Restoration Effectiveness Monitoring in the Columbia River Estuary:

Response in Fish Communities

Micah Russell, Columbia River Estuary Study Taskforce Director

Who is monitoring restoration effectiveness for fish in the CRE?

- EP Monitoring Matrix listed practitioners

  -NOAA, CREST, Watershed Councils, USACE, USGS, USFWS, PNNL, NRCS, Univ. Washington, BPA, EPA, CLT, BES and others.

- CREST performs multiple parameters at multiple sites based on:

  Monitoring Protocols for Salmon Habitat Restoration Projects in the Lower Columbia River and Estuary

  Roegner et al 2008

Who is CREST?

- Special District (b. 1974)
  - **Members**: Port of Astoria, Wahkiakum Port Dist. #2, Port of Peninsula, Port of Ilwaco, City of Seaside, City of Warrenton, City of Astoria, City of Ilwaco, Pacific County, Clatsop County, Wahkiakum County, Clatsop Soil & Water Dist.

- Col. River Estuary Data Development Program (CREDDP)

- Current Services:
  1. Coastal/Estuarine Planning
  2. Habitat Restoration
  3. Ecosystem Monitoring

CREST monitoring

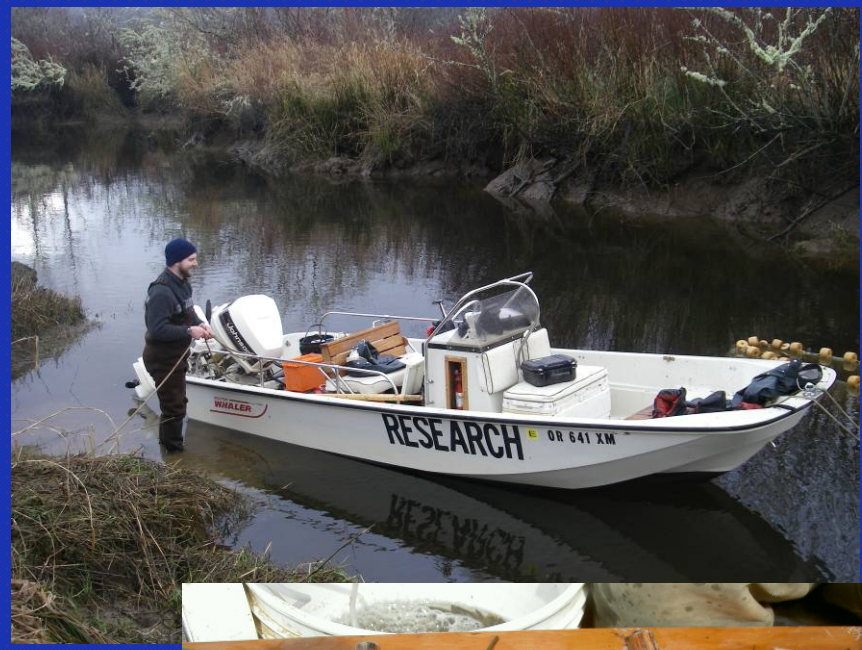
- Grants vs. Contracts

- Who we employee:

  -Biologist/Ecologist (2)

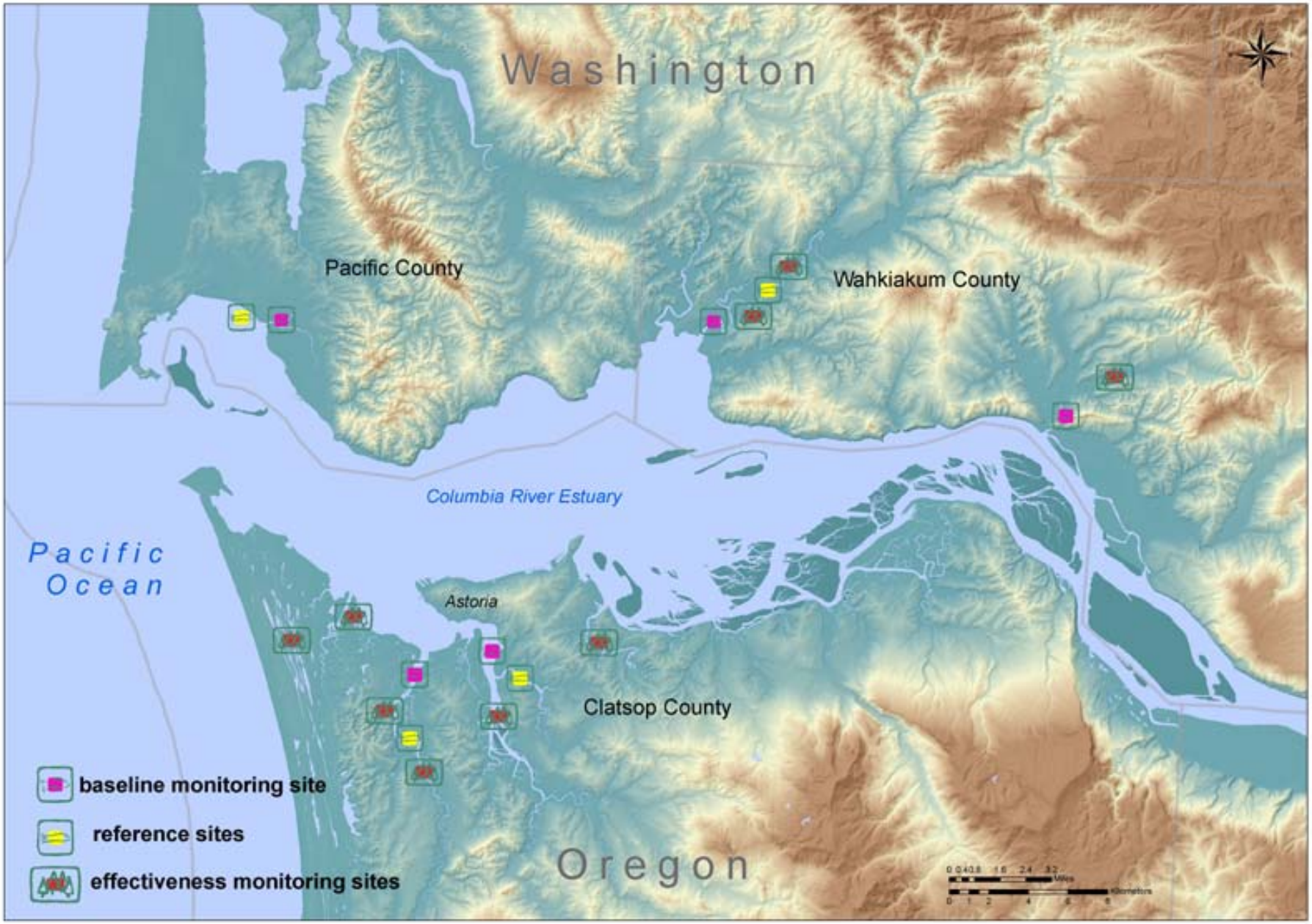
  -Wetlands Monitoring Specialist

  -Field Technician (2)



Monitoring Strategies

- Baseline (several CRE tributaries)
- Restoration Sites (BACI)
- Reference Sites
- Core Metrics vs. Higher Order Metrics; Extensive vs. Intensive Monitoring


Washington
Pacific County
Wahkiakum County
Columbia River Estuary
Pacific Ocean
Astoria
Clatsop County
Oregon
baseline monitoring site
reference sites
effectiveness monitoring sites

Methods

Presence/Absence (juvenile salmonids):

- Seine*
- Trap net*
- Smolt trap
- Snorkel

*Twice per month, January – June

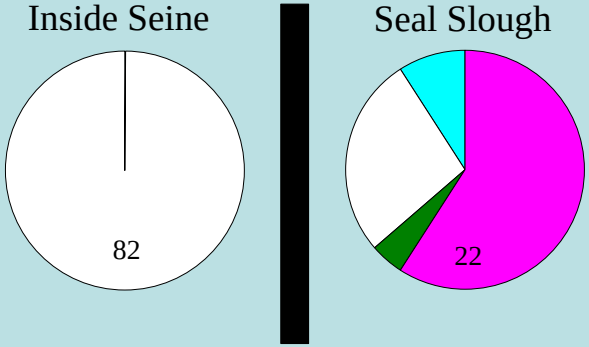
Methods

Fish Usage:

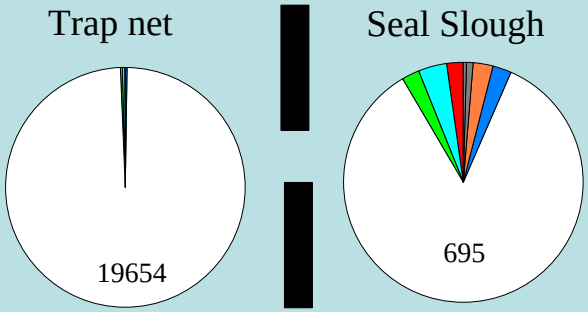
- Diet (lavage > 60mm FL)
- Prey Availability (fallout / benthic)
- Residence Time (pit tagging / marking)
- Genetics

Case Study: Columbia Land Trust Grays River Restoration Sites

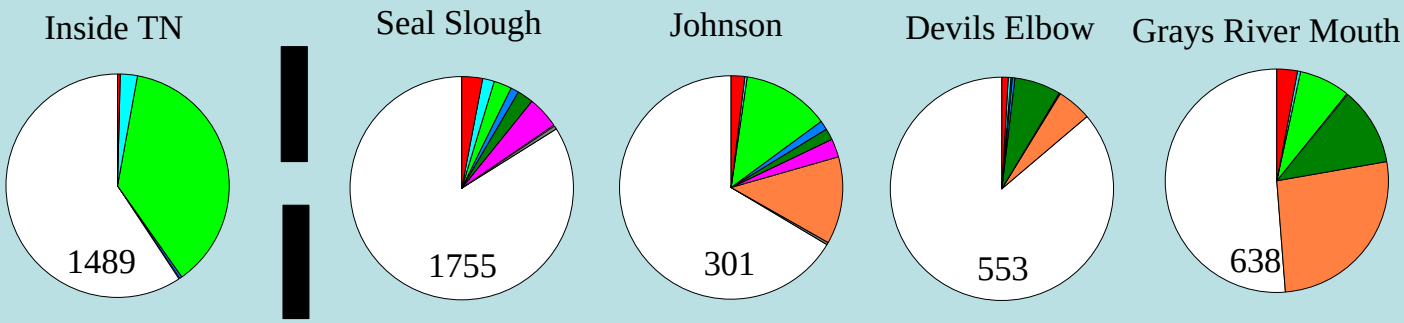
2005



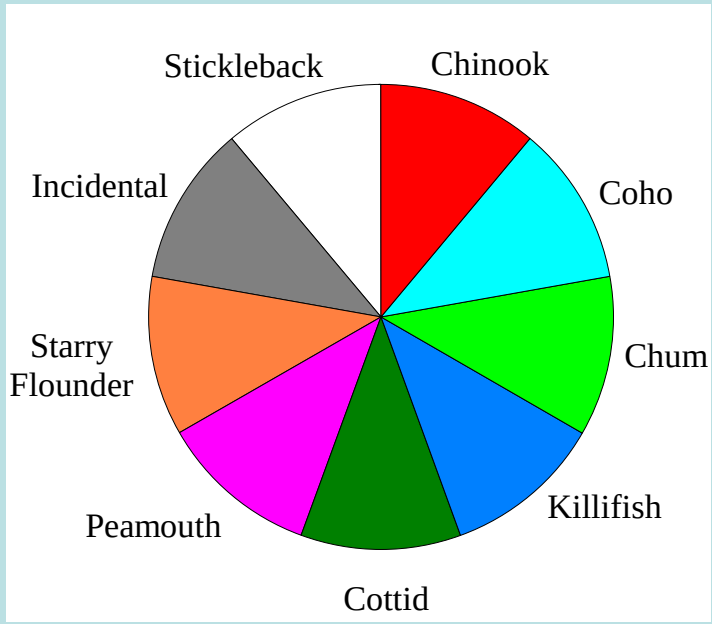
2006



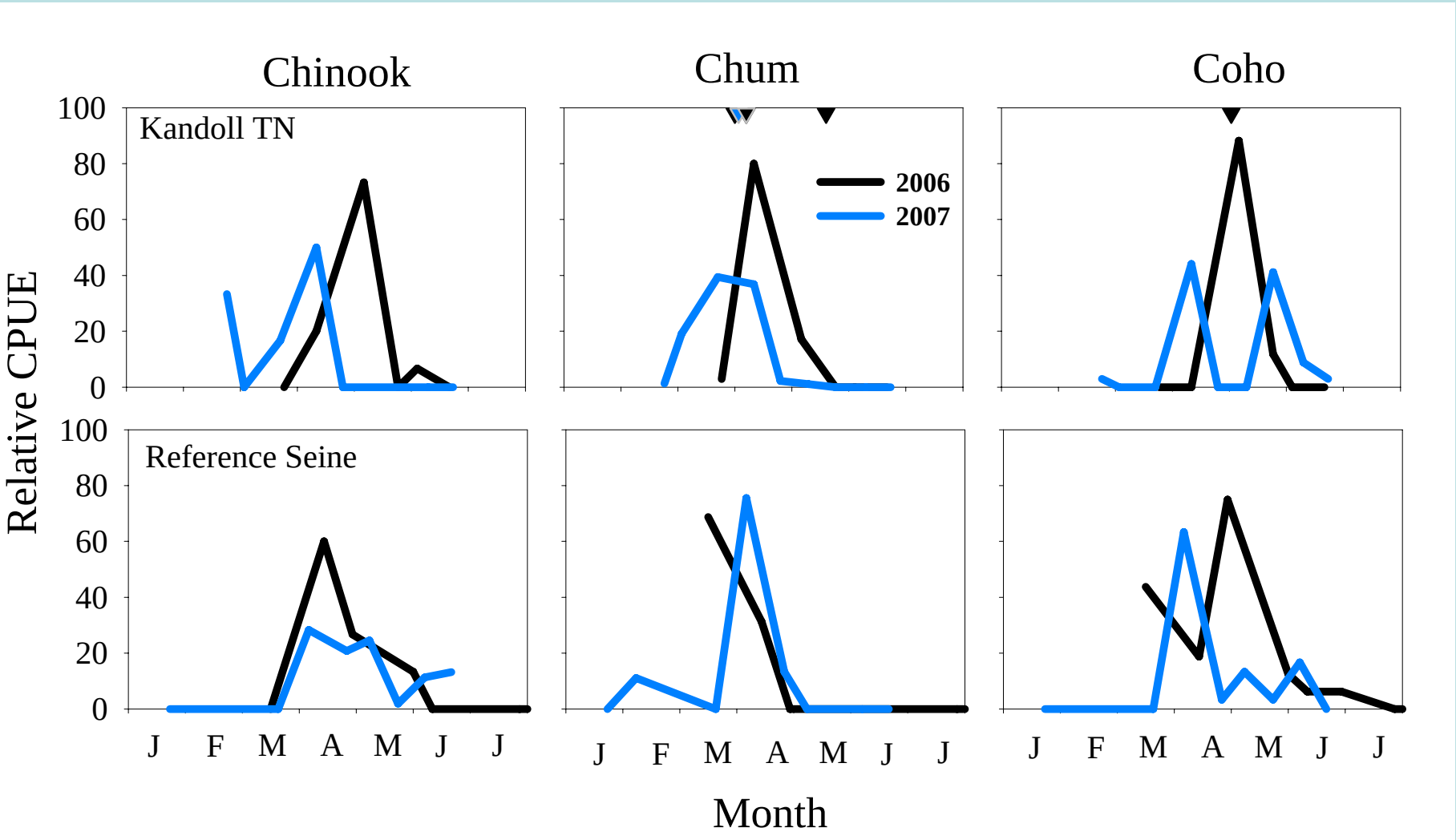
2007



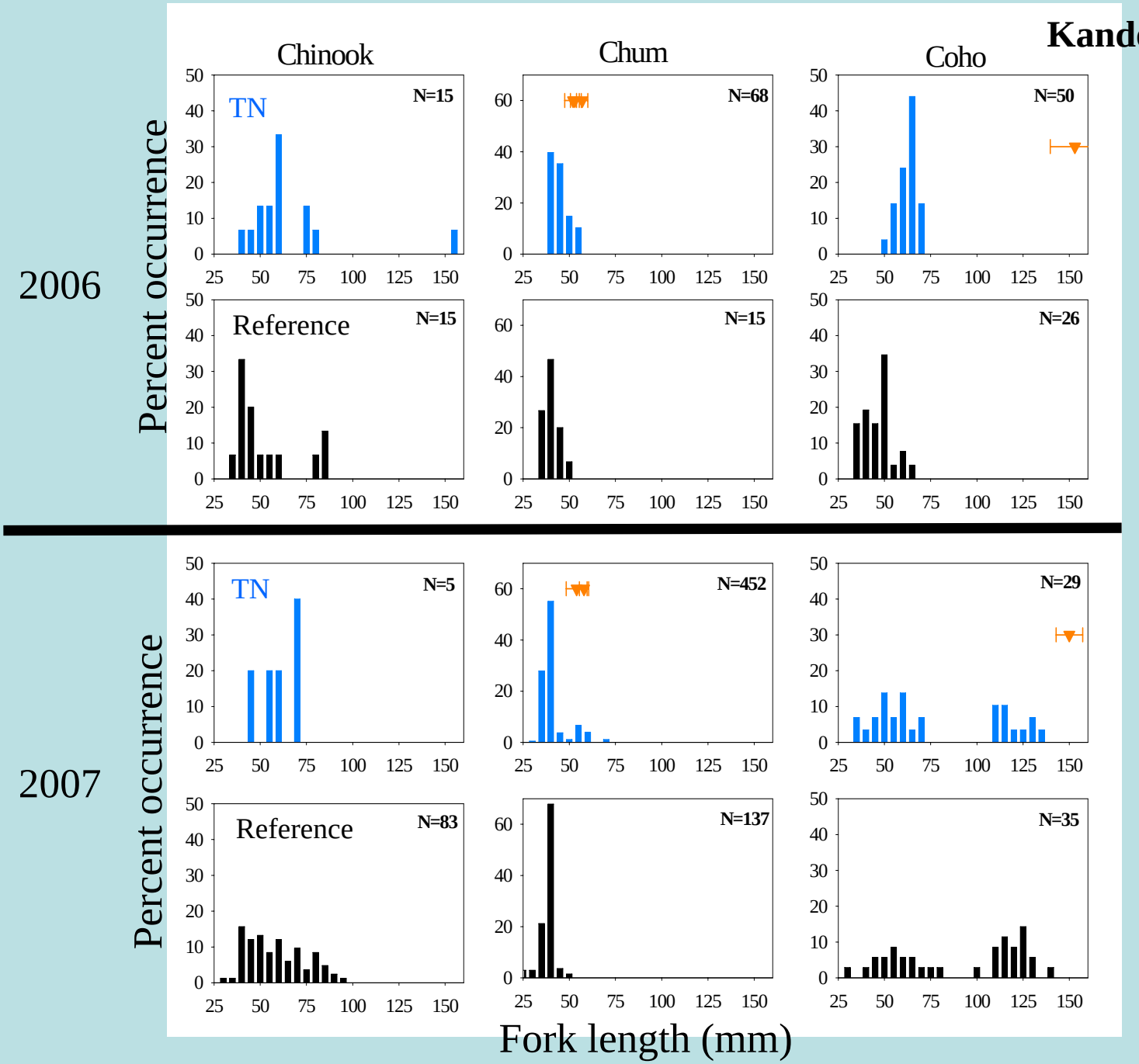
Kandoll Farm



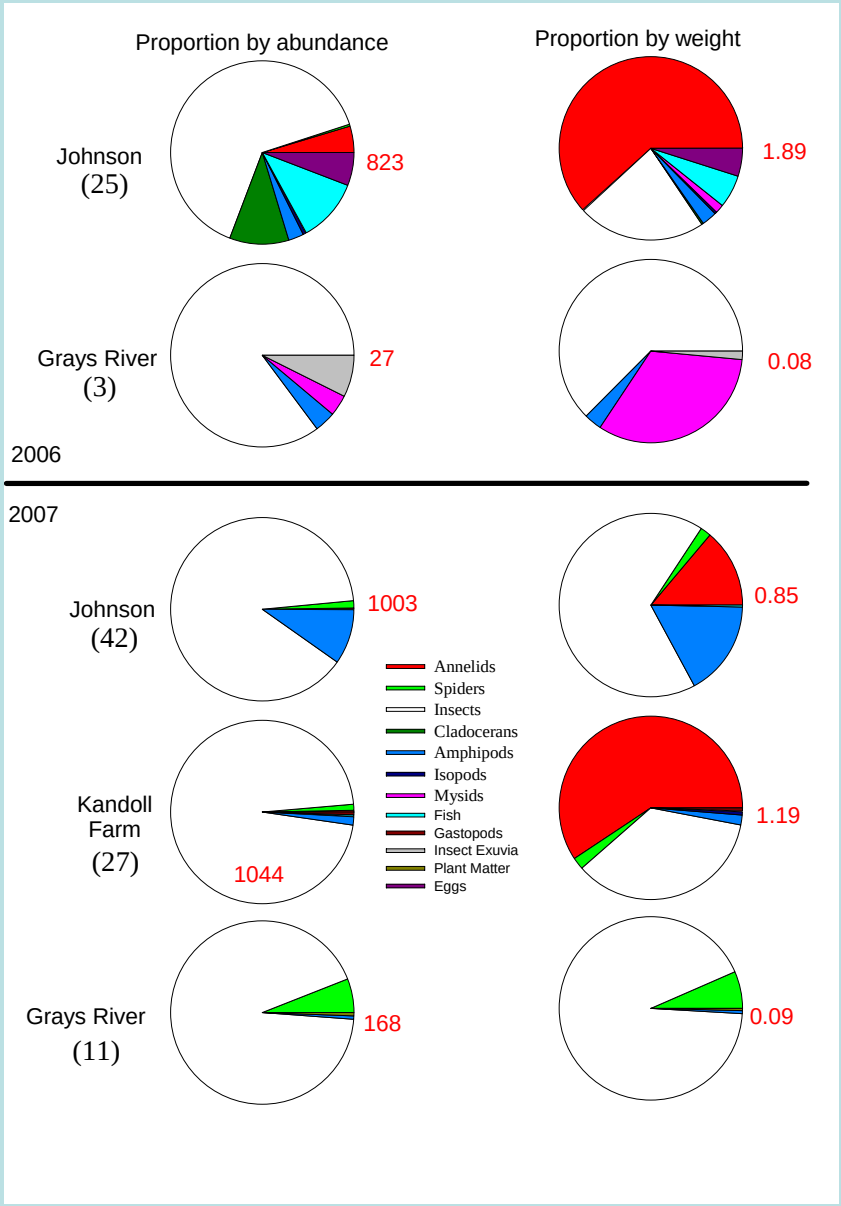
Kandoll Farm

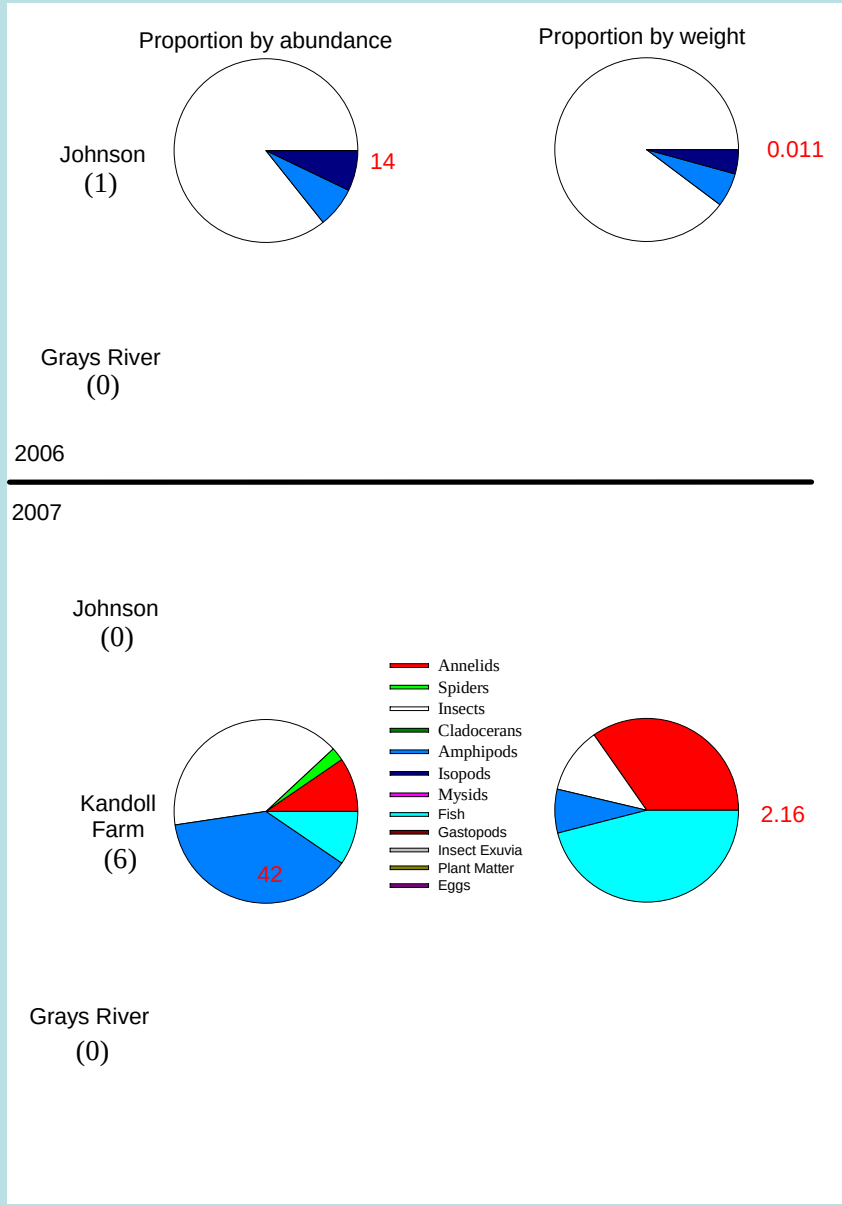


Kandoll Farm



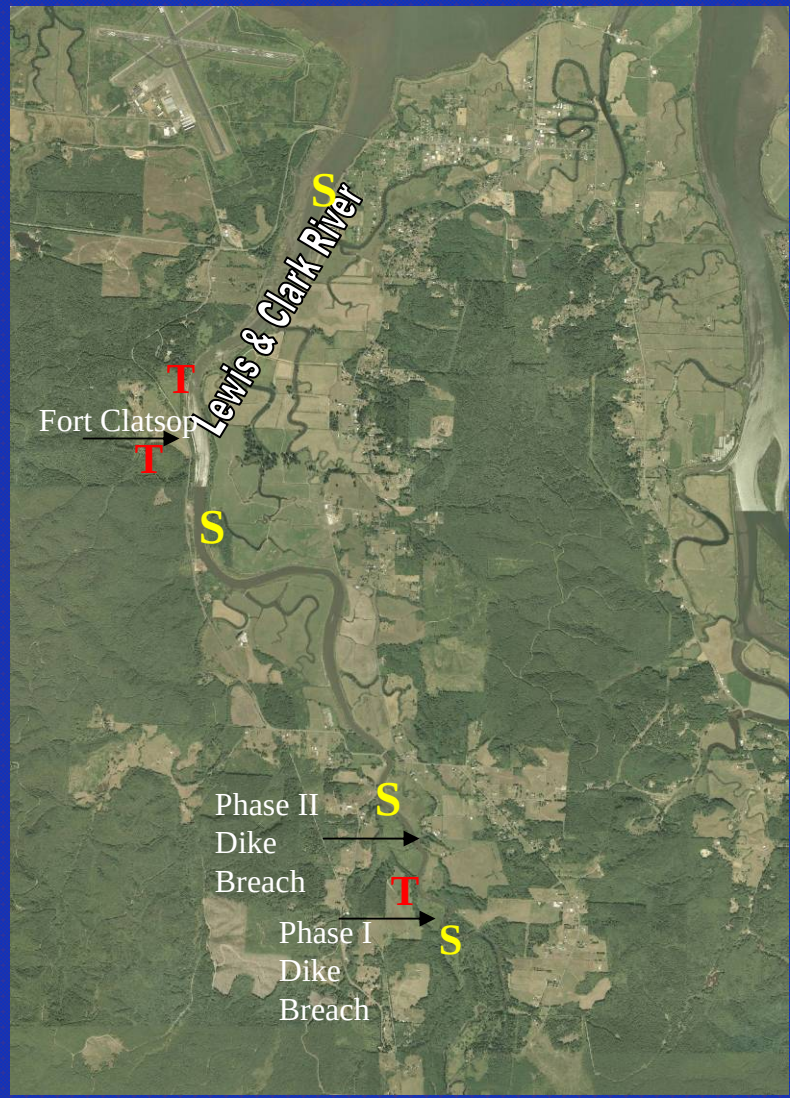
Subyearling Coho Kandoll Farm Yearling Coho



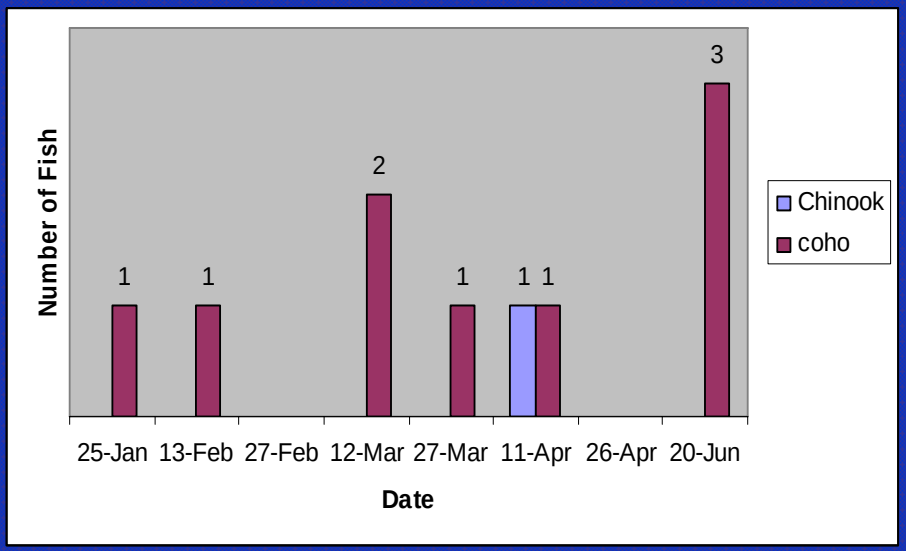


- **Analyses of prey availability and Chinook genetic stock in progress**

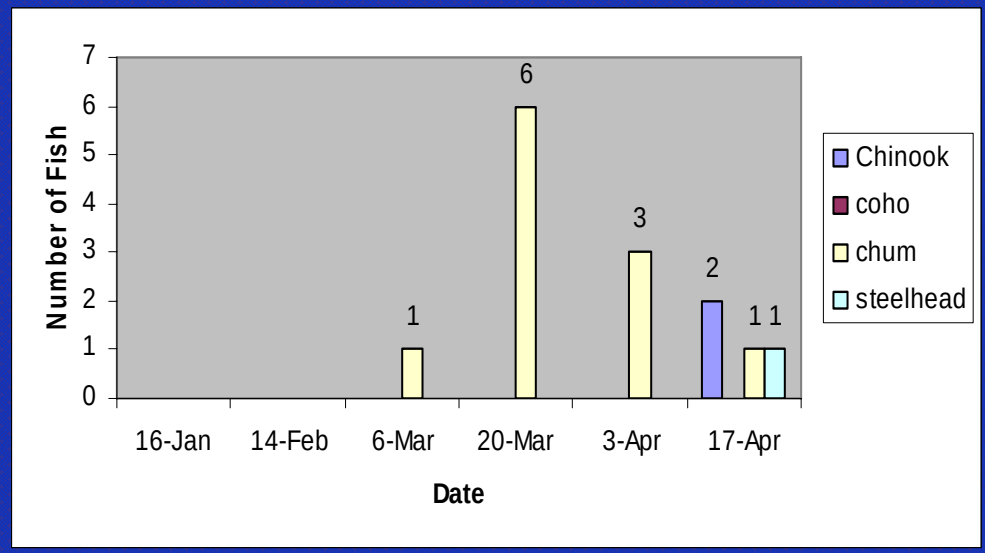
Case Study: Fort Clatsop Culvert Removal



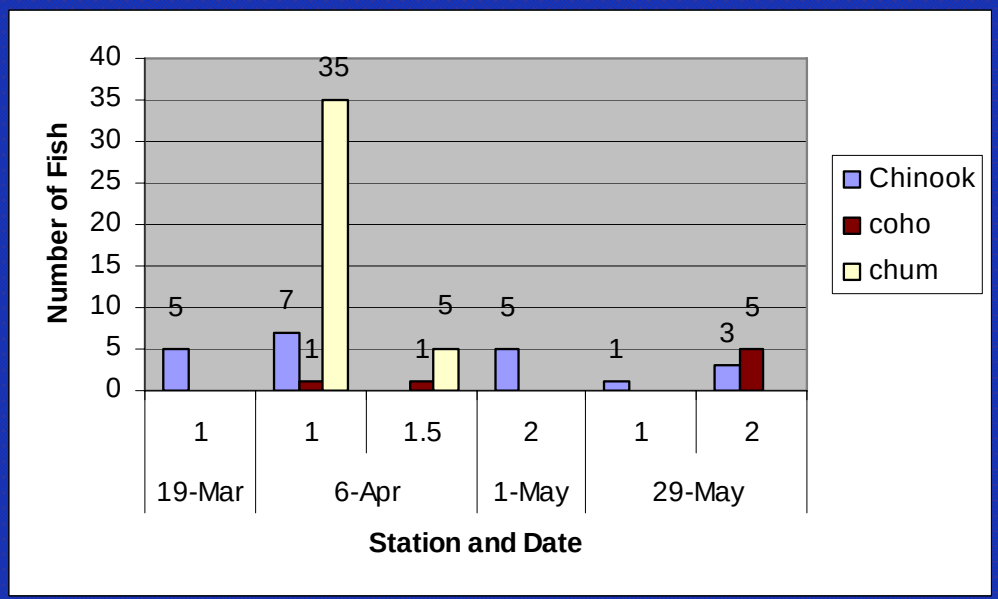
Fort Clatsop Pre-construction (2007)



Post-Construction (2008)



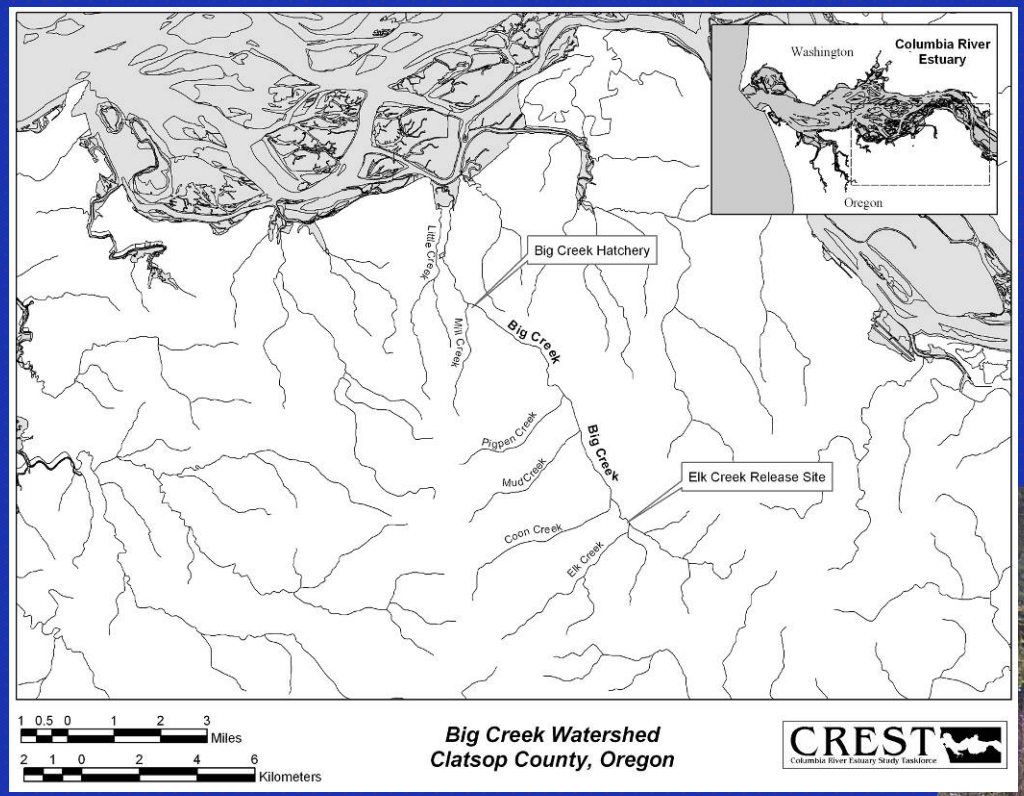
Lewis & Clark River Baseline Seining (2007)



Additional Metrics Planned for May 2008 at Ft. Clatsop:

-prey utilization
-prey availability
-residence time
-genetics
-otolith/lipid analyses

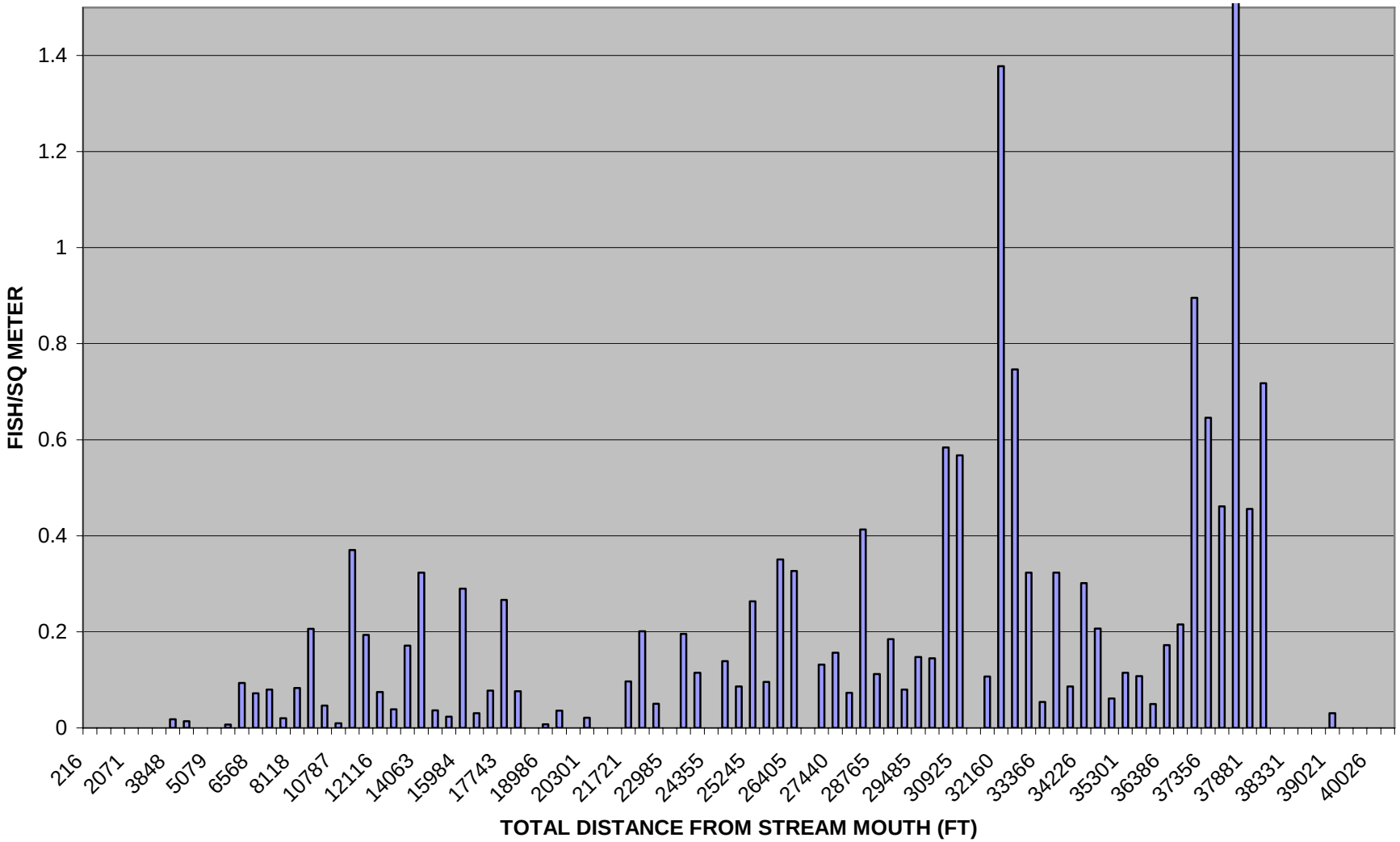
Case Study: Big Creek Fish Passage

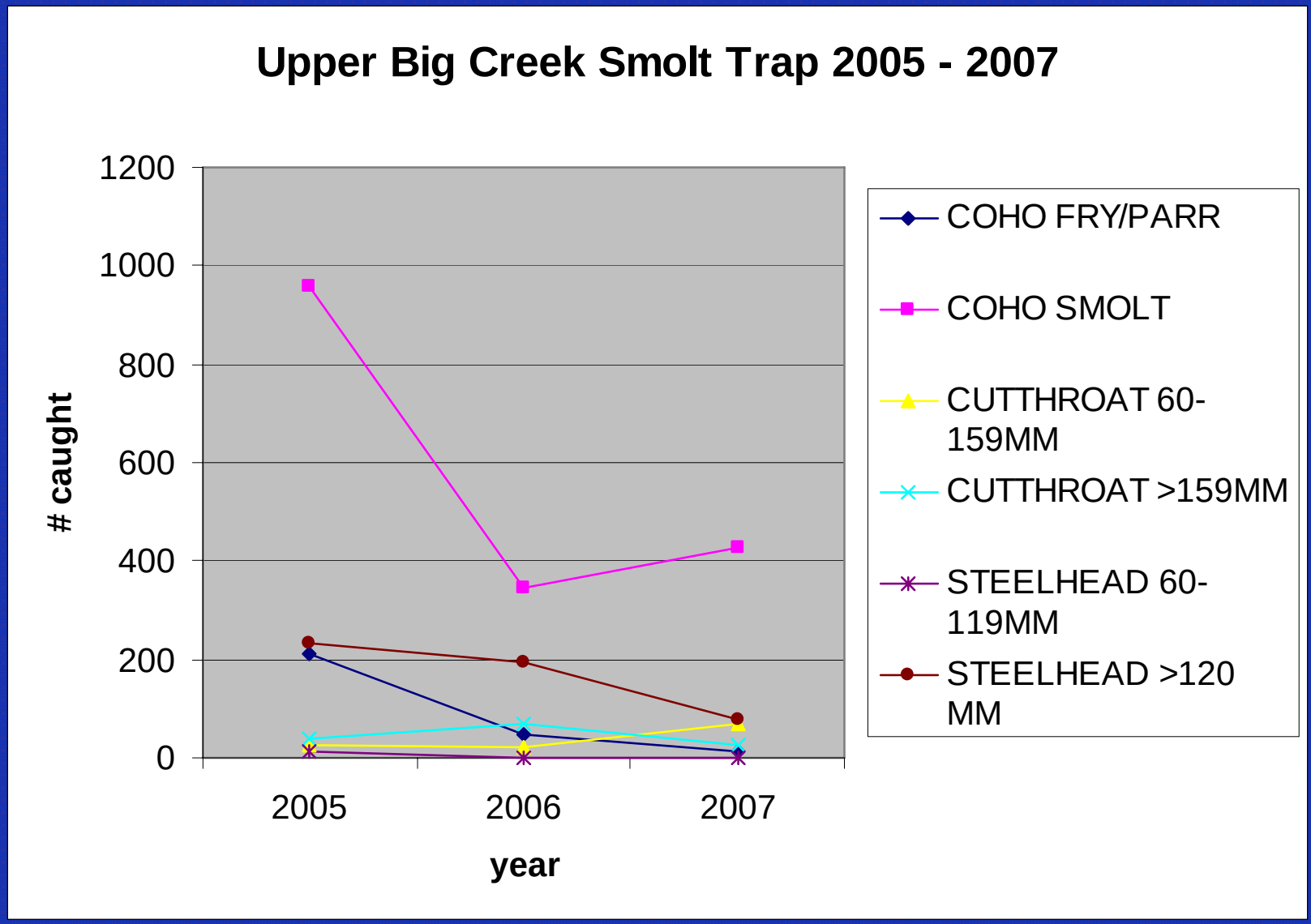


- Fish passed above diversion
- Artificial velocity barrier removal (summer, 2008)

Methods:
-pit tag adult salmon
-smolt trap & snorkel for juvenile salmon
-habitat assessment

Coho Density on Big Creek (2006)





- **Baseline telemetry data under analysis**
- **Post-construction: adult telemetry (2008), juvenile production (2010)**

What we've learned so far:

- **Fish occupy restoration sites in accordance with their life histories.**
- **Salmonids appear to be utilizing the dominant prey types available in the site.**
- **Recruitment, density-dependent, and migration corridor factors may control variability, regardless of habitat conditions.**
- ***Site-specific* success**
- **Growth / Survival?**

LESSONS LEARNED:

- Reference sites
- Sampling standardization
- Timescale response

NEXT STEPS:

- Gear refinement
- Improved conceptual modeling
- Tributary-scale studies & long-term funding
- Higher order metrics
- Cumulative effects

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