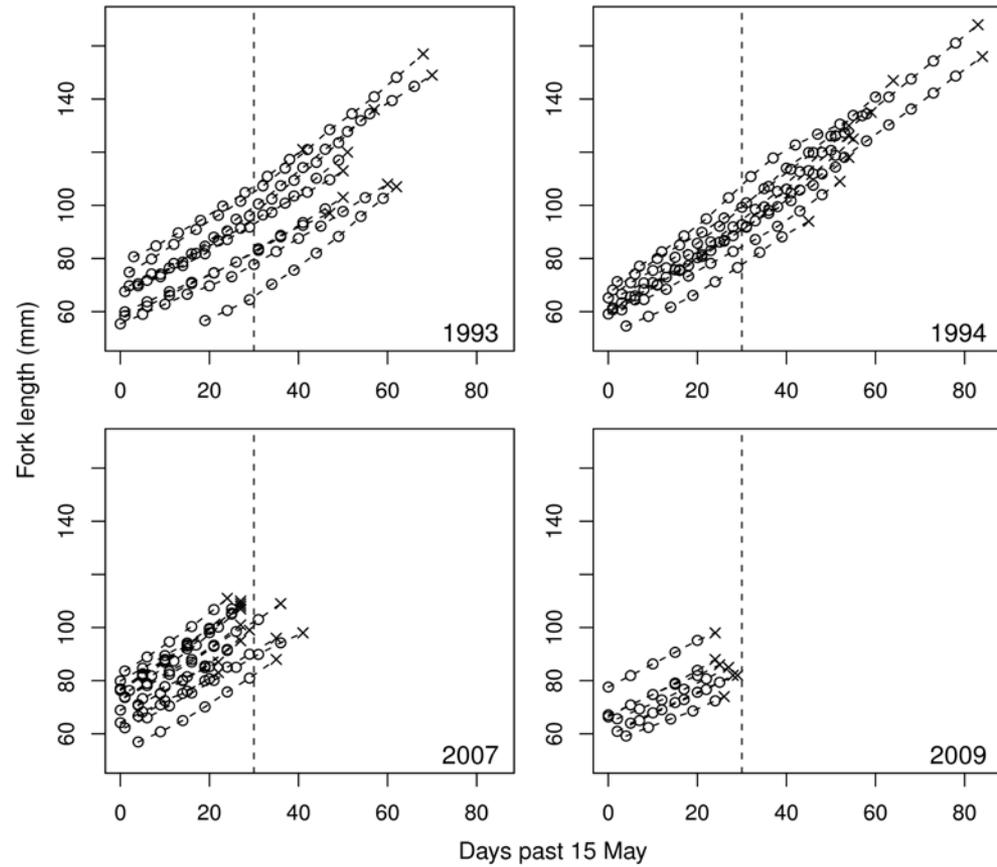
Reconstruct migratory history by determining
when and *where* fish resided
and how much they grew there

Fish length – otolith length relationship

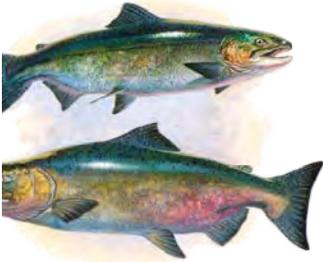
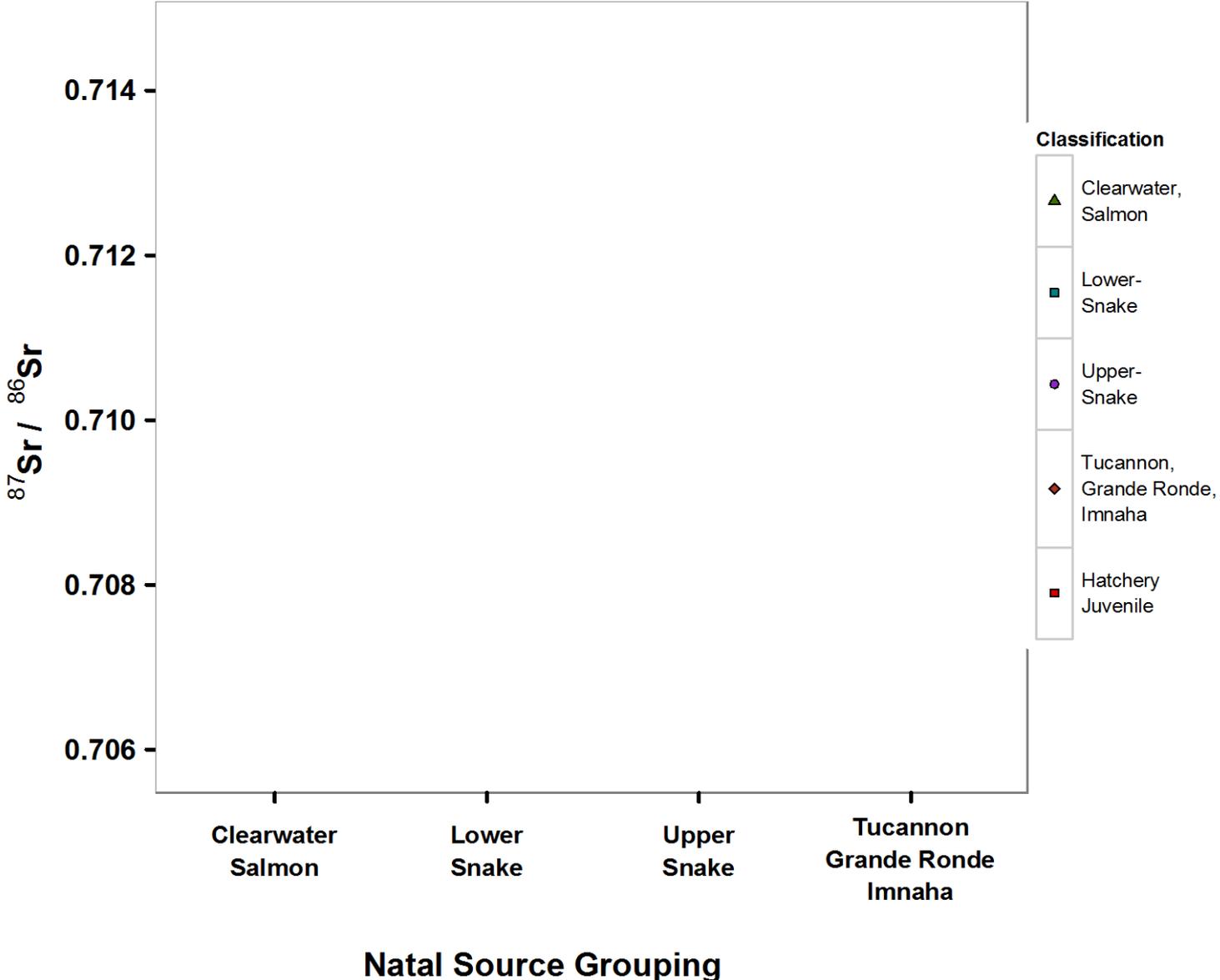


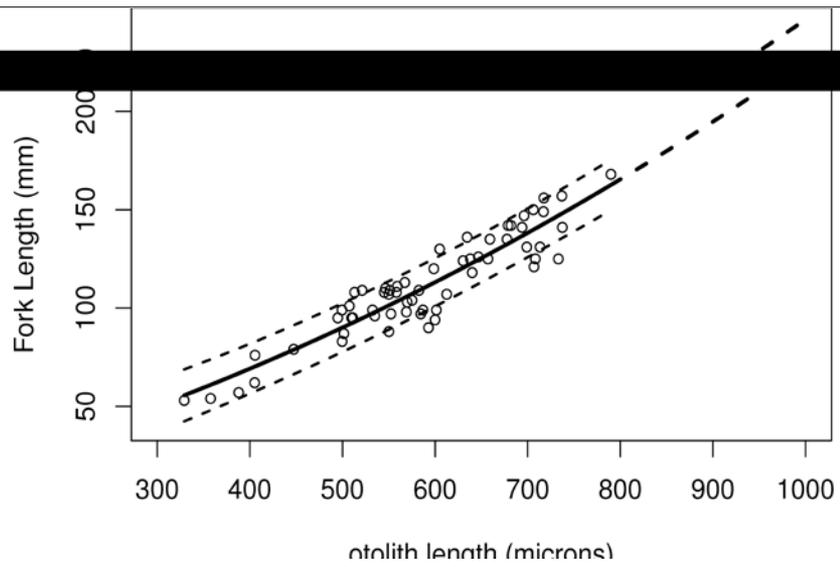
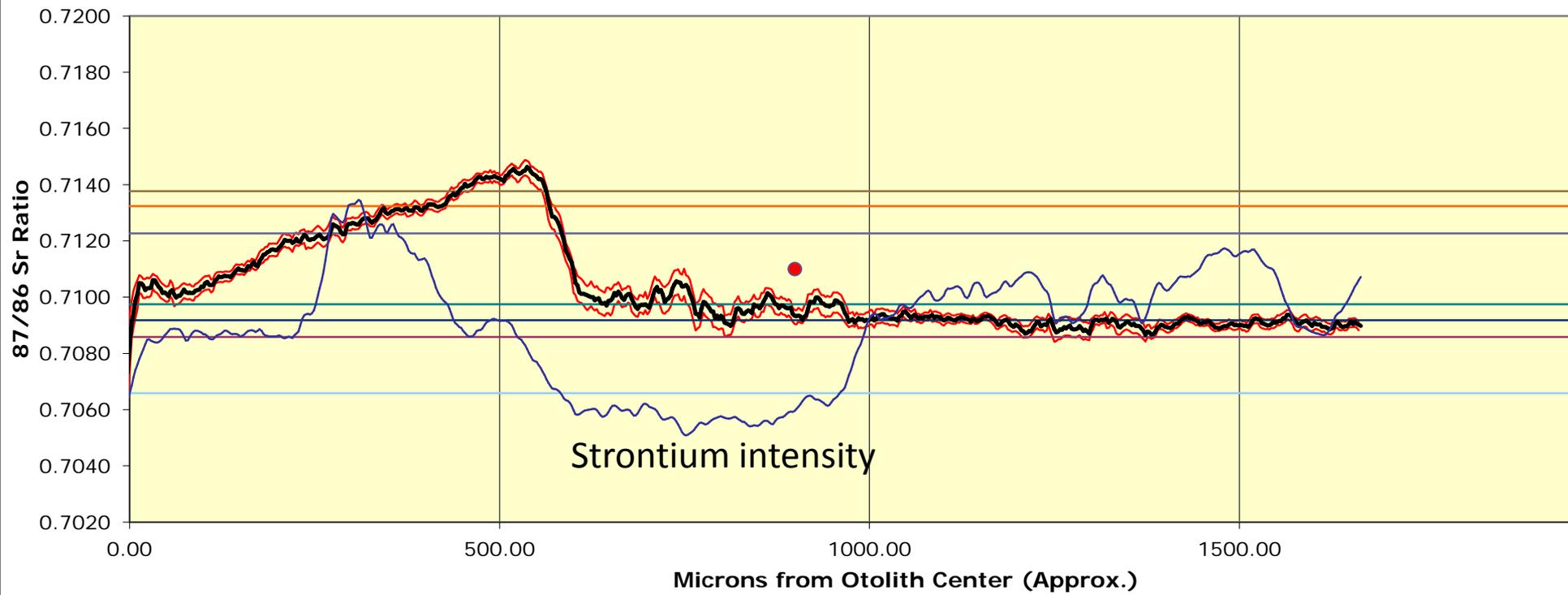
Modified From: Zabel et al. 2010. Environmental Biology of Fish

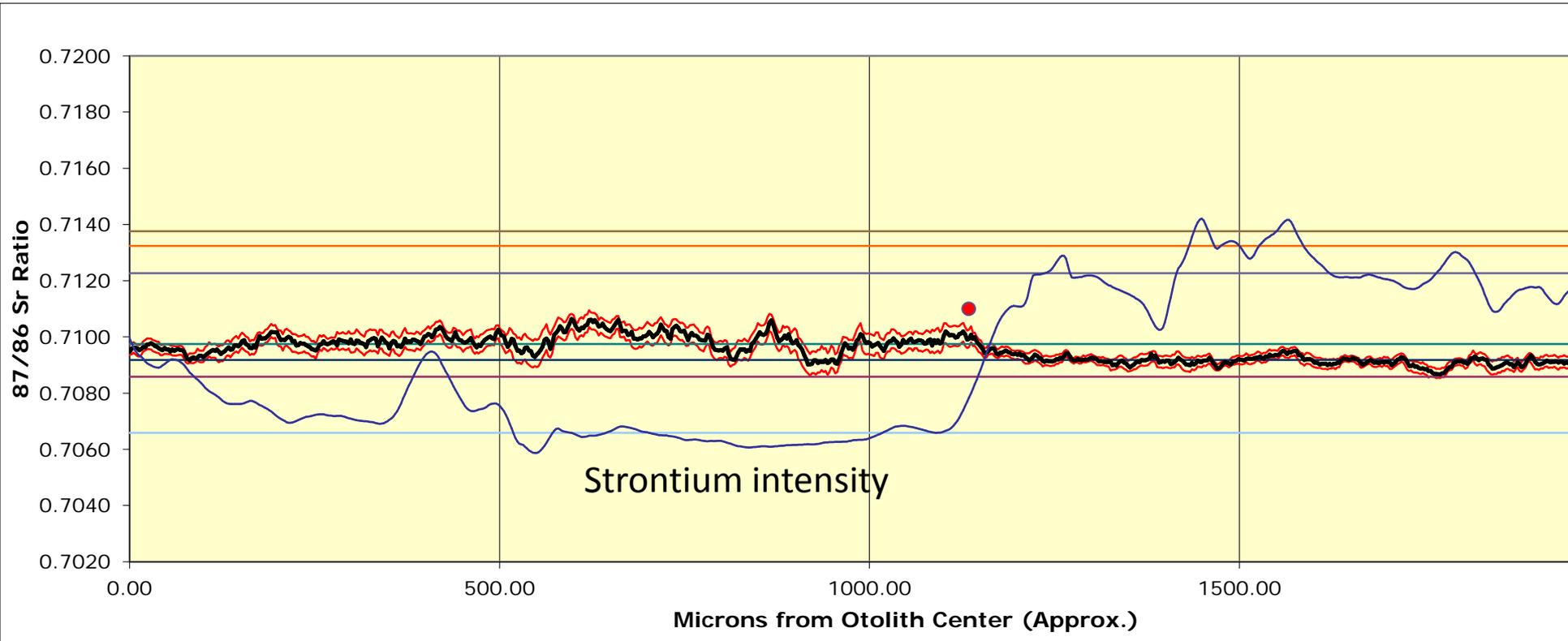
Back-calculated growth trajectories



Results - Natal Origins







2011 Snake River sample collection

- 1049 Presumed wild adult otoliths collected at Lyons Ferry
- 26 Seasonal water samples from throughout the Snake Basin
 - Spring – 8 (Snake, Clearwater, Salmon)
 - Summer – 11 (Snake, Clearwater, Salmon, Gr. Ronde, Tucannon)
 - Fall – 7 (Snake, Clearwater, Tucannon, Lyons Ferry Hatchery)
- 15 juveniles - Nez Perce Tribal Hatchery
- 33 beach seined juvenile fish
 - 18 – Snake and Grande Ronde
 - 15 – Clearwater River
- 50 (approx) Sort-by-code juveniles
 - Unknown number, samples have not been delivered. Number based on last year.

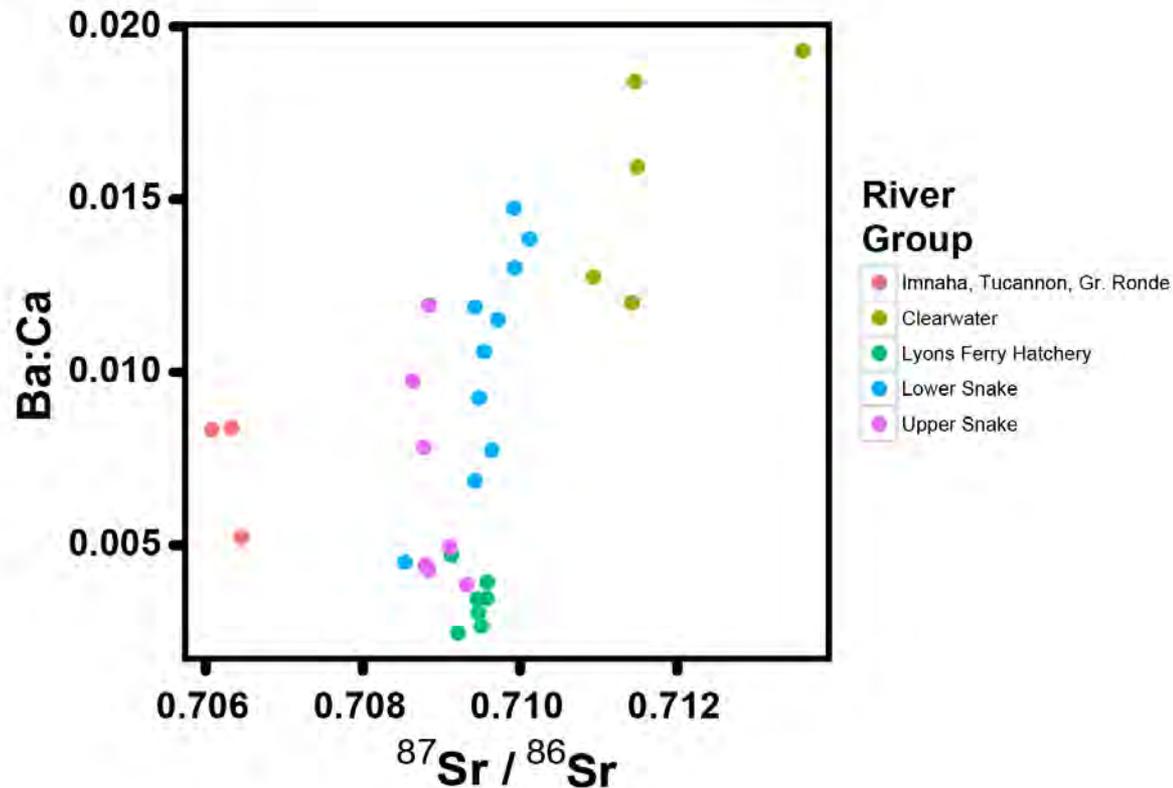
Hatchery vs. Wild Fish

	Imnaha Tucannon Gr. Ronde	Clearwater	Lyons Ferry Hatchery	Lower Snake	Upper Snake
Imnaha Tucannon Gr. Ronde	3	0	0	0	0
Clearwater	0	4	0	1	0
Lyons Ferry Hatchery	0	0	7	0	0
Lower Snake	0	0	0	9	1
Upper Snake	0	0	1	3	3

Using $^{87}\text{Sr}/^{86}\text{Sr}$ and a suite of 4 elemental ratios we can distinguish Lyons Ferry Hatchery juveniles from juveniles caught in the Upper and Lower Snake River.

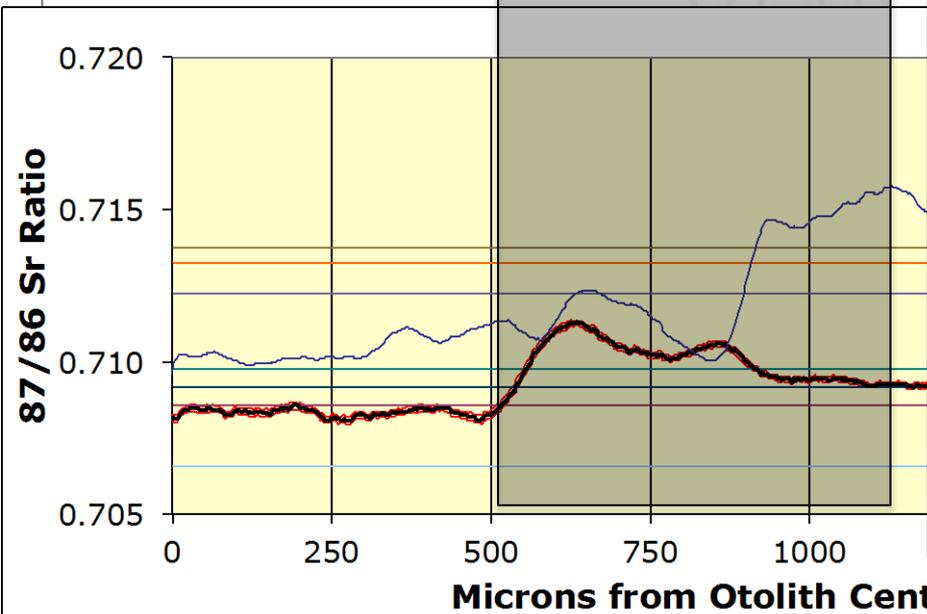
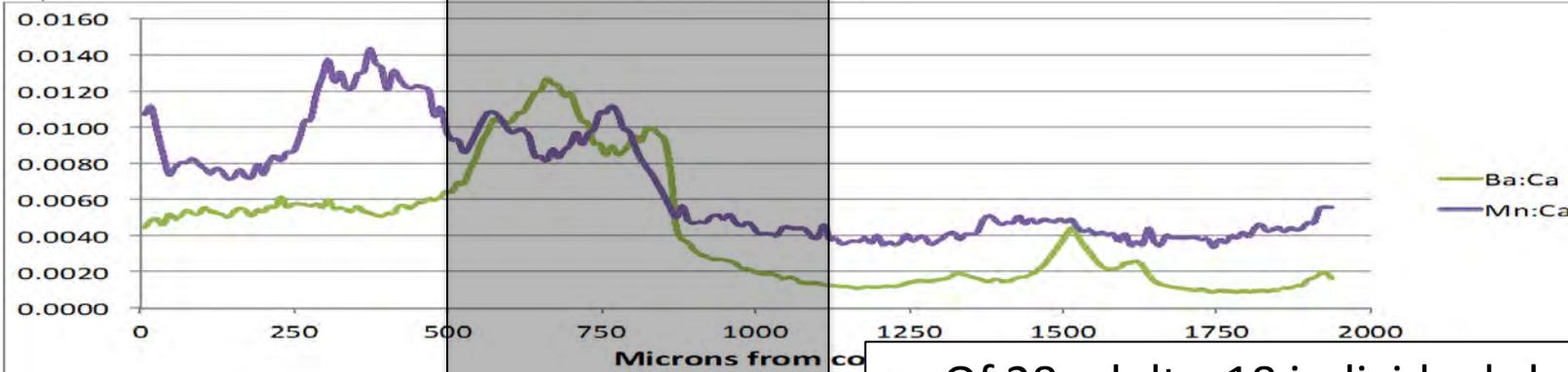
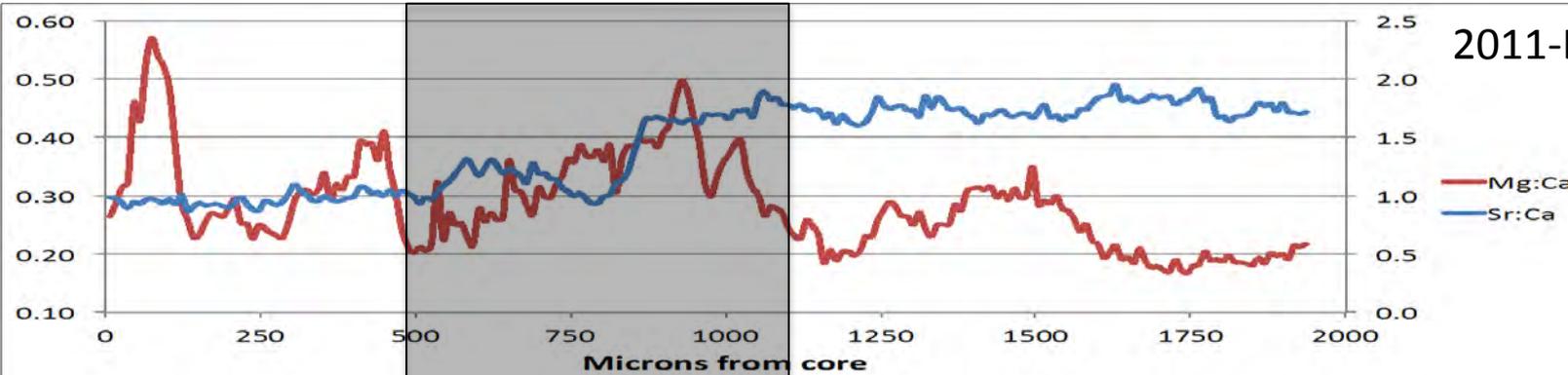
Classification is based on a Linear Discriminant Function with Jackknife resampling.

Hatchery vs. Wild Fish



Two chemical signatures weight most heavily on the classification, $^{87}\text{Sr}/^{86}\text{Sr}$ and Ba:Ca.

2011-LFH-5051



- Of 28 adults, 18 individuals had elevated concentrations of barium within 'estuary' portion of their otolith (12 of these fish also had high levels of manganese).
- For the remaining 10 fish an 'estuary' signal was difficult to identify suggesting that these fish moved relatively quickly to the ocean (i.e., little estuary usage).

Ba:Ca

- Linking Ba:Ca to sites in the Lower Columbia River.

