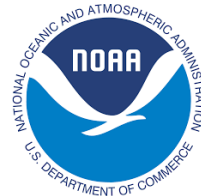


# Fish Response to Habitat Treatments in the Lower Columbia IMW Complex

Marisa Litz & Jamie Lamperth, WDFW LCFRB Meeting June 4, 2021

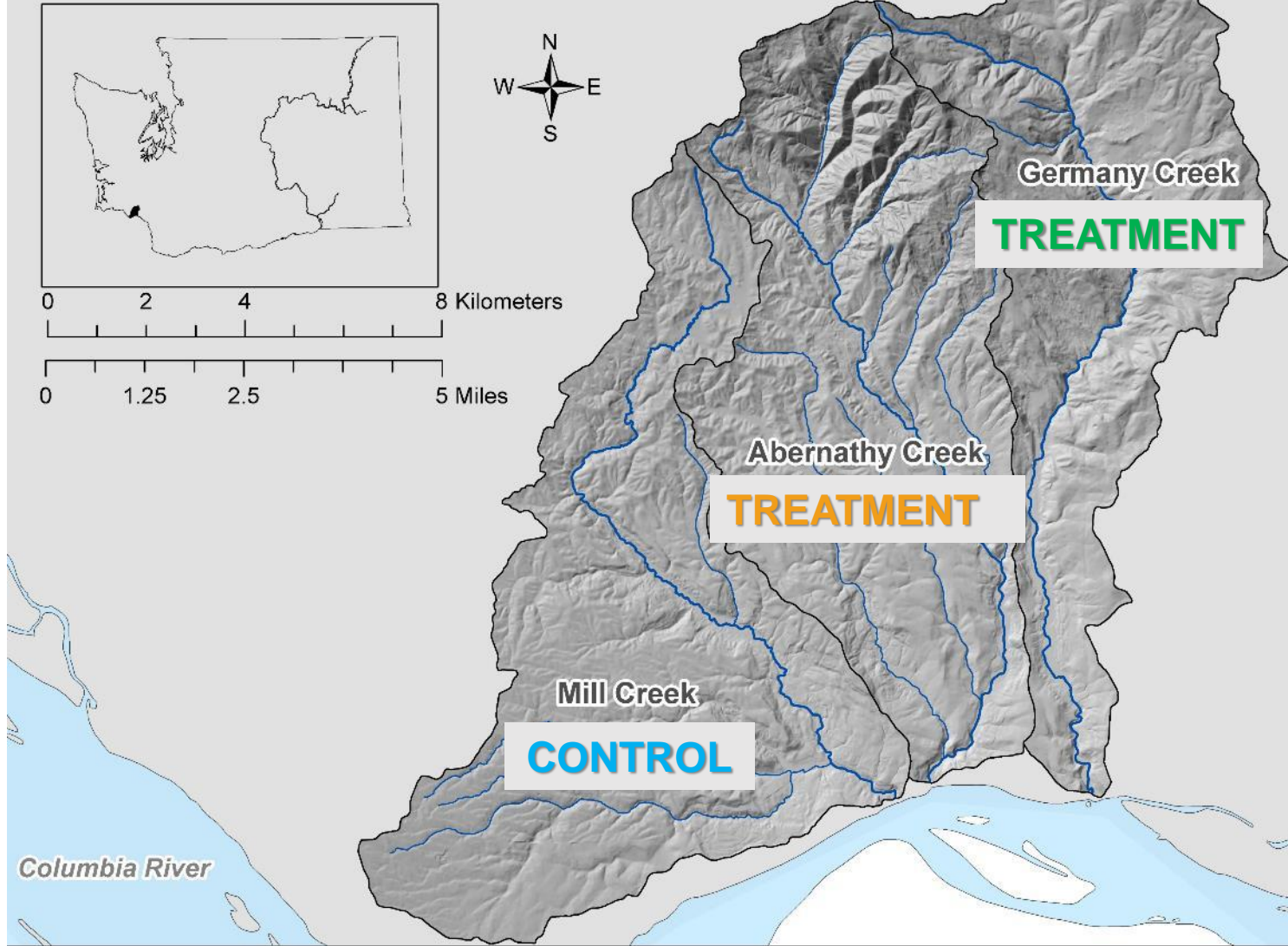




Is restoration working to increase salmon & steelhead freshwater survival, diversity, and production over the long-term?



# Lower Columbia Intensively Monitored Watersheds



Lower  
Columbia  
IMW  
Complex

**Coho Salmon**  
ESA Threatened



*Oncorhynchus kisutch*

**Chinook Salmon**  
ESA Threatened



*Oncorhynchus tshawytscha*

**Steelhead Trout**  
Not Listed



*Oncorhynchus mykiss*

Species of interest

**Monitoring**

Stream Flow and Water Quality

Habitat (Watershed)

Parr, Adult Abundance, Distribution

Smolt Abundance



**Germany**

Nutrient Enhancement

Salmon Carcass Analogs (Sp)

Instream Habitat Complexity

Smith

Godinho

Upper Germany (proposed)

Andrews

Kosiba

**Abernathy**

Nutrient Enhancement

Salmon Carcass Analogs (Fa)

Floodplain Reconnection/Riparian

Bridge Removal

Floodplain Reconnection/IHC

Two Bridges

Off-Channel/Side-Channel/IHC

5A Side Channel

Davis

Instream Habitat Complexity/Floodplain Reconnection/Riparian

Sitka Spruce

Wisconsin

Headwaters Implementation

Instream Habitat Complexity/Off-Channel/Side-Channel

Cameron

Erick Creek

Mainline Restoration

Fish Passage

Midway

Sarah Creek

**Design, Analysis & Reporting**

Watershed Selection

Study Design

Power Analysis

SCA Analysis

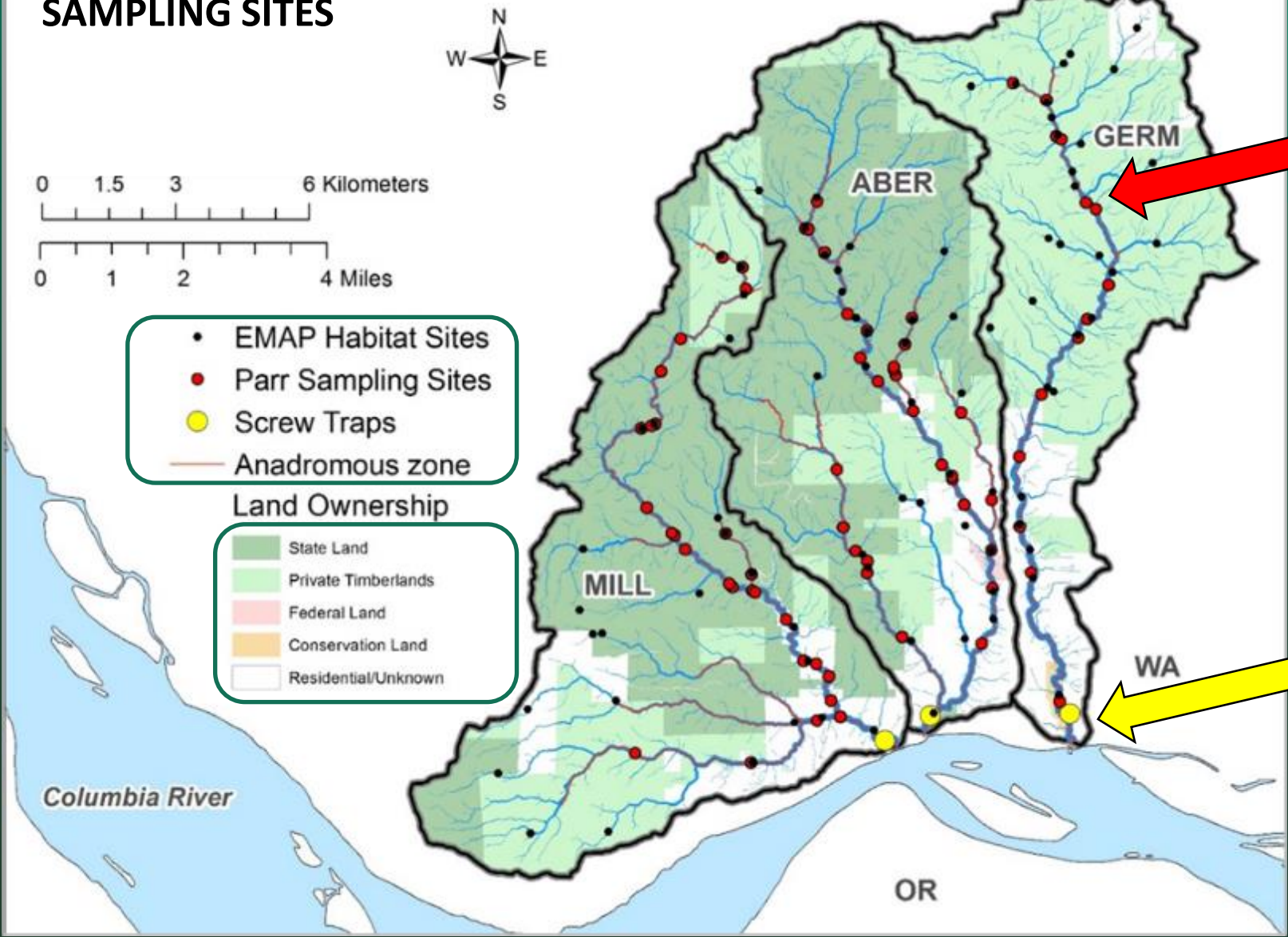
Growth, Survival

Habitat Analysis

Post-Treatment Synthesis



# SAMPLING SITES

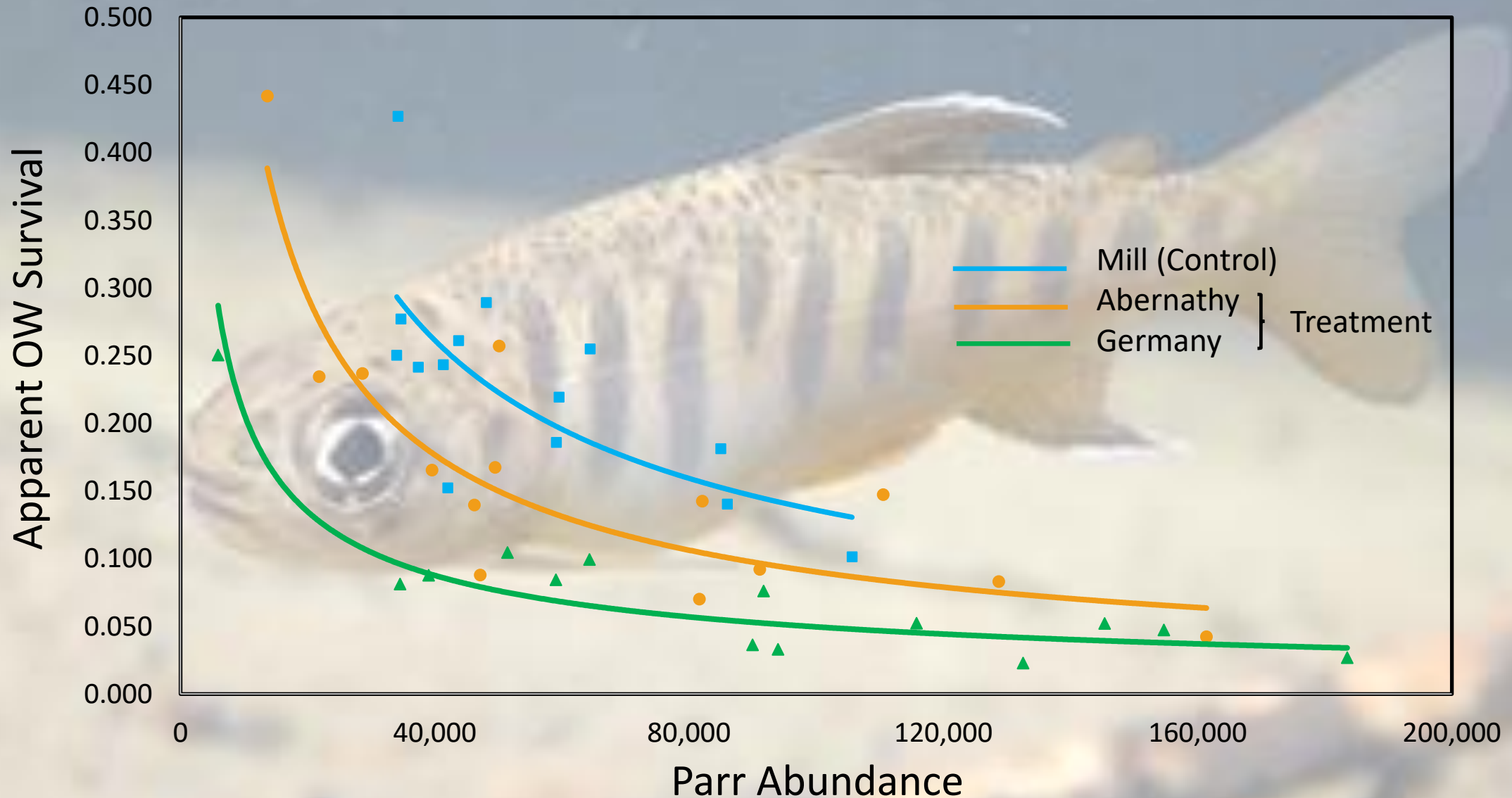


Parr Sampling: summer



Smolt Trapping: spring

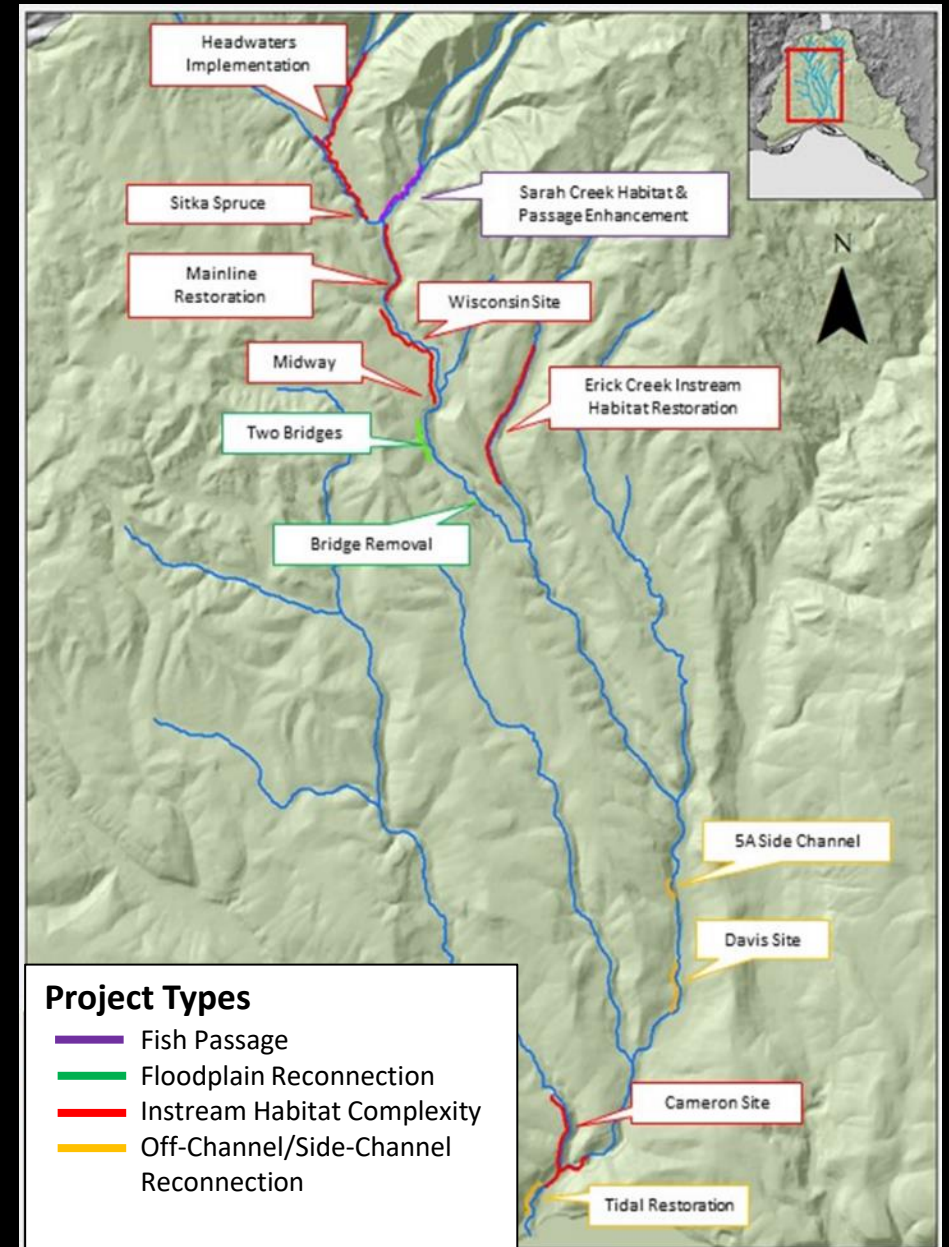
# Density Dependence: winter and summer rearing habitat is limiting coho freshwater productivity





# Abernathy Creek Treatments

- **13** completed projects
- **12 acres** of riparian habitat restored
- **0.8 miles** of new off/side-channel habitat
- **30%** of habitat accessible by anadromous species treated (6.5 miles)







Habitat Complexity

Floodplain Connectivity

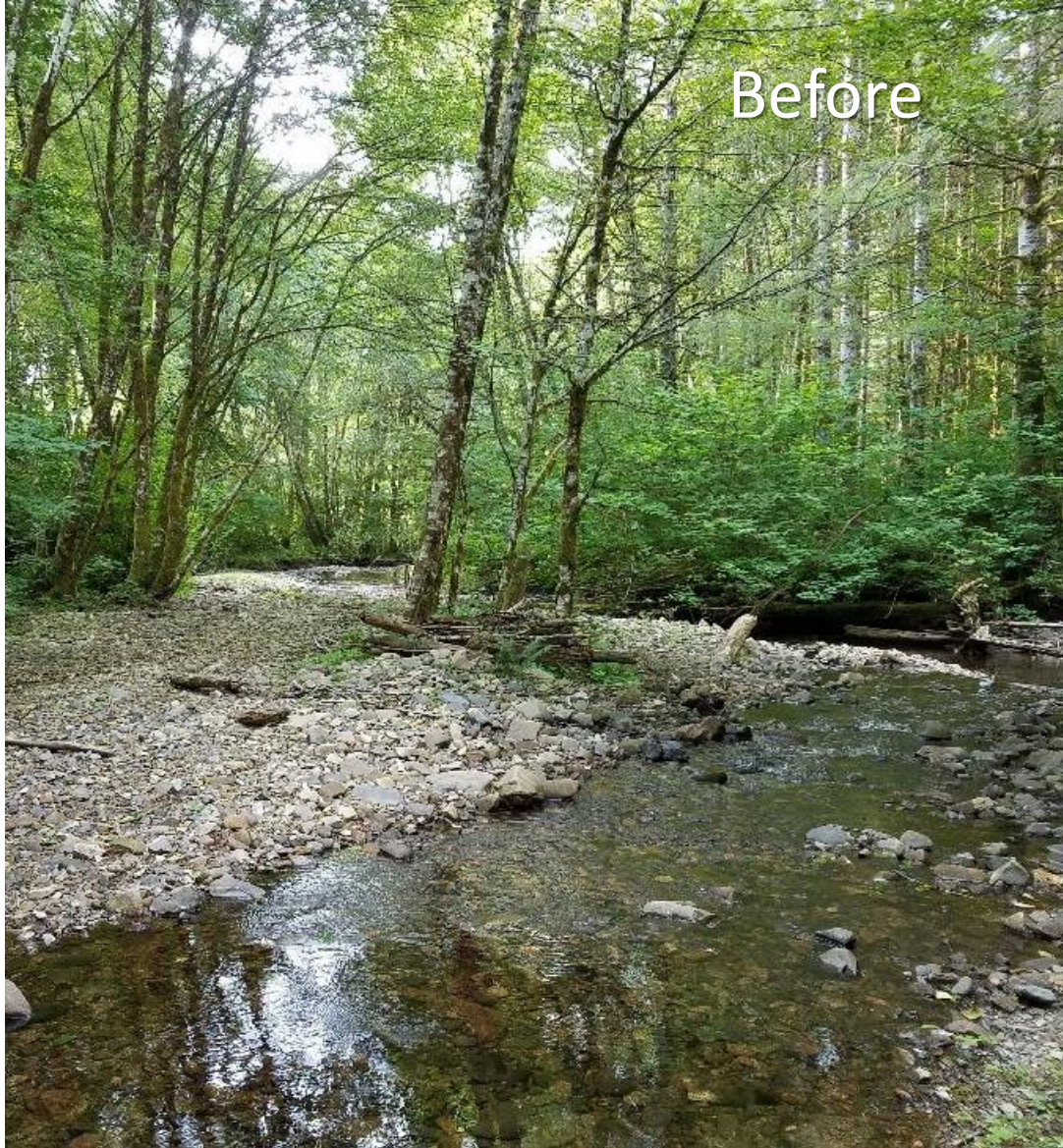
# Abernathy Headwaters



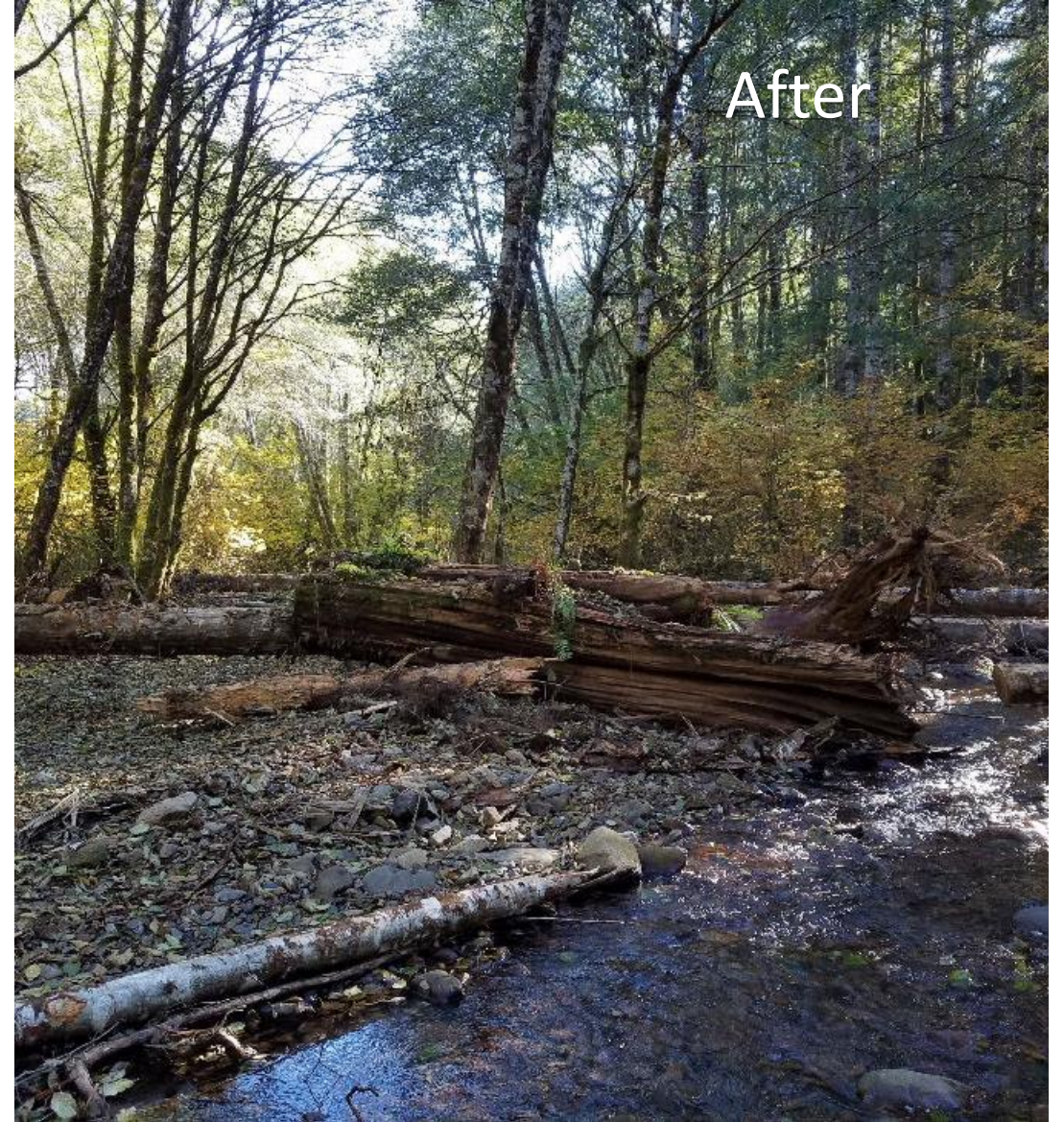
>1 million pounds of wood placed in Abernathy Creek





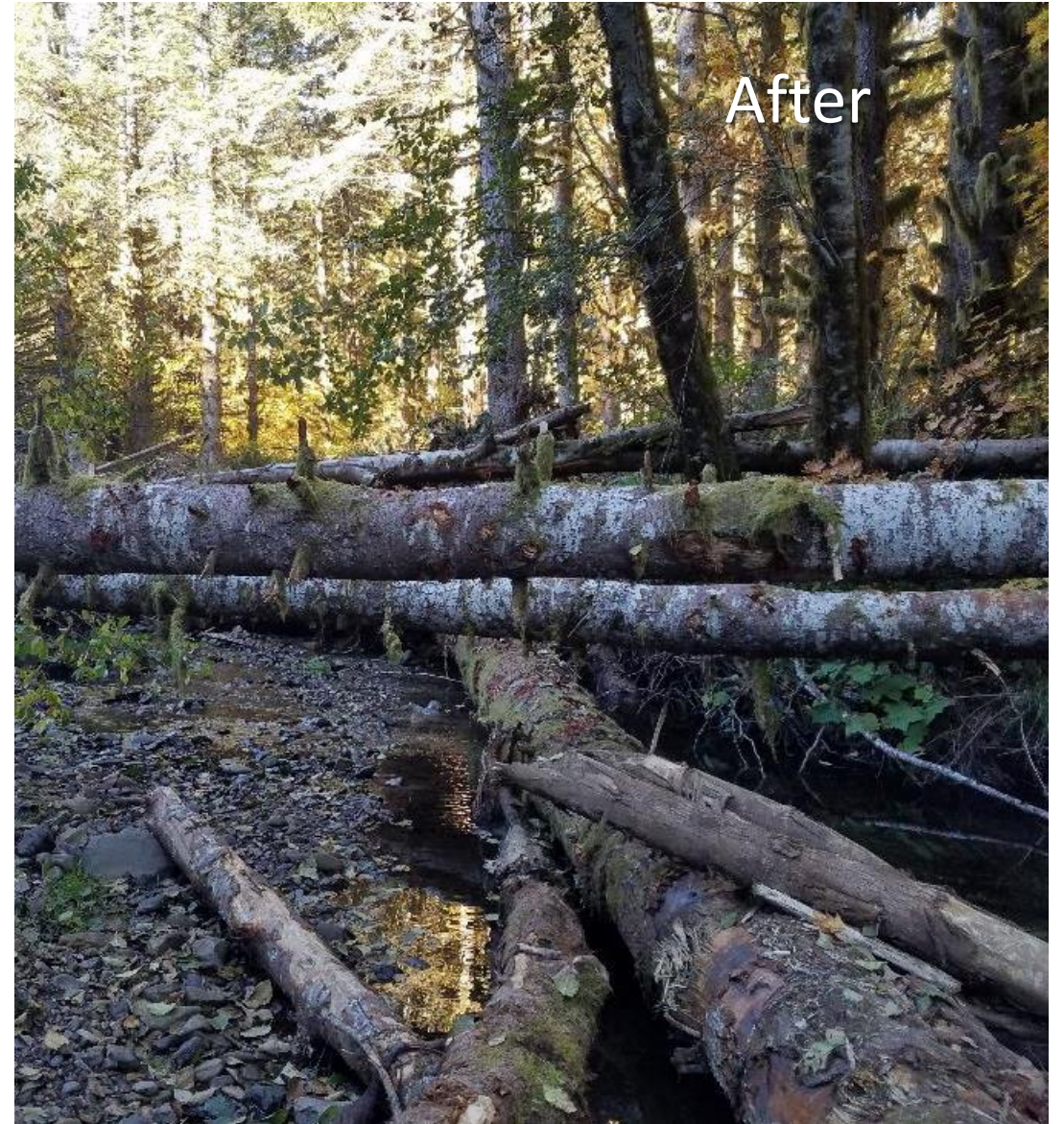


Before



After













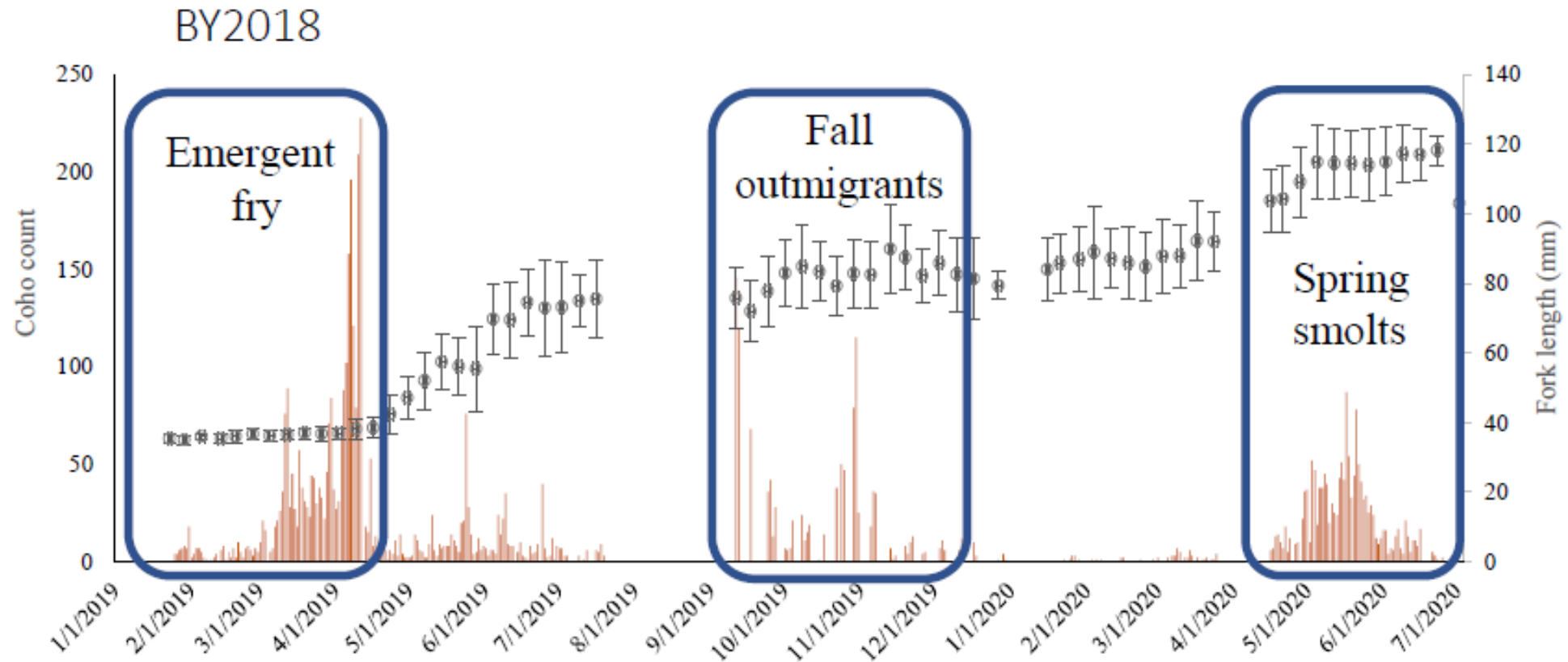
## Sarah Creek (2019)

- Partial Barrier Removal
- Habitat Complexity
- Floodplain Connectivity



# Lessons learned....

- **Nutrient enhancement** – No long-term population response following carcass placements in Germany (spring) and Abernathy (fall) creeks (2010-2015)
- **Spring smolt** – more likely to rear in headwater and tributary habitat
- **Life history diversity** – some coho outmigrate during their first year in freshwater

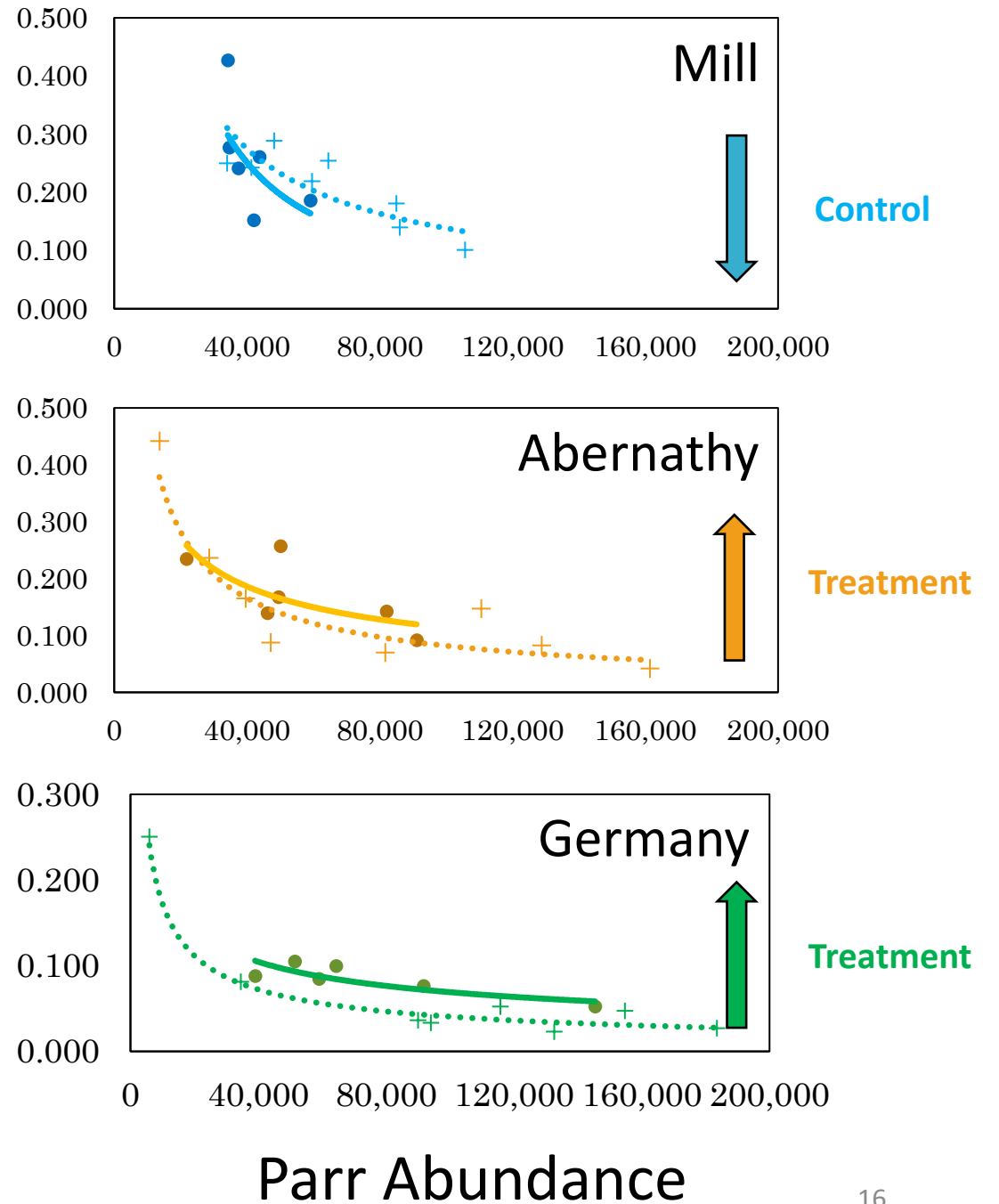




Coho apparent over-winter survival:  
*decreasing* in control and  
*increasing* in treatment  
 watersheds

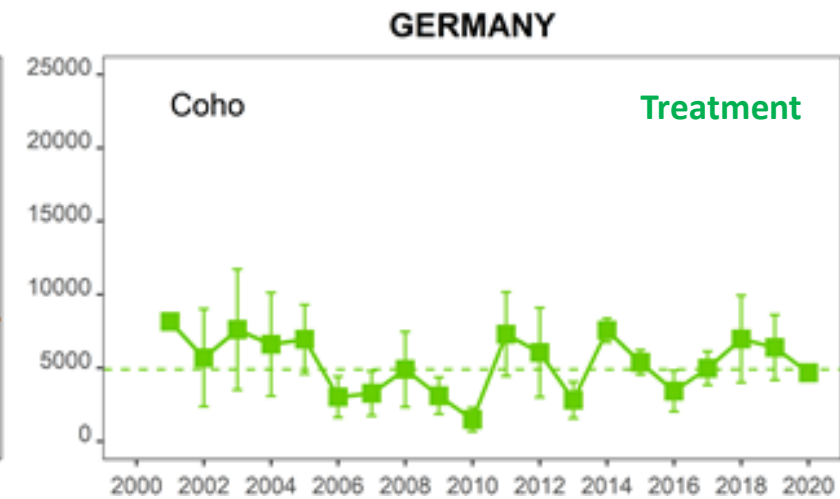
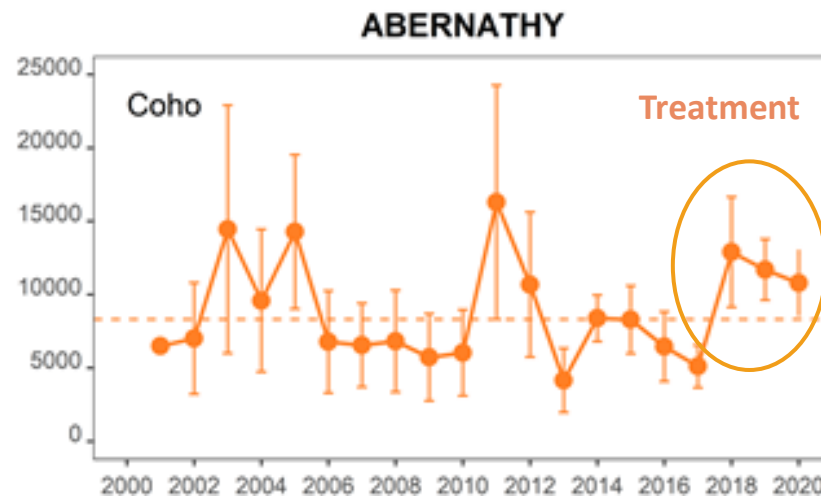
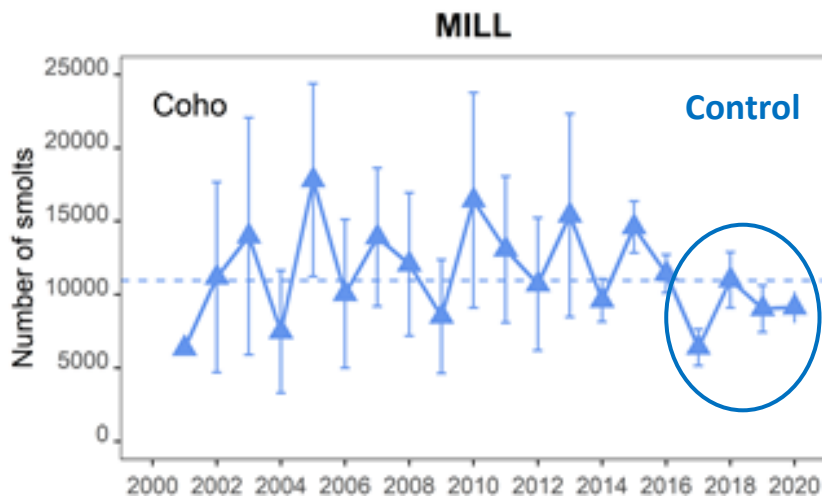
----- BY 2004-2011 (Before)  
 — BY 2012-2018 (After)

Apparent OW Survival





# Scale matters! Coho smolt abundance increasing in treatment watershed after restoration







## Next steps.....

- Continue monitoring fish populations (parr, smolt, adult) up to 10 years post-treatment
- Coho life history – how do fall outmigrants affect overwinter survival and adult returns?
- Alternative analytical approaches to better model fish response to restoration through time



# Acknowledgements Questions?

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