

Juvenile Salmon Composition, Timing, Distribution, and Diet in Marine Nearshore Waters of Central Puget Sound 2001-2002

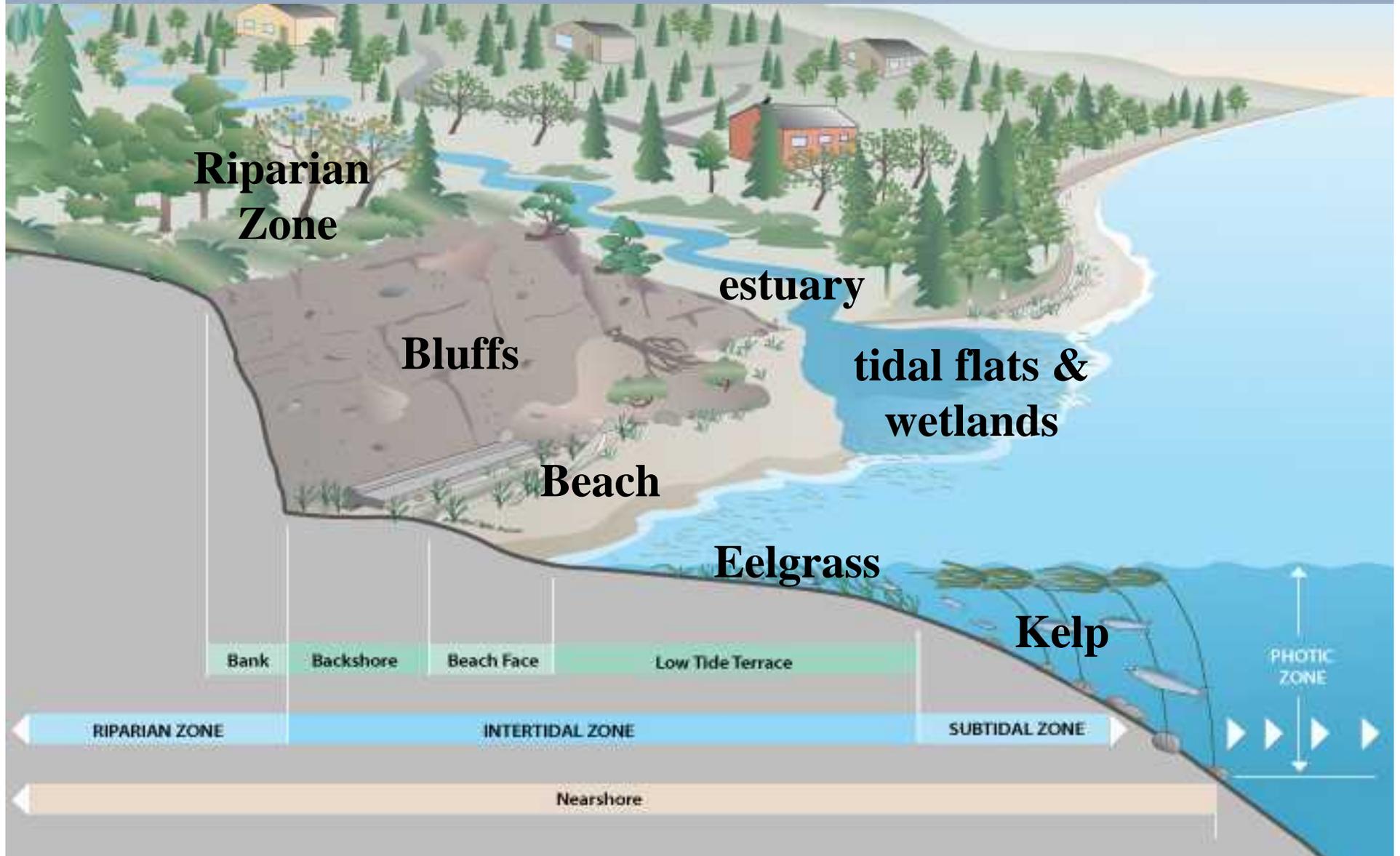
**Kollin Higgins
and Jim Brennan**

**Funding provided by the
King Conservation District**

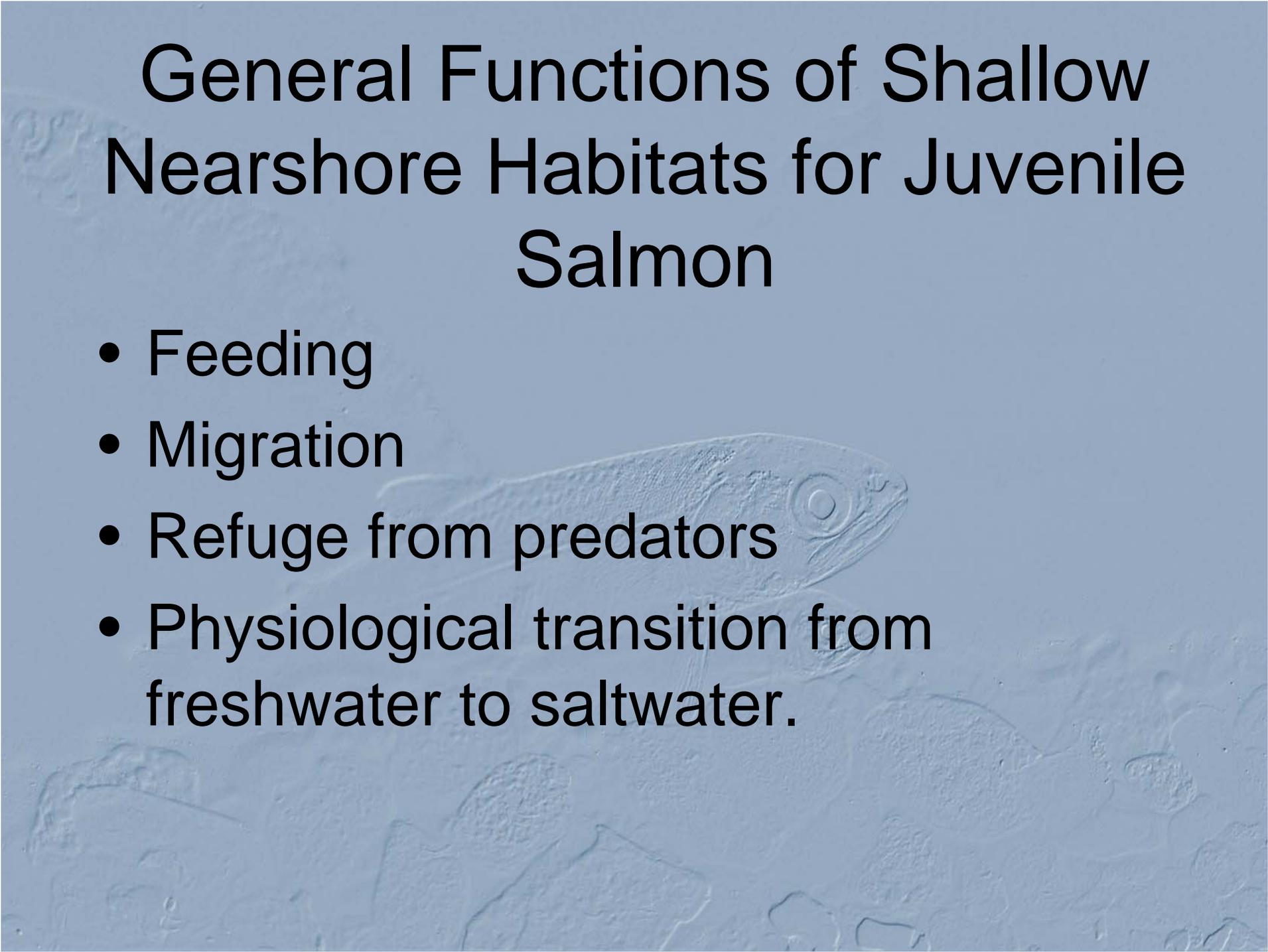


6.25.2001

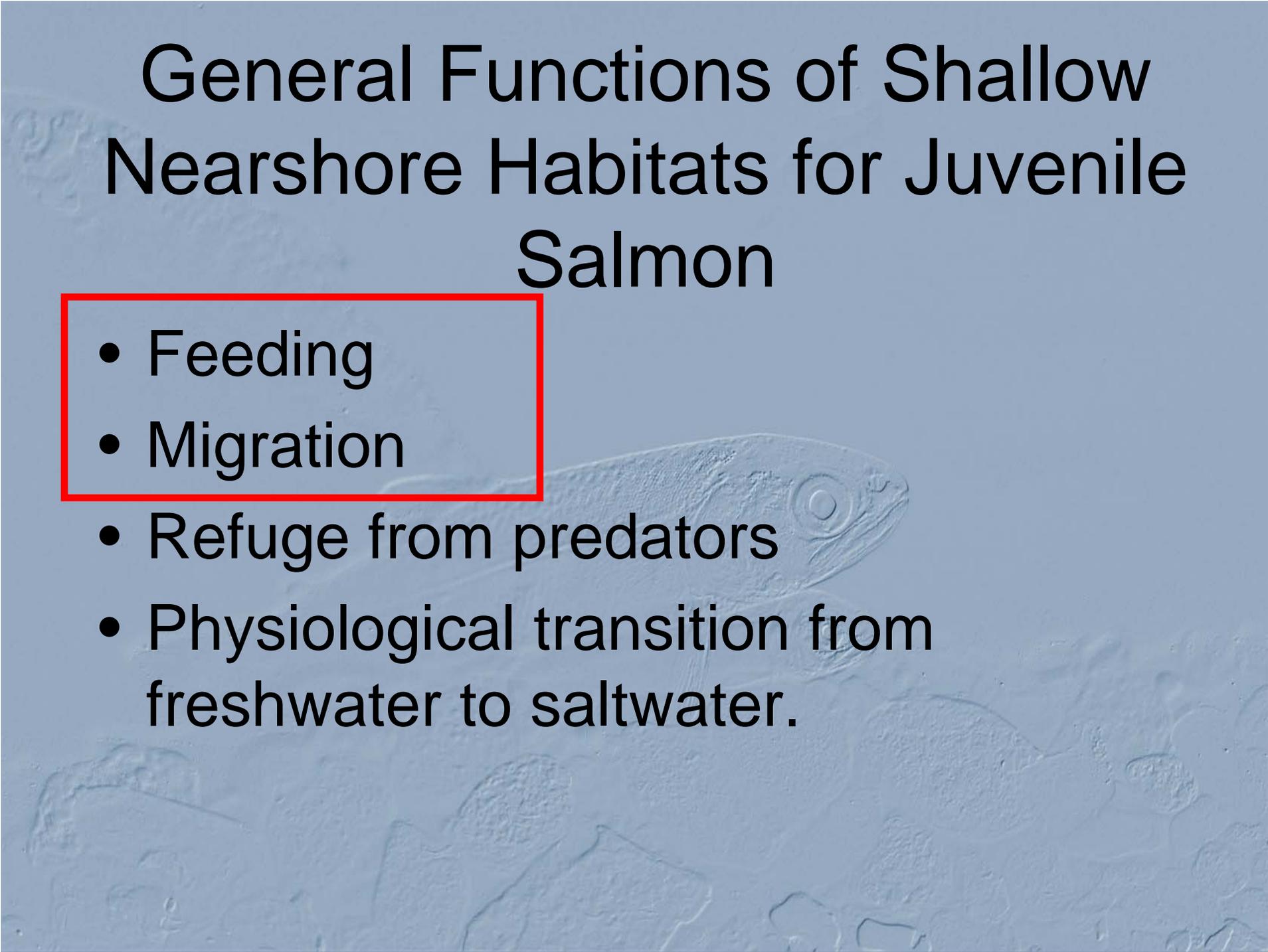
Nearshore Definition= Riparian and coastal landforms out to -30 m MLLW (photic zone)



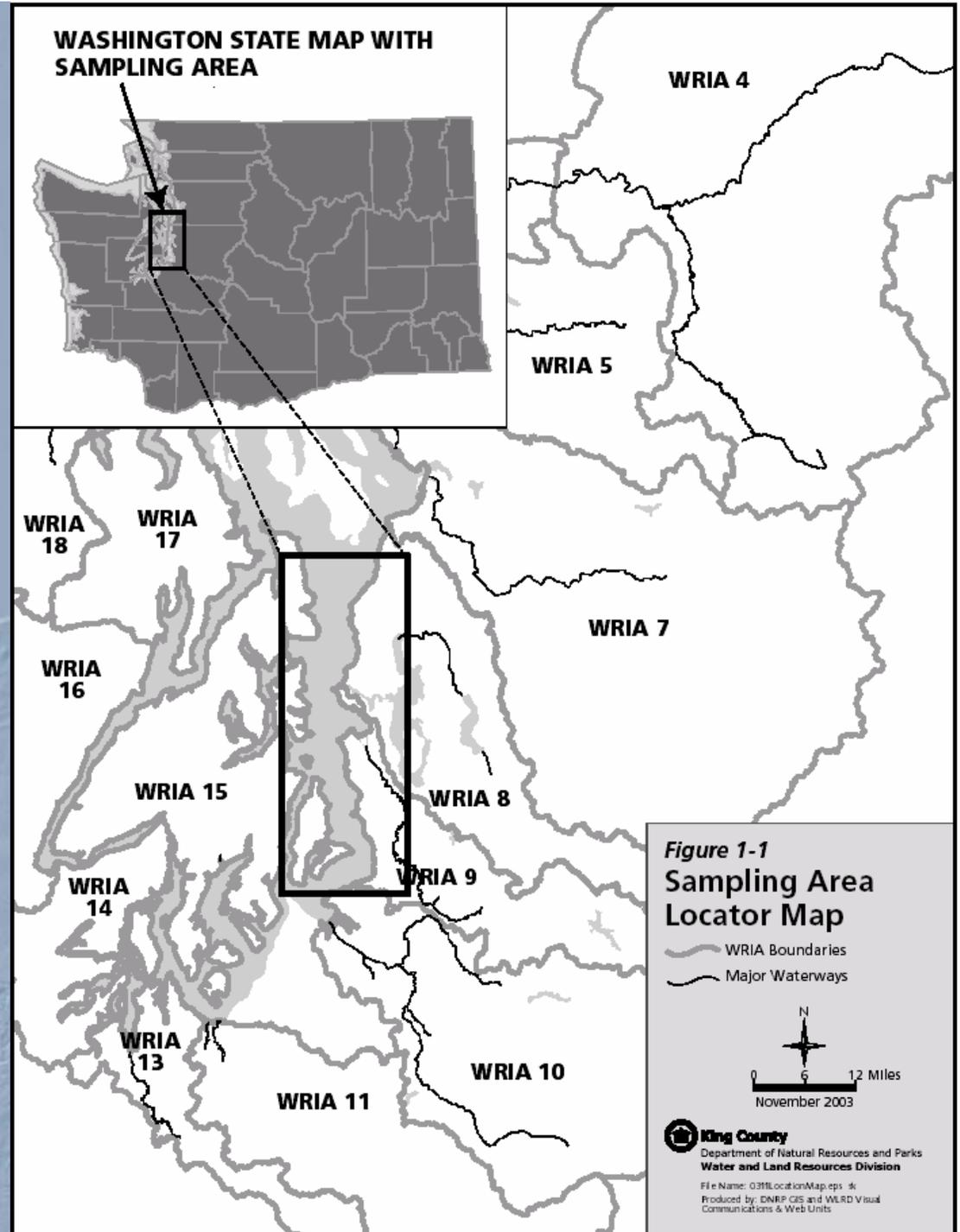
General Functions of Shallow Nearshore Habitats for Juvenile Salmon

- Feeding
 - Migration
 - Refuge from predators
 - Physiological transition from freshwater to saltwater.
- 

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- 591 beach seines made in 2001 and 2002 within King and Snohomish Counties
- Sampled May through Dec.
- Collected data on timing, distribution, growth, and diets
- Unique in that sampled at all tides, consistently over a long period, along open marine shorelines not river estuaries



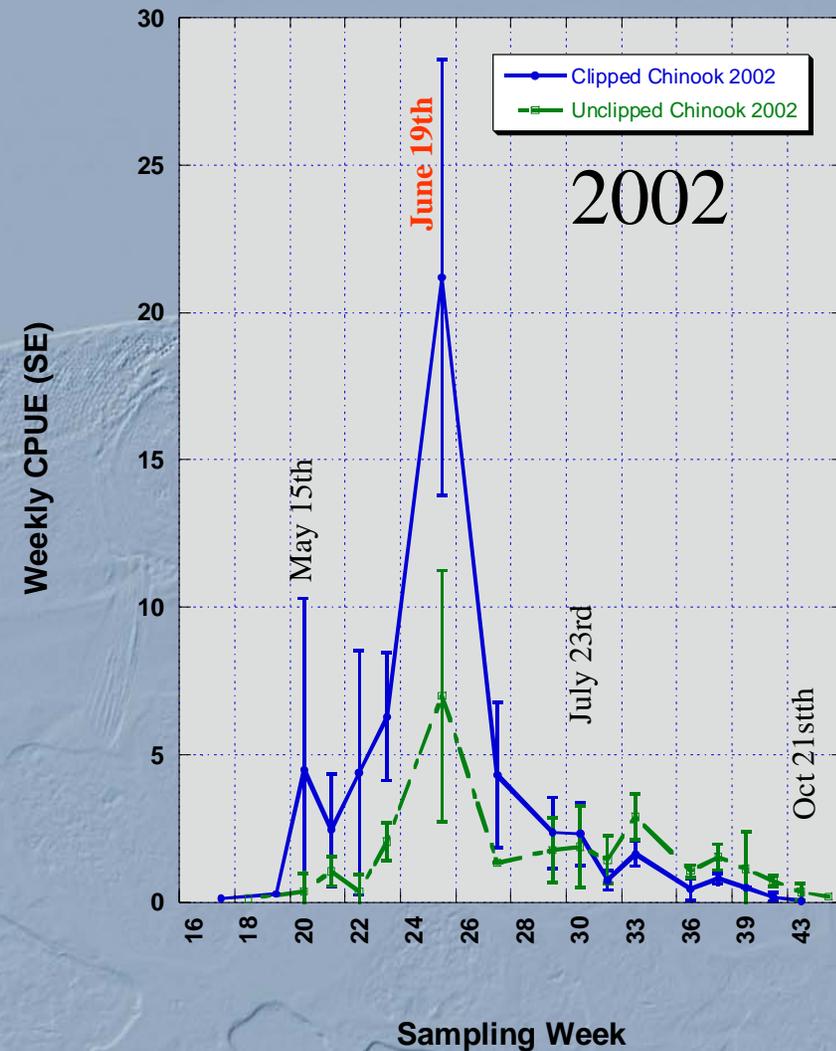
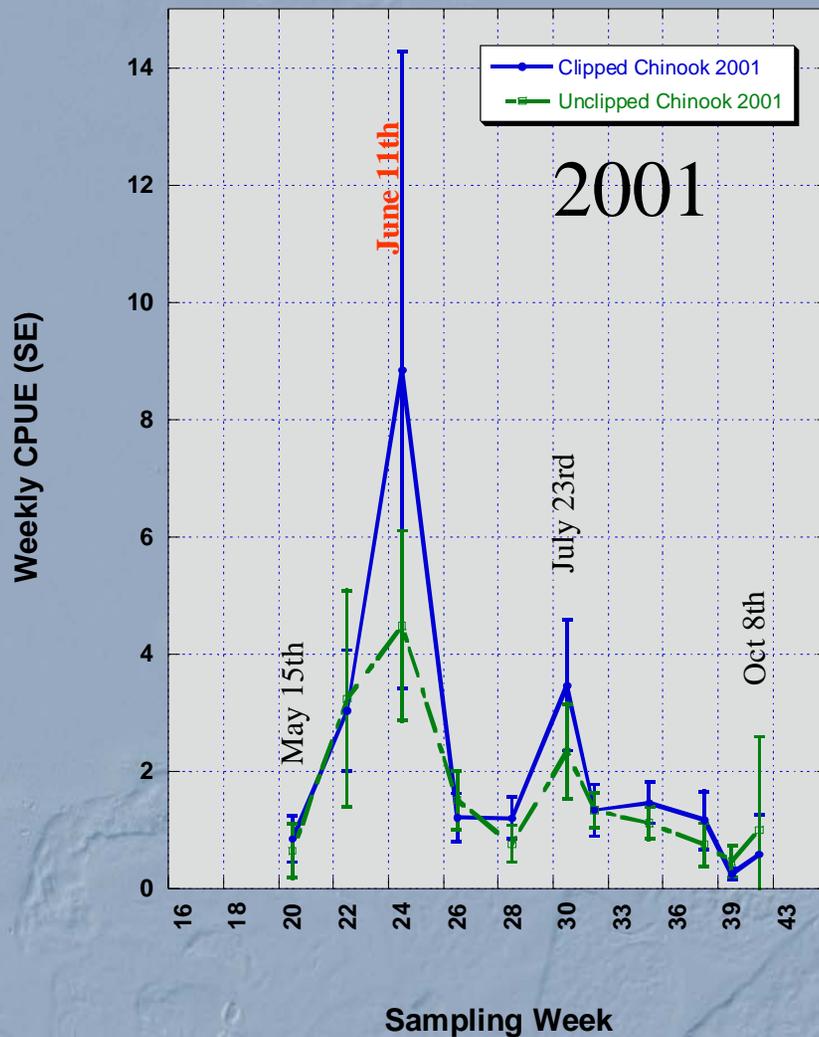


6. 1. 1999

Species	2002 totals	2001 totals	Sum totals
Chum	24740	2556	27296
Pink Salmon	2518	0	2518
Chinook	1354	1066	2420
Coho	1053	234	1287
Cutthroat	133	211	344
Sockeye	4	113	117
Steelhead	2	7	9
Char	1	0	1
Atlantic Salmon	0	1	1
Salmonid totals	29,805	4,188	33,993

- 2001--At least 54% of chinook caught were of hatchery origin
- 2002--At least 75% of chinook caught were of hatchery origin

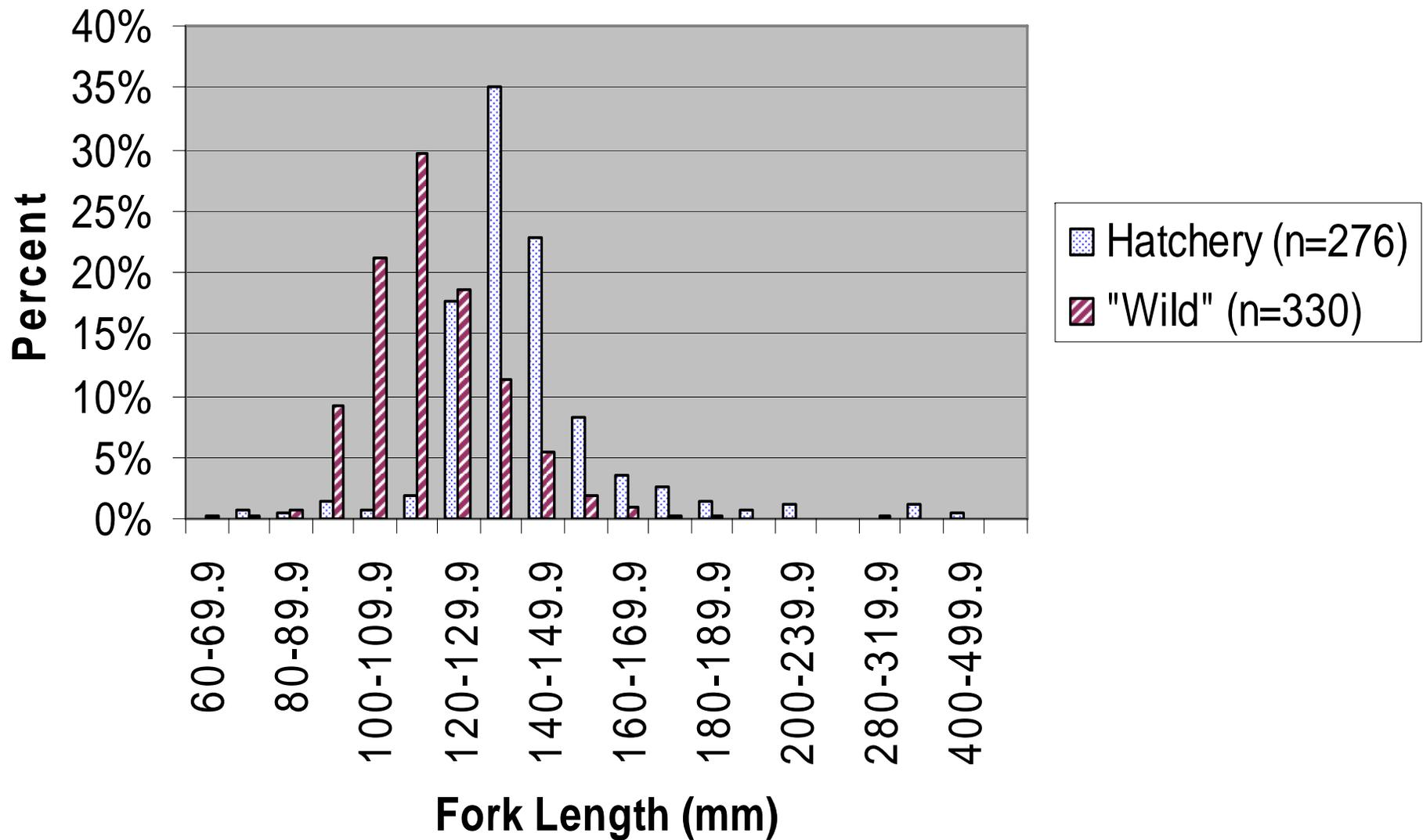
Timing of Chinook use in Shallow Marine Nearshore Waters



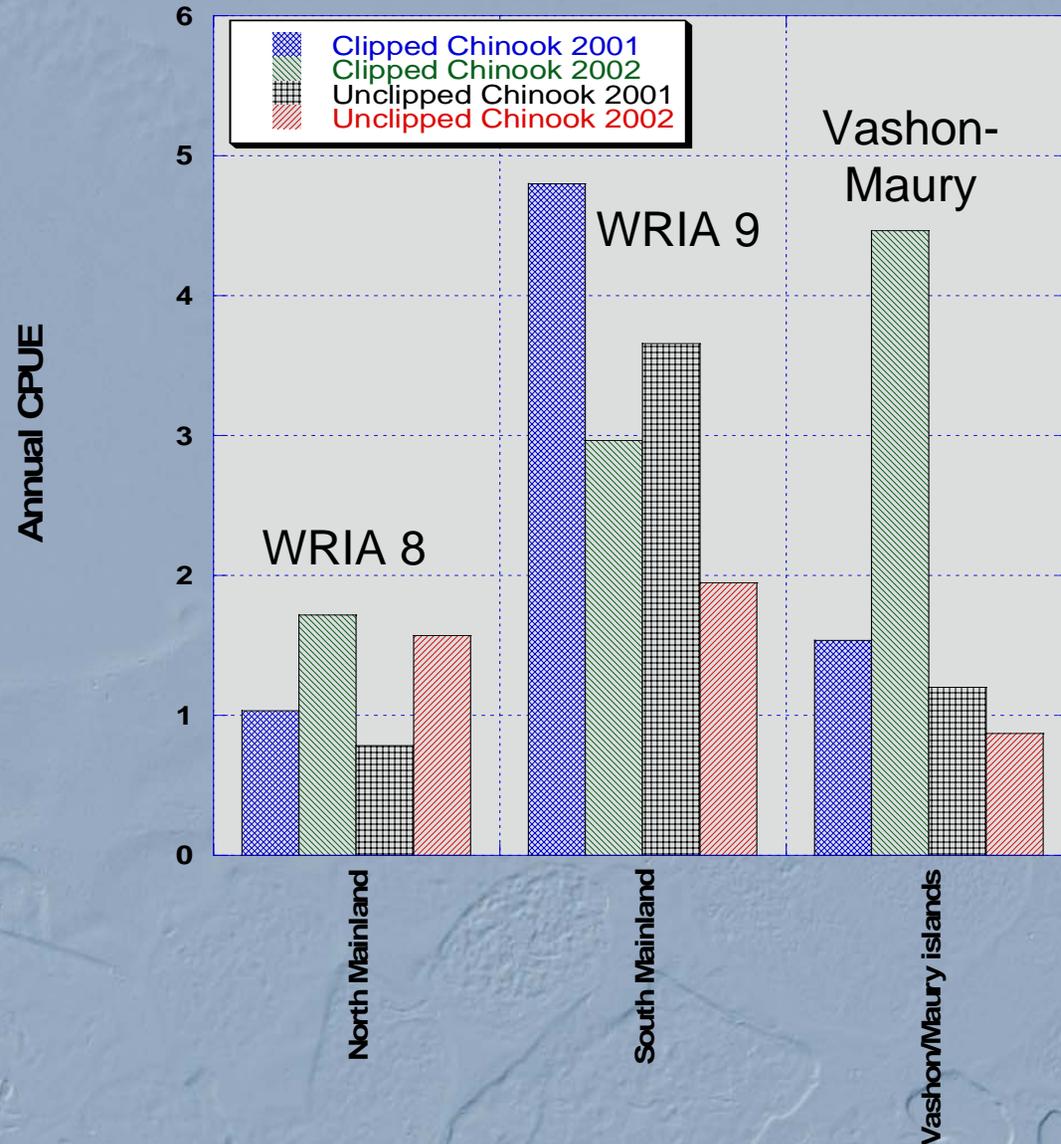
Size of salmonids

- Hatchery fish were larger than wild fish
- Salmonids of the same age class were larger in 2001 than 2002
- WRIA 8 Chinook and cutthroat were significantly larger than WRIA 9 fish--for both years
- WRIA 8 chum and coho were significantly larger than WRIA 9 for 2002. (2001 small sample size)

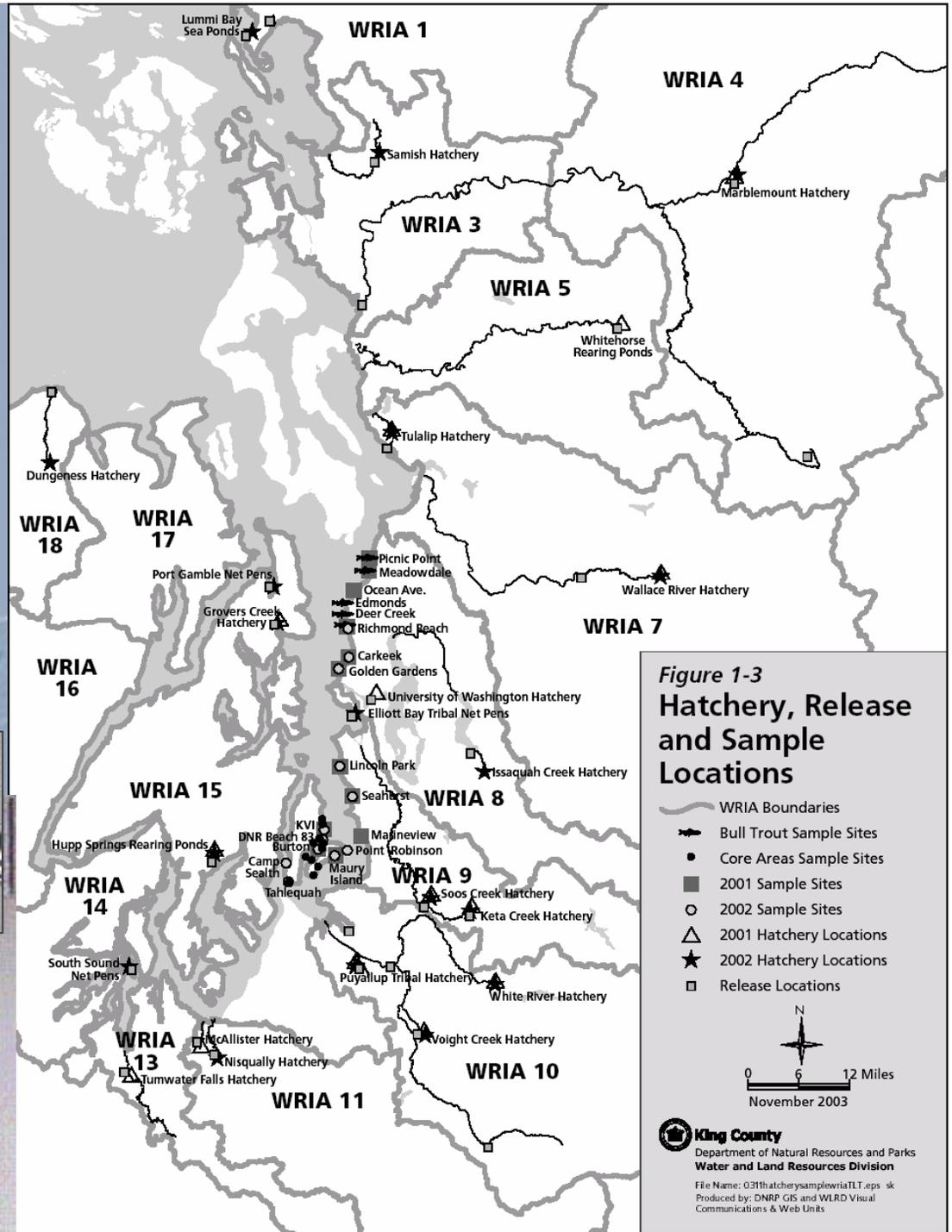
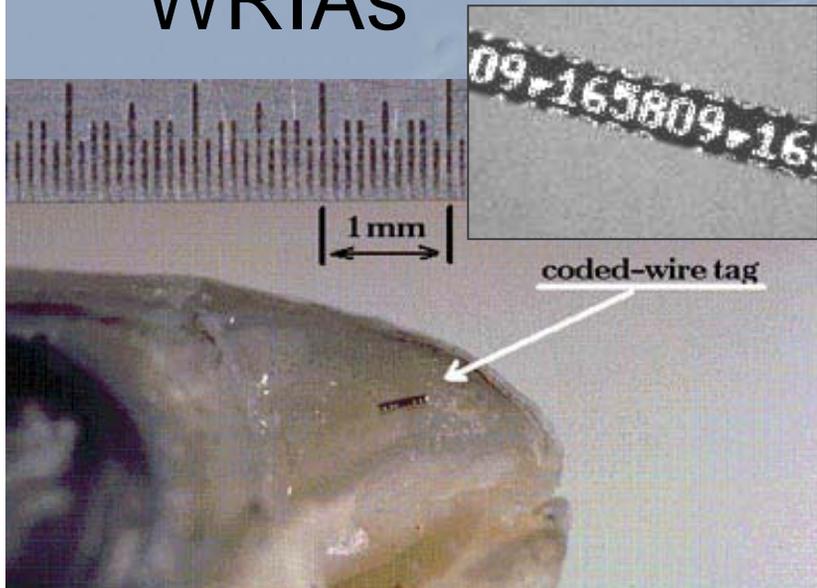
2002 Coho



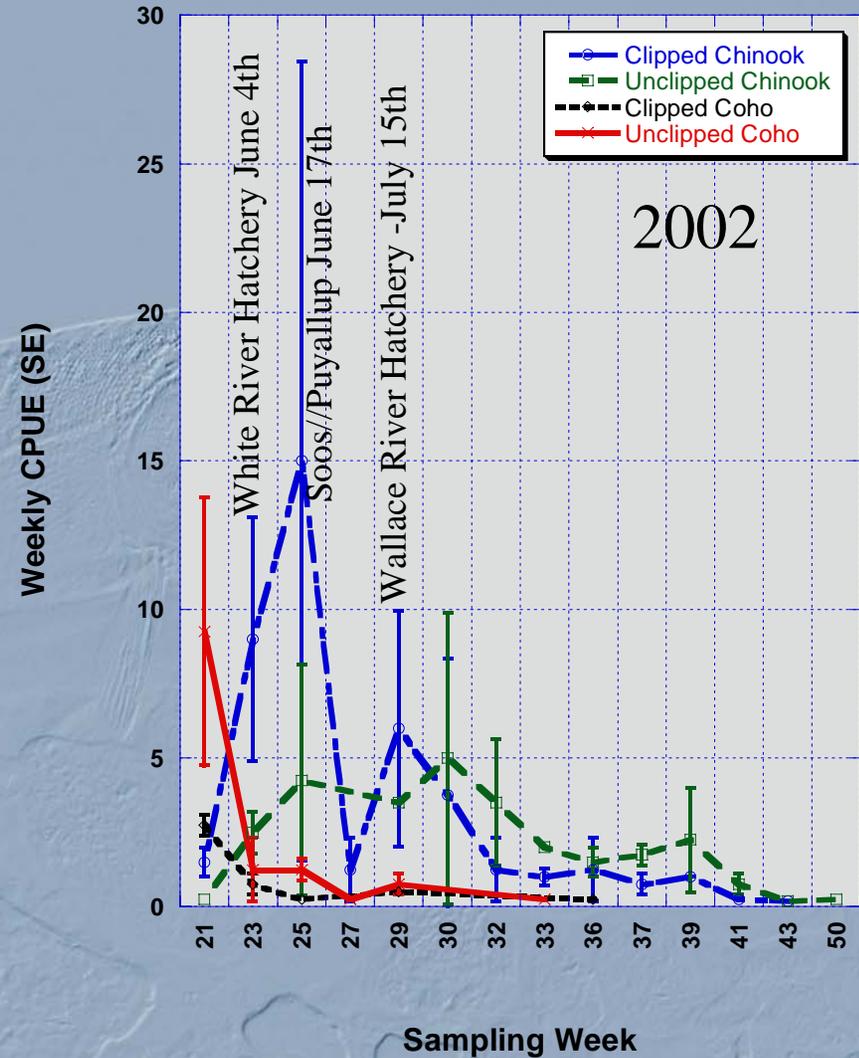
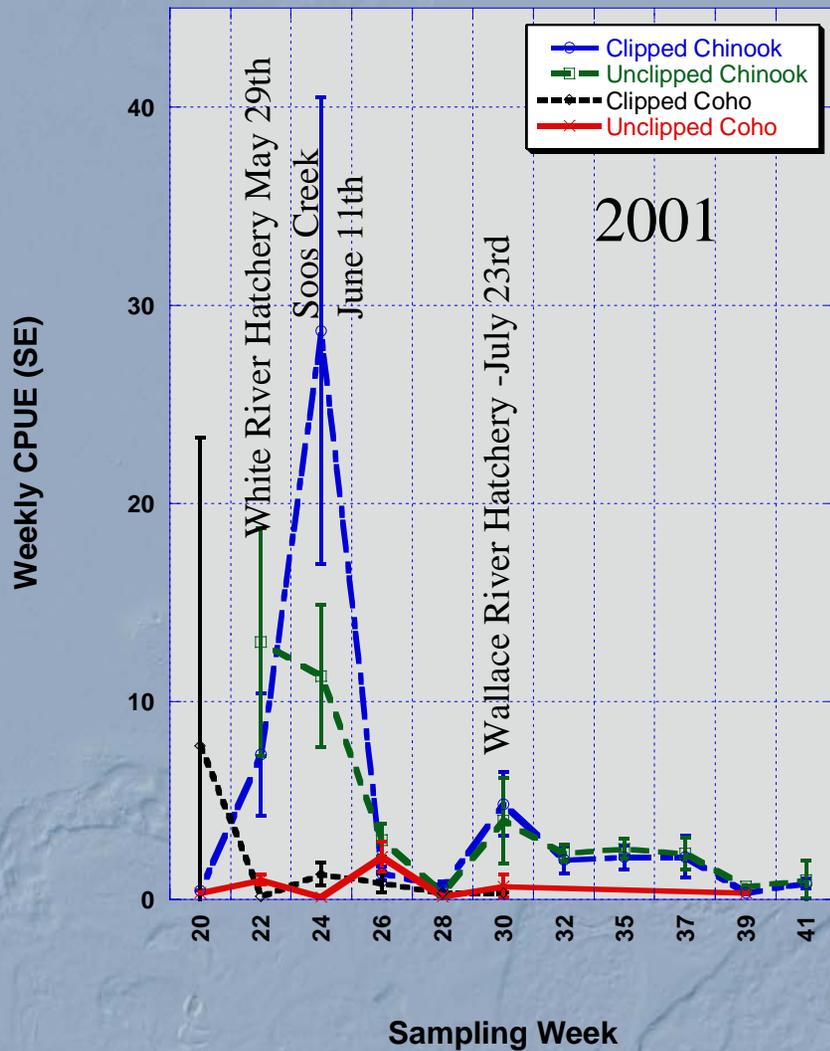
Annual Chinook CPUE and Distribution by Regions in 2001 and 2002

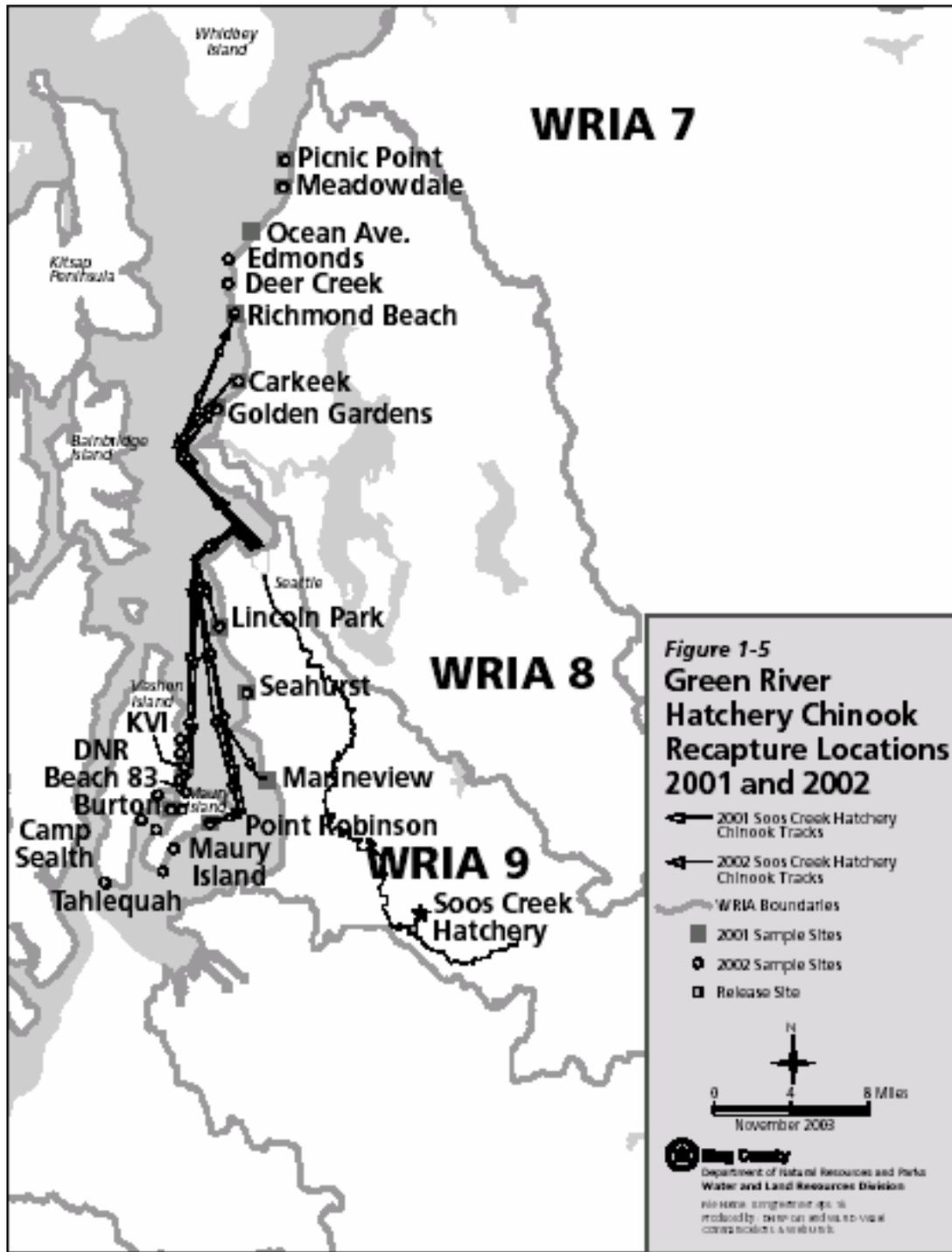


- CWT Chinook were caught from 22 different hatcheries representing 13 different WRIAs



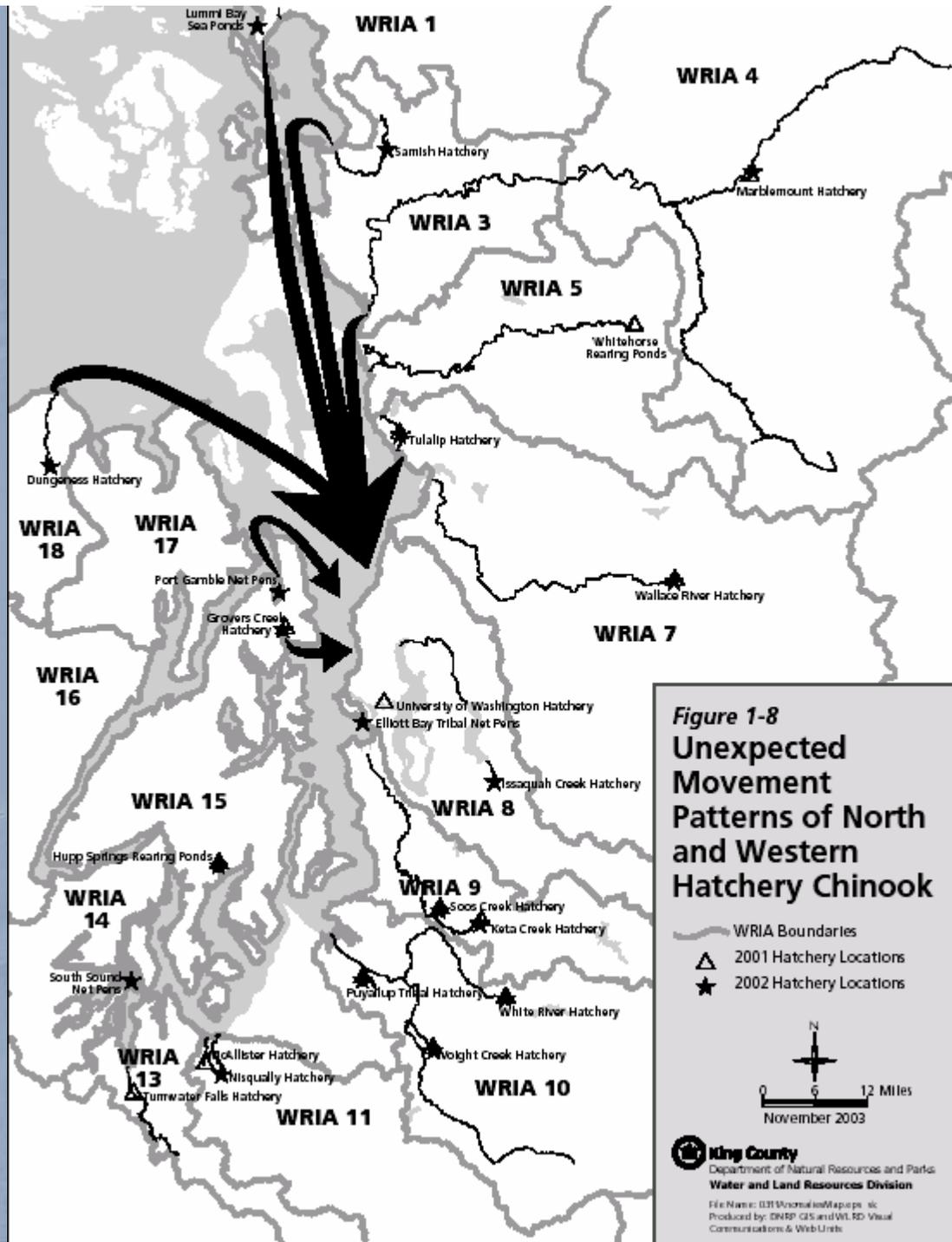
Timing along WRIA 9 mainland





- 86% of CWT chinook from Soos Creek were caught SOUTH of Elliot Bay.

- Based on CWT recoveries, Most Green River Chinook were caught within 2 to 4 weeks of being released.



Diet

819 Chinook

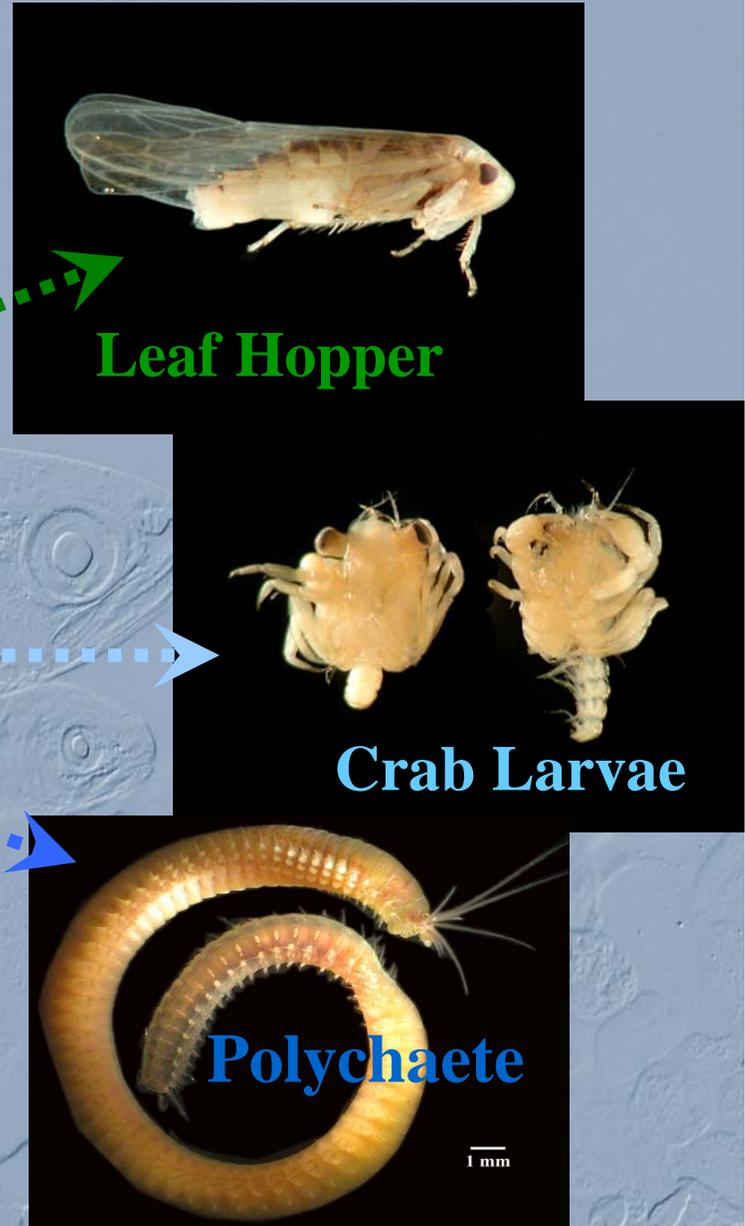
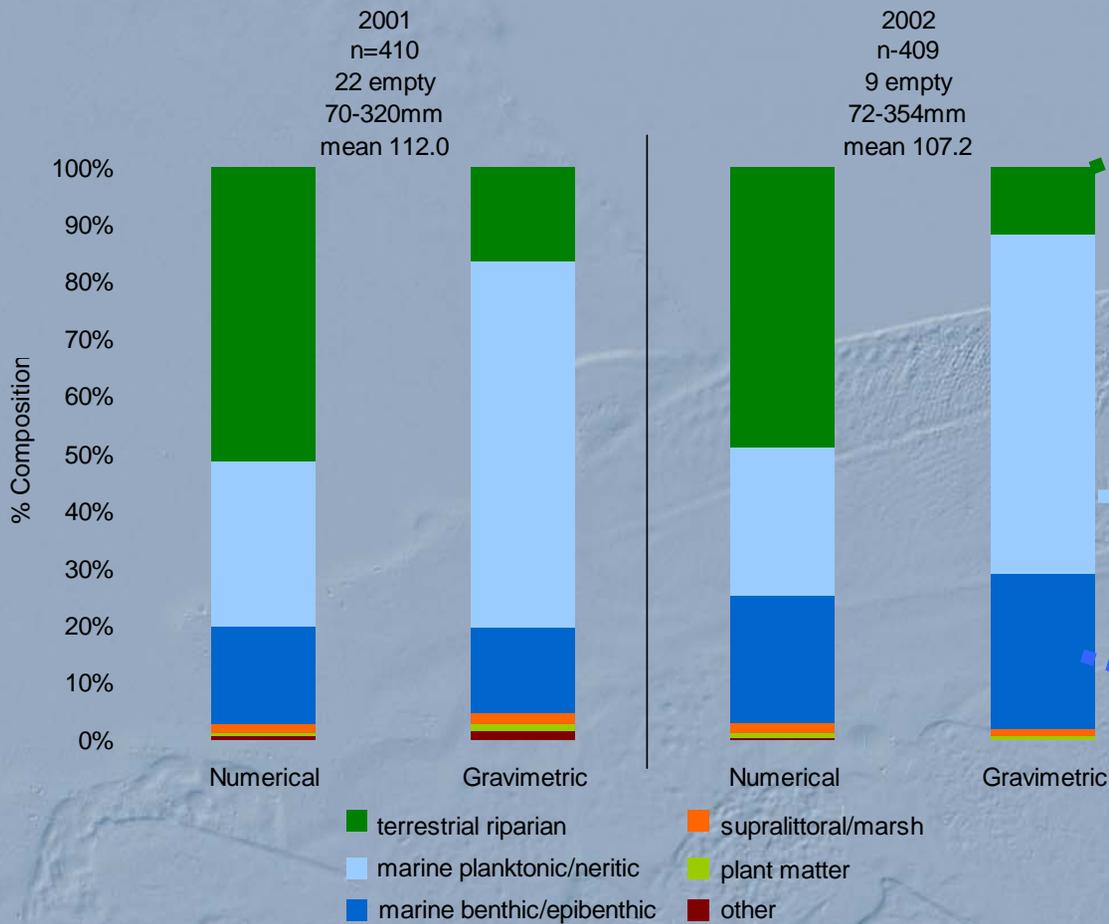
89 Coho

56 Cutthroat

11.7.1999



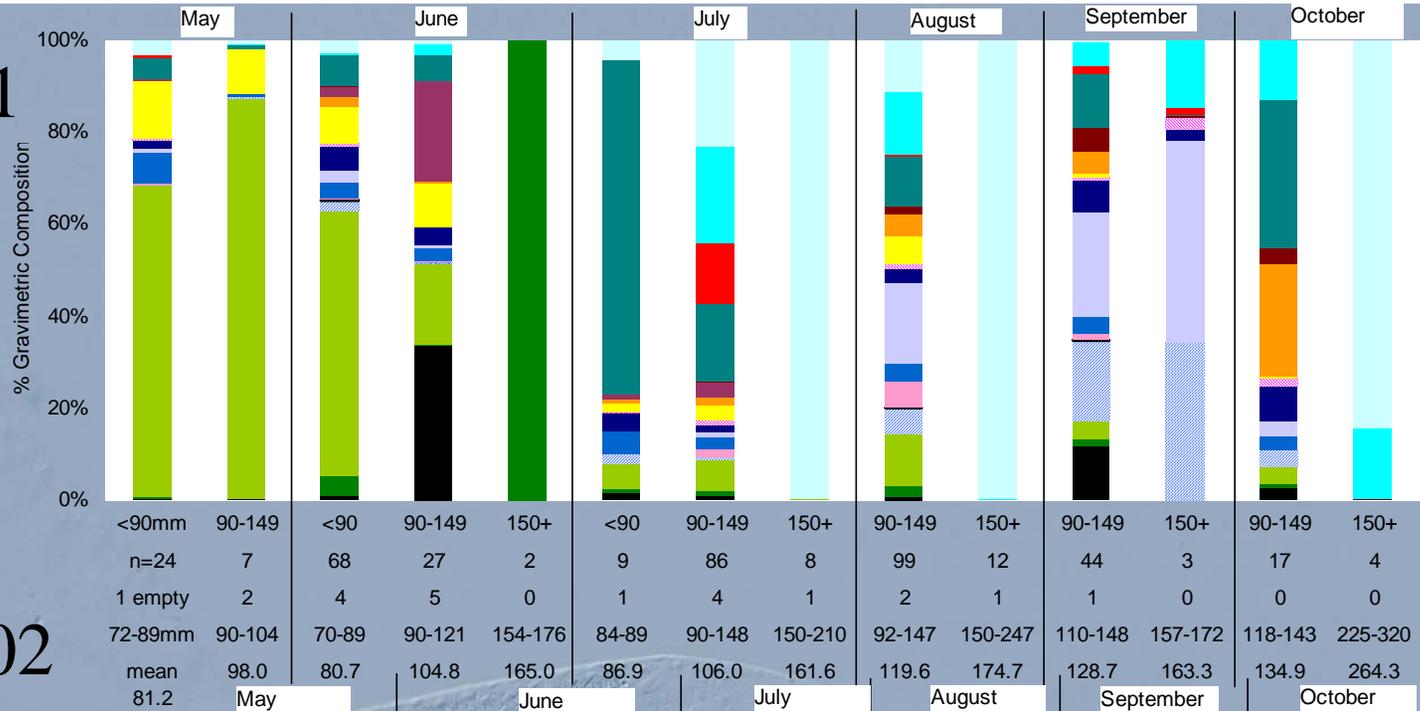
Overall diet composition based on prey ecology for juvenile Puget Sound Chinook



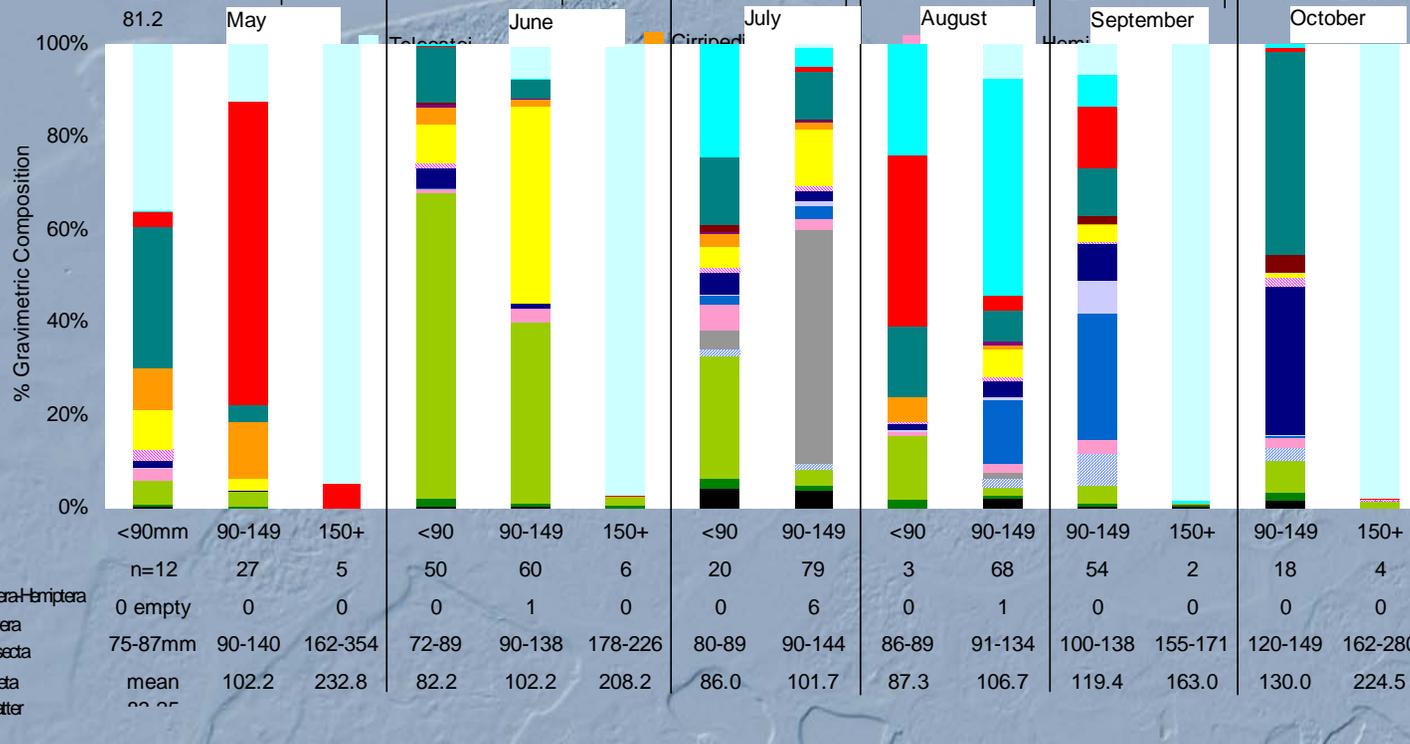
Diet composition by weight based taxonomic groups for three size classes of juvenile Puget Sound Chinook salmon in five time periods in 2001 & 2002

90 mm=3.5 inch
150 mm=6 inch

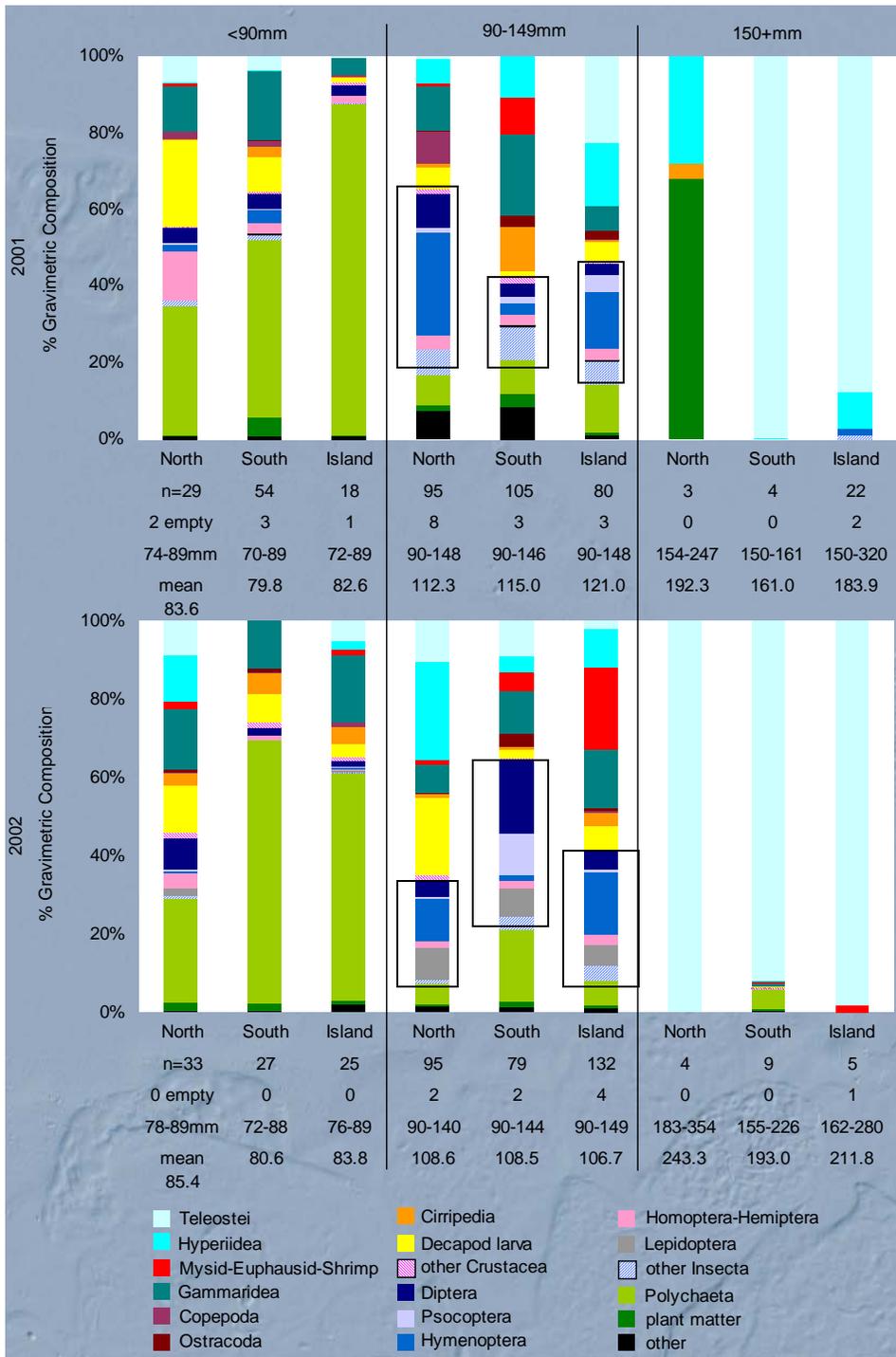
2001



2002

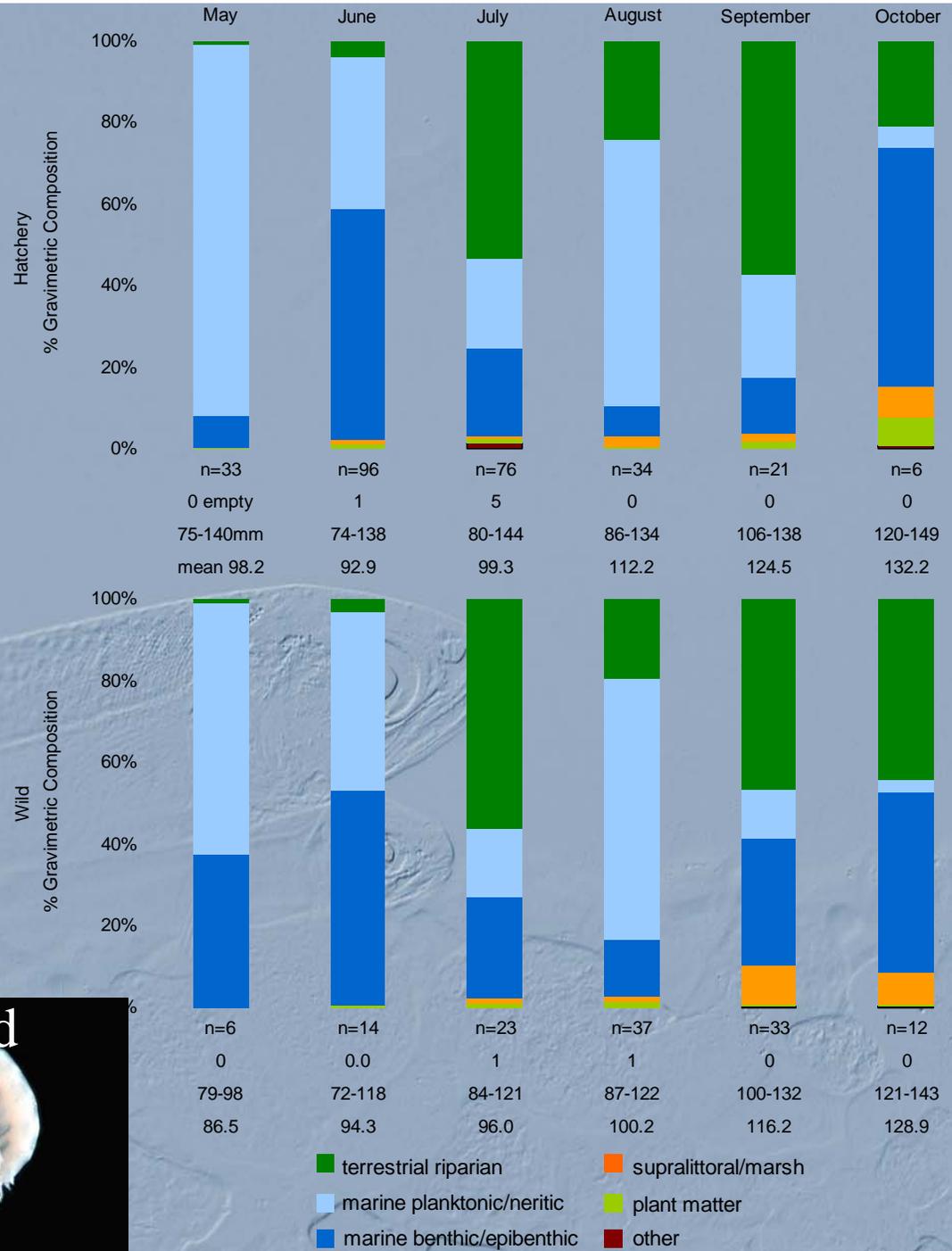


- Teleostei
- Hyperichthya
- Mysid-Euphausiid-Shrimp
- Gammaridea
- Copepoda
- Ostracoda
- Clupeida
- Decapod larva
- other Crustacea
- Diptera
- Hymenoptera
- Hemiptera-Hemiptera
- Lepidoptera
- other Insecta
- Polychaeta
- Psocoptera
- plant matter
- other

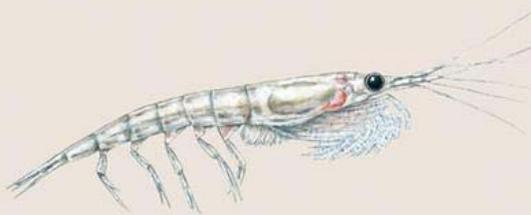


Diet composition
by weight based
on prey
taxonomic groups
and geographic
region for three
size classes of
juvenile Puget
Sound Chinook
salmon from 2001
and 2002

Diet composition by weight based on prey ecology for juvenile hatchery and wild Puget Sound Chinook salmon (<150mm) in 2002.



Euphausiid



Gammarid



Key Points

- Peak timing and use of the nearshore differ by salmonid species
- Caught mostly subyearling Chinook from April through Dec, with peak catches in mid-June
- It appears that juvenile Chinook are mostly shoreline oriented but not always. Oceanographic patterns might help explain larger scale Chinook distribution patterns (i.e. Chinook on Vashon)

Key Points

- In strict numbers, hatchery Chinook dominate the nearshore
- Hatchery Chinook of the same age are significantly larger than wild Chinook
- Substantial overlap in space, time, and diet between hatchery and wild Chinook
- These findings indicate that there is a strong possibility of negative competitive interactions between wild and hatchery Chinook under certain conditions

Key Findings

- Chinook (subyearlings) under 150 mm have very diverse diets which are derived from diverse habitats
- Chinook (yearlings/spring) over 150 mm appear to feed primarily on larval fish
- Chinook appear to feed opportunistically on seasonally abundant prey
- There are food web linkages between shallow vegetated substrate (e.g., herbivorous polychaetes), marine riparian vegetation (e.g., terrestrial insects) and juvenile chinook salmon

Key Point

- What you do in your jurisdiction's nearshore (including hatchery practices) affects other watershed's Chinook and what they do in their nearshore affects "your" Chinook

- The Puget Sound Nearshore is the tie that binds the Puget Sound Chinook ESU



- These fish are your fish, These fish are my fish,
- From the Lummi Nation, to Vashon Island
- From the Skagit Valley to the Nisqually Del-hell-ta.
- These fish spawned for you and me!