



SALISH SEA
MARINE SURVIVAL PROJECT

Snohomish Salmon Recovery Forum

February 7, 2019

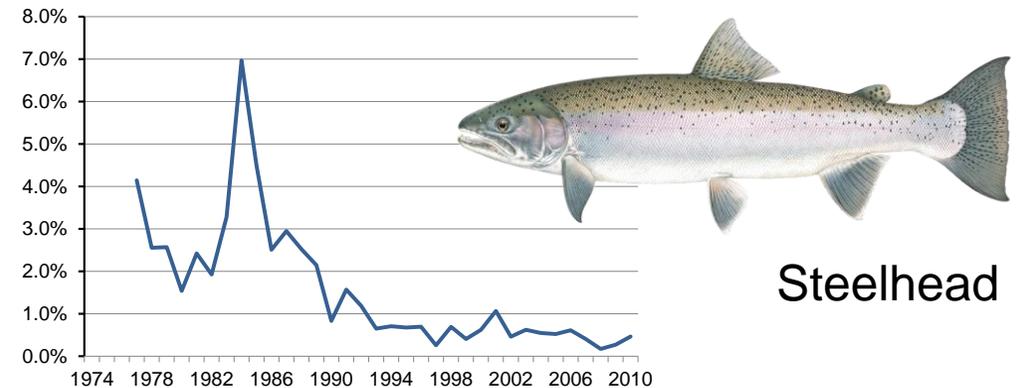
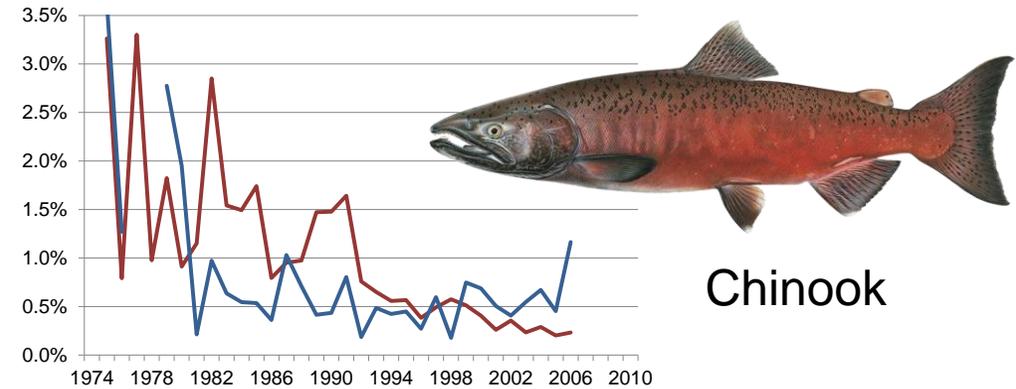
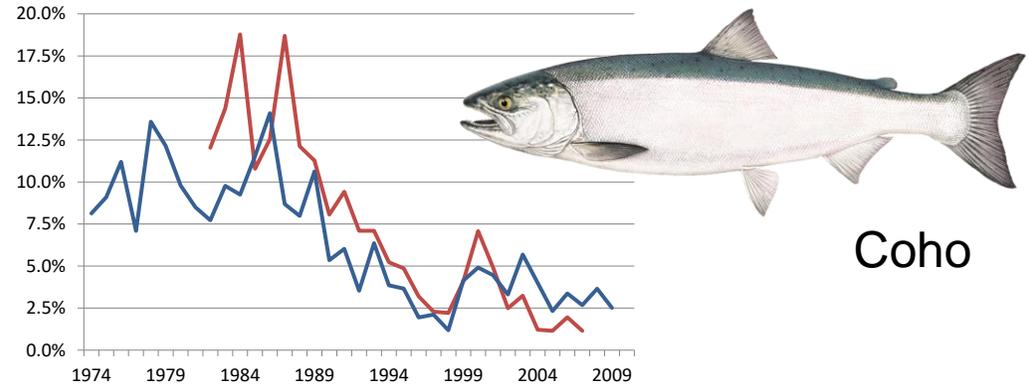
Susan O'Neil

Assoc Director of Conservation & Strategy



Up to 10x decline
in early marine
survival

*If juveniles can't make it out,
there aren't adults to come
back*





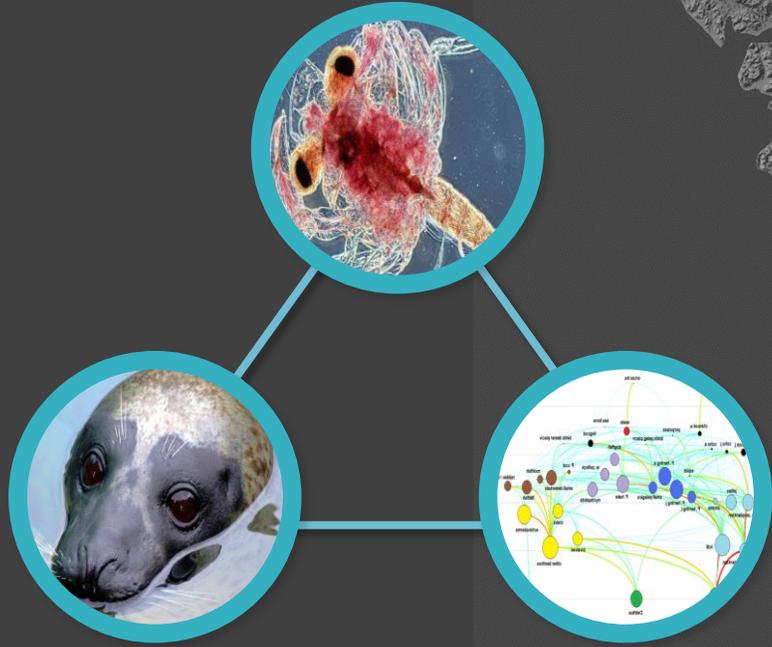
60+ Partners





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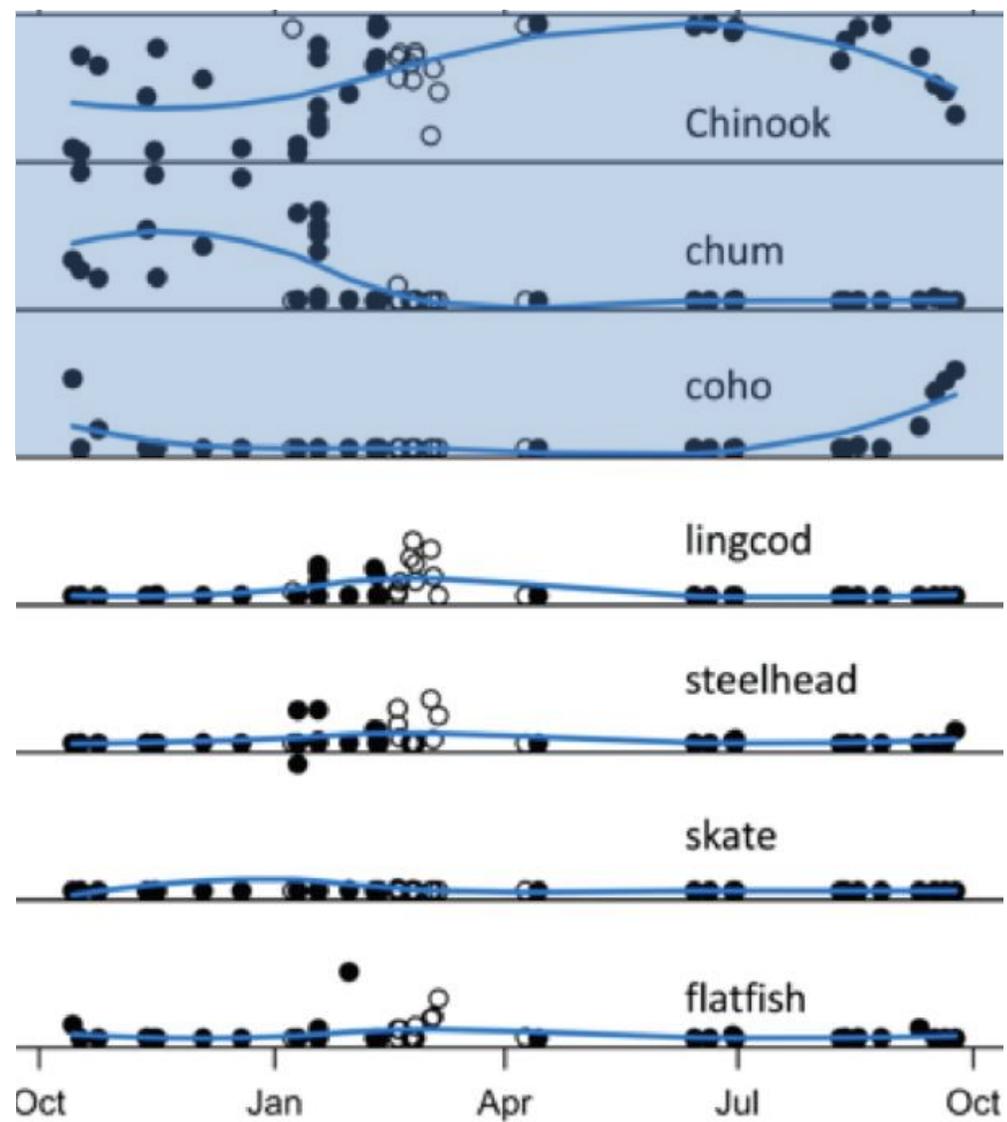


Pacific Ocean

Juan de Fuca Stra

Puget Sound

Over 80 studies
across the Salish Sea





SALISH SEA

MARINE SURVIVAL PROJECT

Sandie O'Neill
Senior Research Biologist

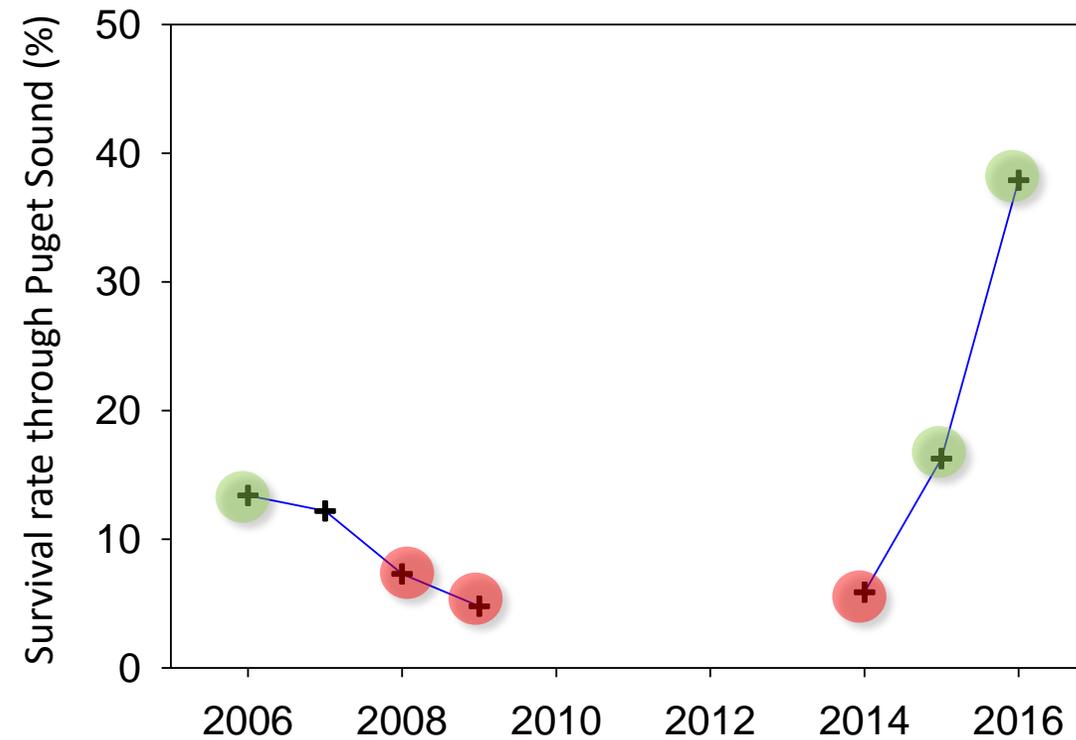


Harbors seals are more abundant,
eating 20-40% of the juvenile Chinook and coho

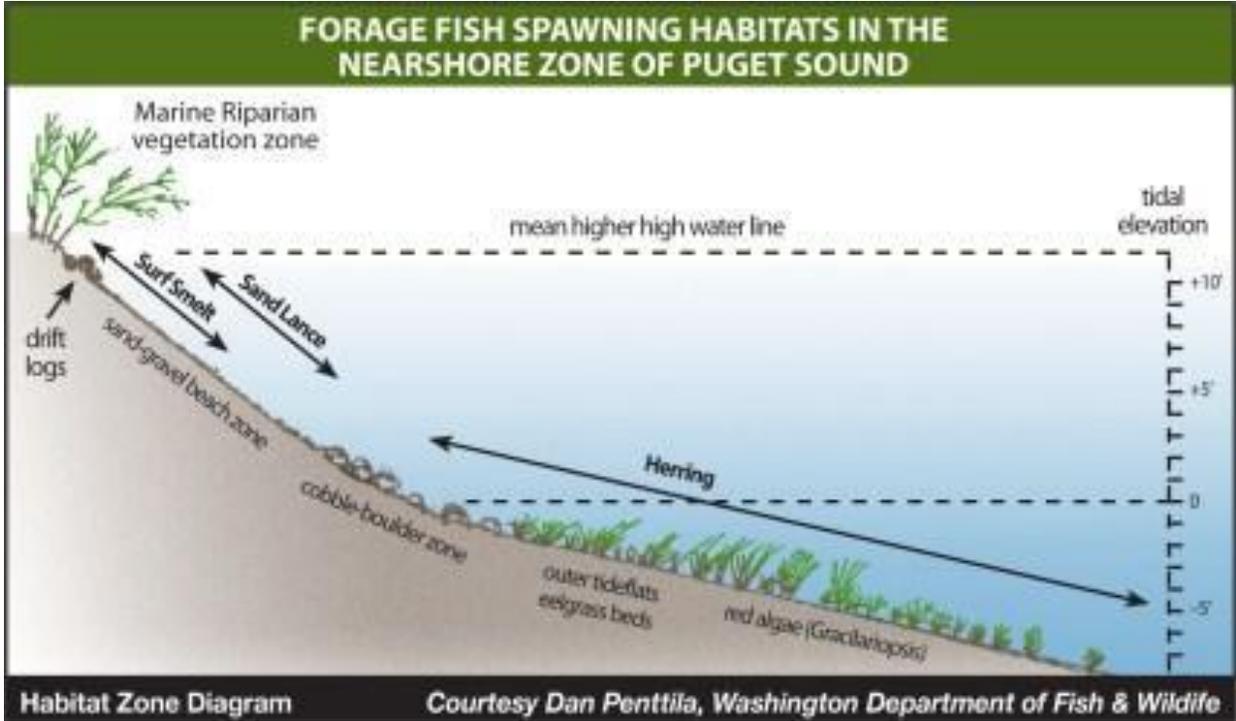


Are Anchovies Buffering Predation?

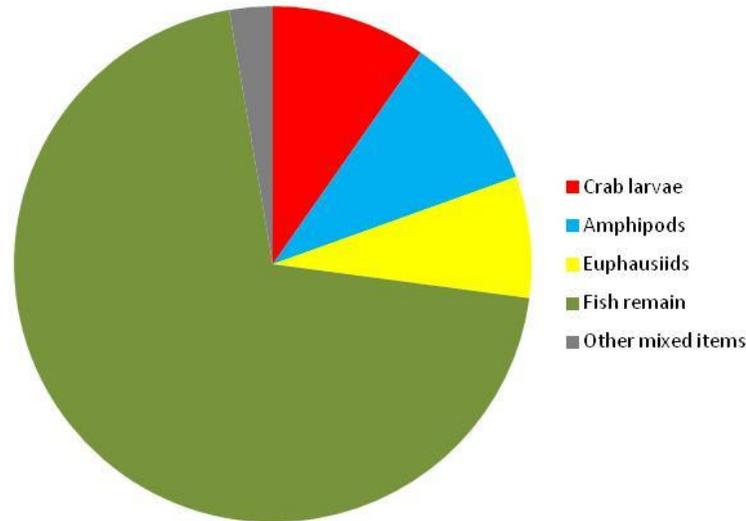
Marine survival rate of steelhead through Puget Sound relative to years of high ● vs. low ● anchovy abundance



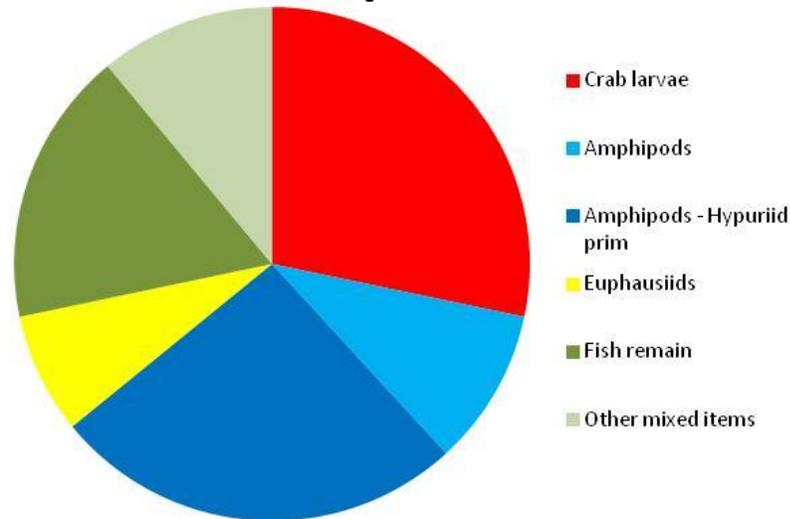
STRATEGY: Recover forage fish to feed *Chinook and their predators*



Chinook prey may be changing

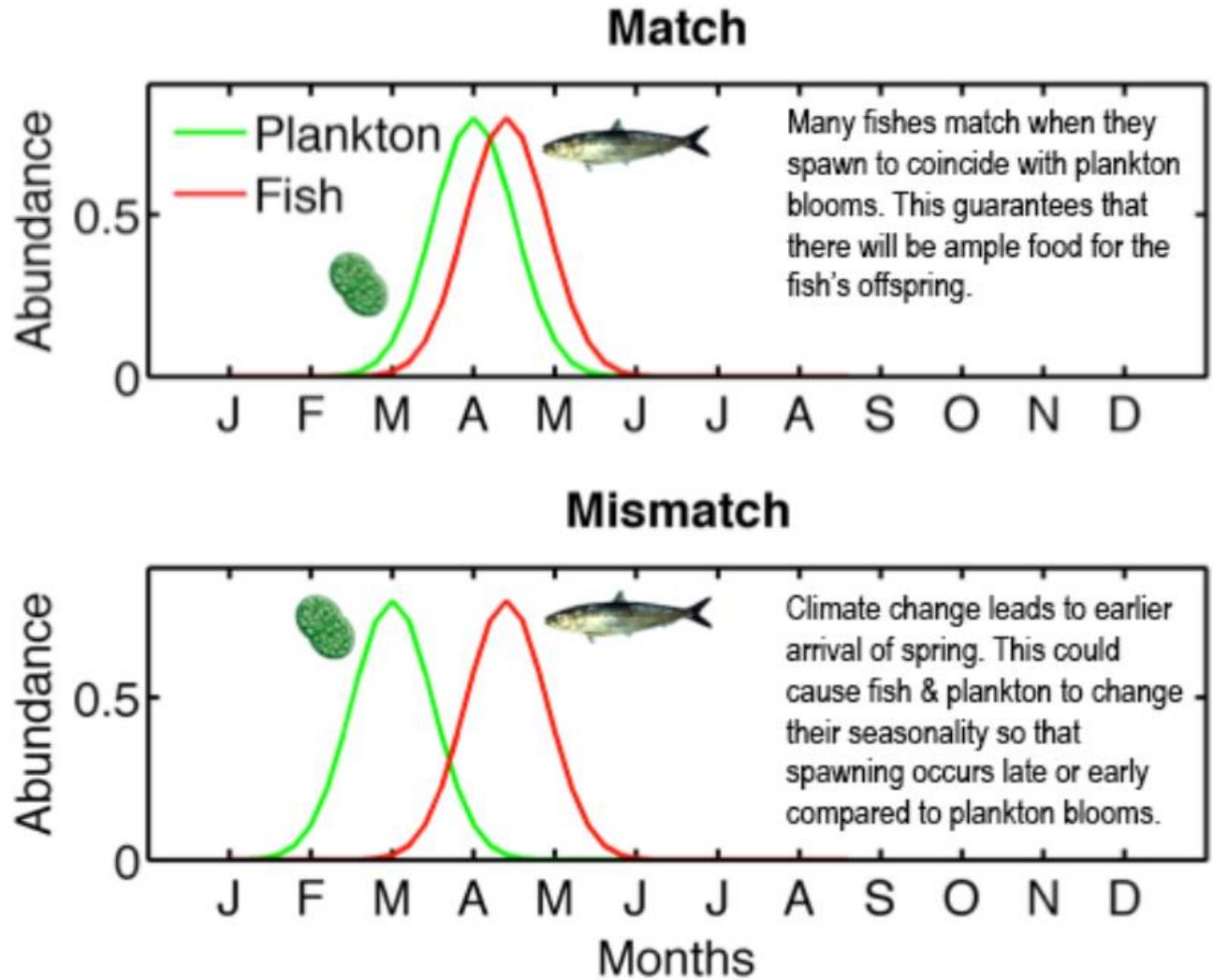


1997-2006 compared to 2014

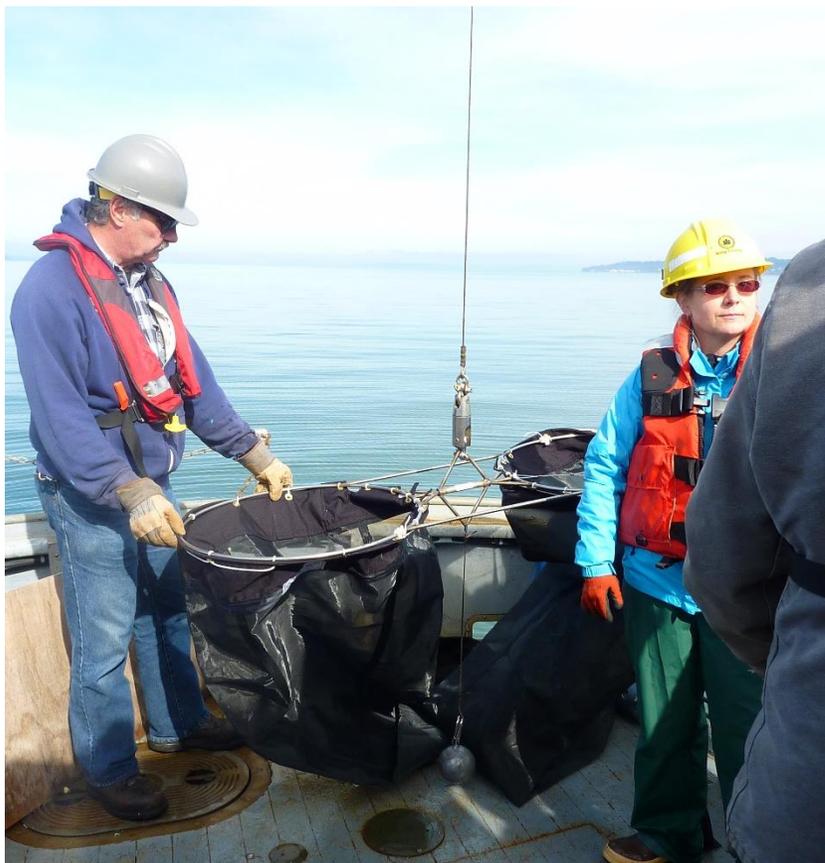


- 1. Key prey items have remained consistent** - crab, amphipods, fish remains, euphausiids
- 2. The relative proportions of these key prey items have shifted** to an increased dominance on crab larvae and amphipods and a reduced proportion of fish remains (mostly herring).

...and a changing climate may be contributing



STRATEGY: Monitor zooplankton
to track changes and forecast returns



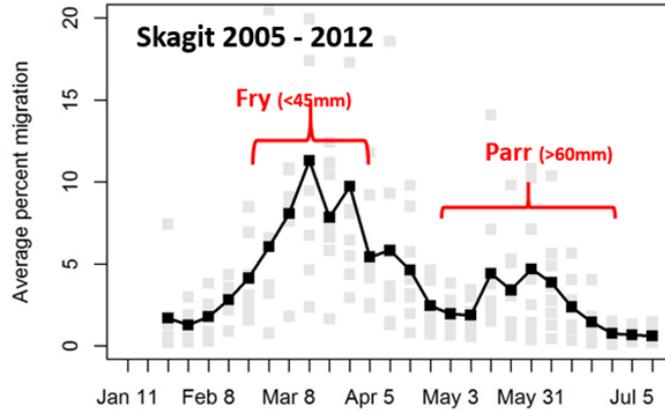
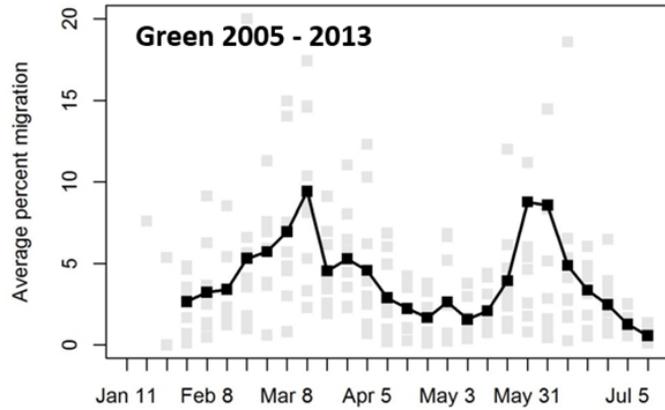


Role of
healthy estuaries

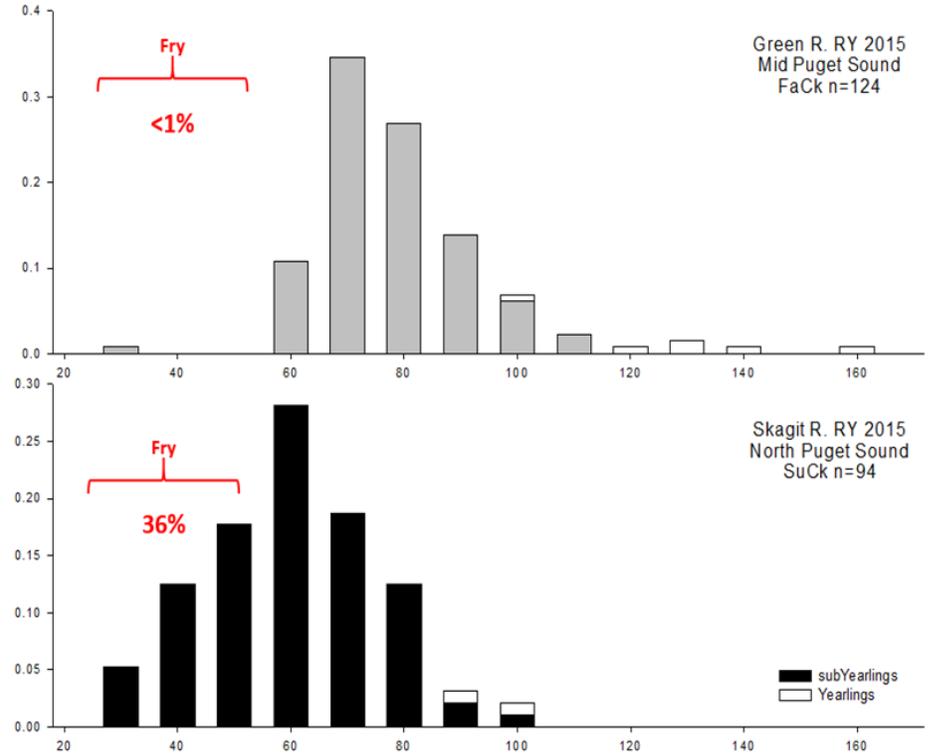
It helps the little guys.



Juvenile Chinook salmon migration timing and size

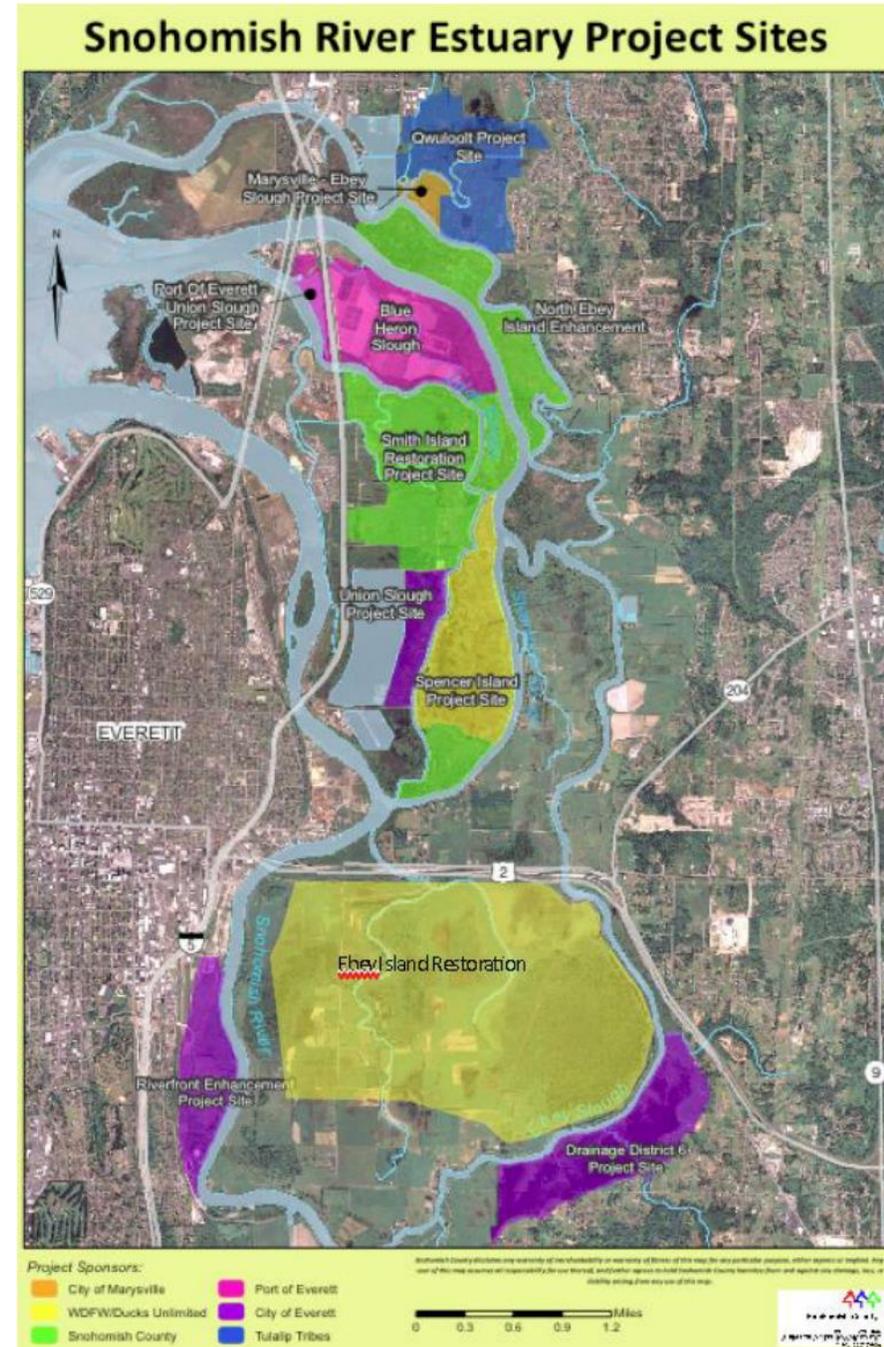


Estuary entry size composition within adult returns



Lance Campbell (Washington Department of Fish and Wildlife), unpublished 2016.
 Juvenile Chinook salmon migration timing data courtesy of WDFW Wild Salmon Evaluation Unit

STRATEGY: Accelerate pace of estuary protection and restoration





Address impacts
in freshwater

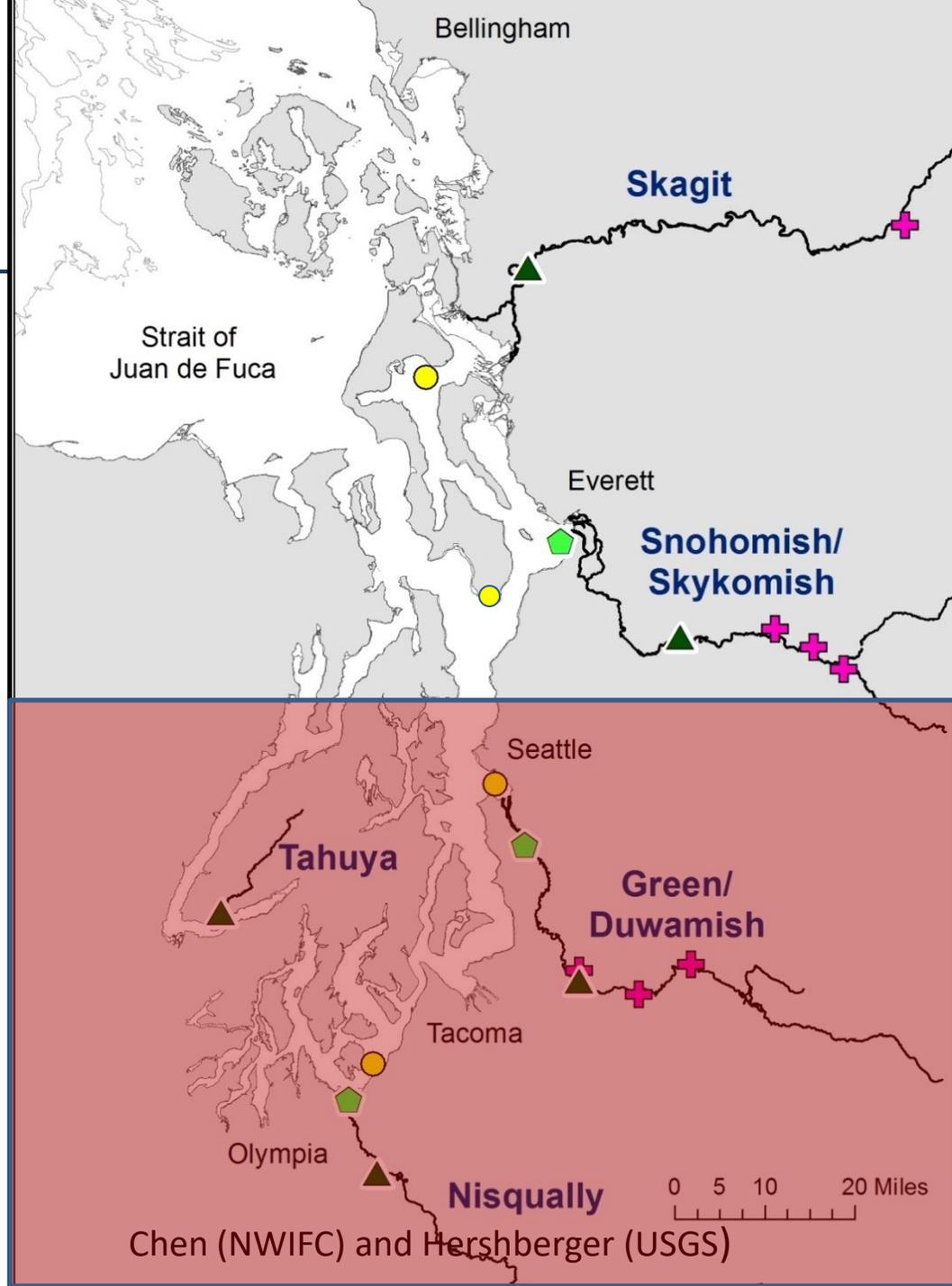


Disease and **WATER QUALITY** impact fish
condition and survival

Reduce disease

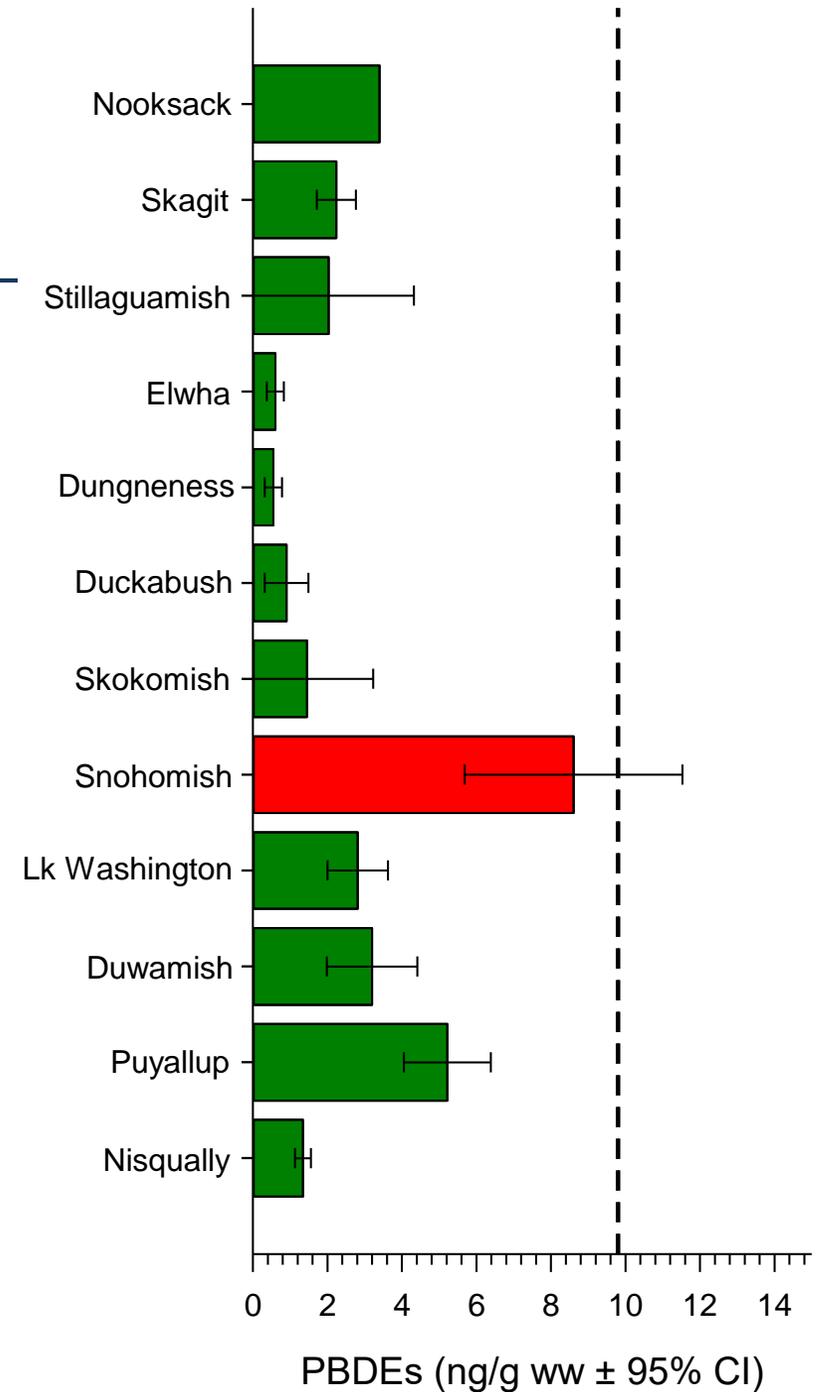
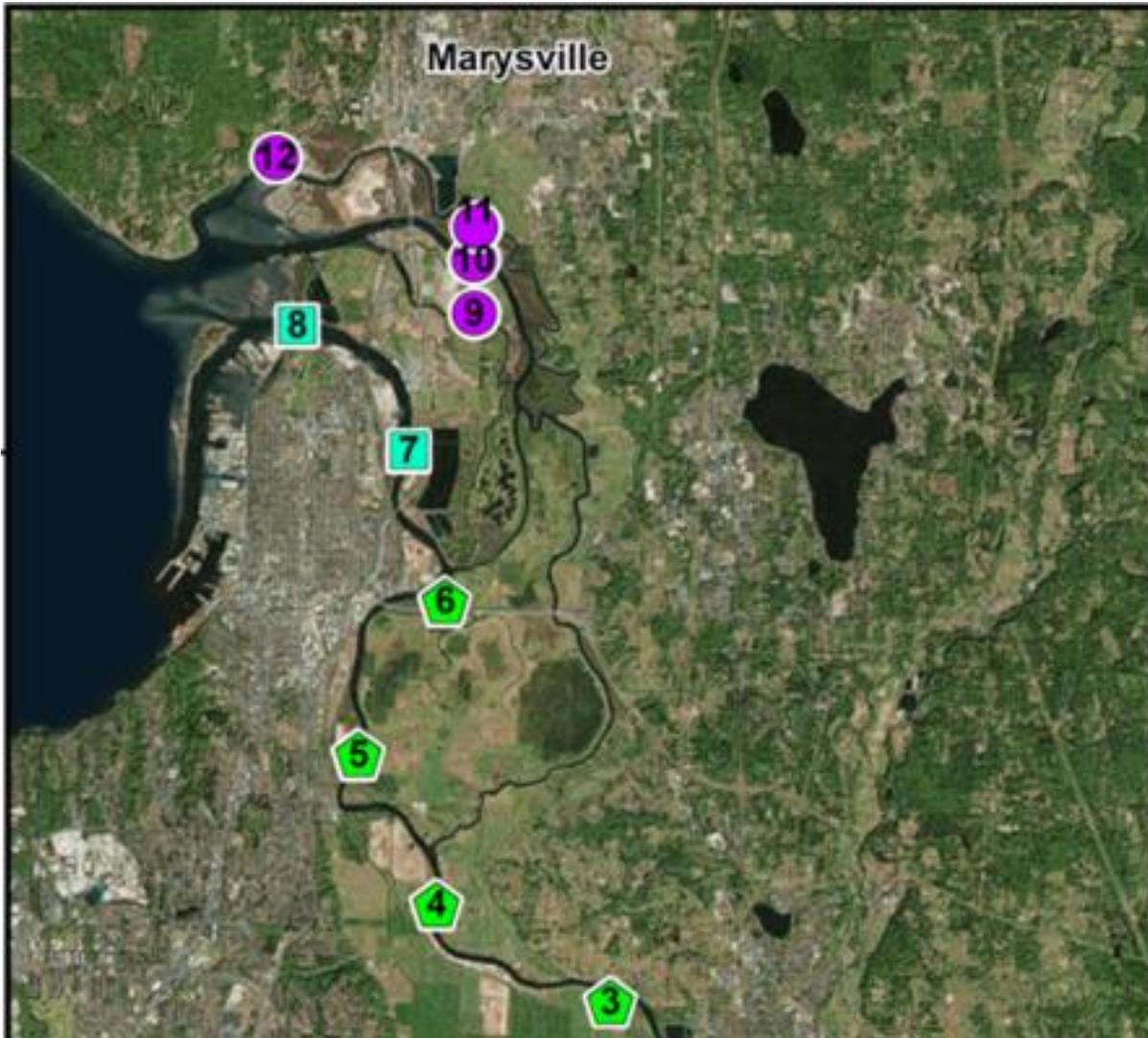
in juvenile steelhead in South PS

Parasite causes reduced swim performance
and an increase in direct mortality



Reduce contaminants

entering juvenile Chinook



Next steps of the



- Finish research in 2019, synthesize results across US-Canada
- Support 2019-2021 WA Operating and Capital Budget requests for monitoring, modeling, and solutions testing
- Develop local strategies to address local issues and incorporate in salmon recovery plans

LONG LIVE THE KINGS **Budget Priorities for Salmon and Orcas**



Addressing Salmon Mortality in Puget Sound

We've restored sections of habitat, significantly reduced harvest, and improved hatchery management. Yet we struggle to recover salmon and the orcas that depend upon them. Addressing juvenile salmon survival in Puget Sound may be the missing link.

Up to 94% of juvenile salmon and steelhead will die in Puget Sound before making it to the Pacific Ocean. Over 60 entities, including Tribes and the Puget Sound Partnership, Washington Department of Fish & Wildlife, and Washington Department of Natural Resources, are working together on the Salish Sea Marine Survival Project - the project addressing high rates of juvenile salmon and steelhead mortality in Puget Sound. Early findings from the project have proven to be important for management, already informing over 20% of the recommendations in the Governor's Orca Task Force report. We request funding for the following operating budget items to advance this work:

- Support the \$2.2M Puget Sound Scientific Research** line item in the Puget Sound Partnership budget. \$1.2 million of this supports the critical transition from research to action, including: synthesizing over 100 studies, implementing new management tools, and testing solutions to improve the survival of salmon and steelhead. (Addresses multiple Orca Task Force Recommendations)
- Increase the Ocean Acidification Research and Coordination line item to \$1.72M** in the Department of Natural Resources budget. This supports ocean acidification monitoring, research on impacts to geoduck from changing conditions, and the Puget Sound zooplankton monitoring program (\$720k). Salmon, forage fish, and crab depend on zooplankton for survival. This program is critical for ecosystem recovery. (Orca Task Force recommendation 1-16)
- In the Washington Department of Fish & Wildlife budget:
 - Support the \$1.24M Pinnipeds in Puget Sound** line item to address seal predation. (Orca Task Force recommendation 1-12)
 - Support testing pilot actions in hatcheries at \$381,660 in the \$4.6M request to Increase Hatchery Production.** This will support practices that could increase the size and survival of Chinook salmon. (Orca Task Force recommendation 1-6)

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