Juvenile Salmon Ecology and Restoration of Tidal Freshwater Habitats

Nichole Sather¹, Gary Johnson¹, David Teel², Adam Storch³, Tucker Jones³, Christine Mallette³, John Skalski⁴

¹Pacific Northwest National Laboratory
²NOAA Fisheries
³Oregon Department of Fish and Wildlife
⁴University of Washington
Overview

► Background
► Trends from SRD
► Landscape scale comparison
  □ Fish community
  □ Environmental Covariates
► Ecosystem-based research
► Implications for ecosystem restoration
Project Background

- June 2007 – present
- Multi-partner collaboration
- Critical Uncertainties Research
- Ecosystem Restoration
Research Goals for Tidal Freshwater

- Determine the types of habitats within the LCRE where juvenile salmon are found, when are they present, and under what environmental conditions?
- What is the ecological contribution these habitats to the recovery of ESA-listed salmon in the Columbia Basin?
Chinook Salmon - 2009

![Graph showing the distribution of Chinook Salmon lengths](image-url)
Unmarked Chinook Salmon

![Graph showing the mean density of fish per square meter over months from 2007 to 2009. The graph indicates a peak in density in May 2007 and May 2008, with a significant decrease in density in July 2007 and July 2009.](image)
Unmarked Chinook Salmon - 2009

The graph shows the growth of unmarked Chinook Salmon over the course of a year, with measurements recorded monthly. The length of the fish is given in millimeters (mm) on the y-axis, and the months of the year are listed on the x-axis. The data points indicate a consistent increase in length from January through December, with the lengths ranging from approximately 20 mm to 120 mm.
Landscape Scale Patterns

- 2009-2010
  - Jan, Feb, May Aug, Nov, Feb

- Random Stratified Sampling
  - Cowlitz to Lewis
  - RKM 109-141

- Principal component analysis (PCA)

- Analysis of Distance (ANODIS)
February 2009

May 2009

August 2009

November 2009
Covariates and Fish Communities

 Metrics

- Temperature
- DO
- Salinity
- Velocity
- Habitat strata
- Beach slope
- Water depth
- vegetation

 Variation
Prey and Diet
Columbia River Basin Chinook Salmon Genetic Stock Groups Resolved with GAPS Microsatellite Loci
Chinook Salmon Genetic Stock Composition

Sample sizes:
Blitz = 37 and 153
Regular = 25 and 110

Percentage

February

Snake fall
Snake spring
Upper Columbia summer/fall
Deschutes fall
Spring Creek Group fall
West Cascade fall
West Cascade spring
Willamette spring

May

0 20 40 60 0 20 40 60
Over-wintering residence time
Continued Work & Research

- Synthesis report; 2010
- Empirically based monitoring design for AE
- Genetic analysis
- Diet & Prey Resources
  - Salmon
  - native and non-native species.
Ecosystem Restoration

- Sizes
- Genetic Stock Composition
- Habitats
- Variation
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