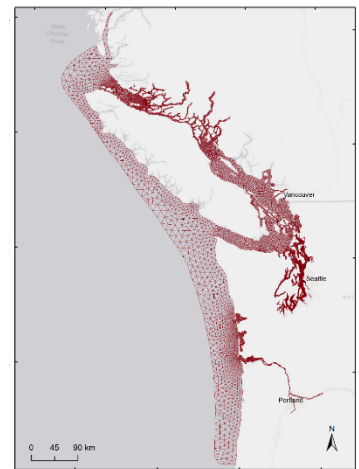




Puget Sound Nutrient Source Reduction Project



Presentation for the Water Quality Partnership

April 11, 2019

Presented by Dustin Bilhimer, WA Dept. of Ecology, Water Quality Program

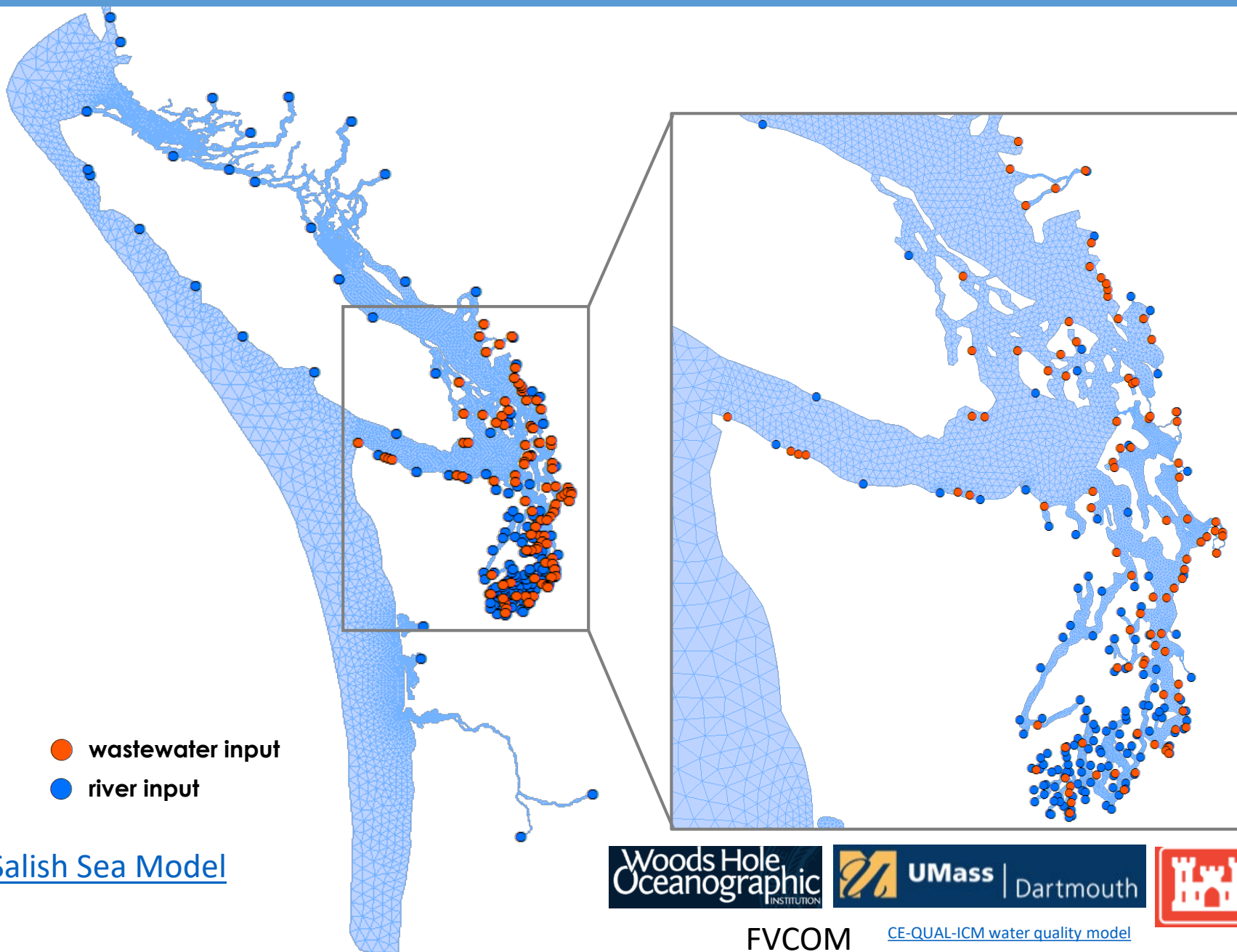
Puget Sound Nutrient Source Reduction Project Objectives

- 1) Communicate and share science
- 2) Use the Nutrient Forum to collaboratively develop a Puget Sound Nutrient Management Plan
- 3) Implement the Plan

SO THAT WE PROTECT THIS



Salish Sea Model



161 river and streams

- Rivers and streams entering Puget Sound, the Straits and the Pacific Ocean

99 point sources

- All facilities with marine outfalls
- 78 U.S. WWTPs
- 9 Canadian WWTPs
- 10 industrial facilities

- wastewater input
- river input

[Salish Sea Model](#)



FVCOM

[CE-QUAL-ICM water quality model](#)

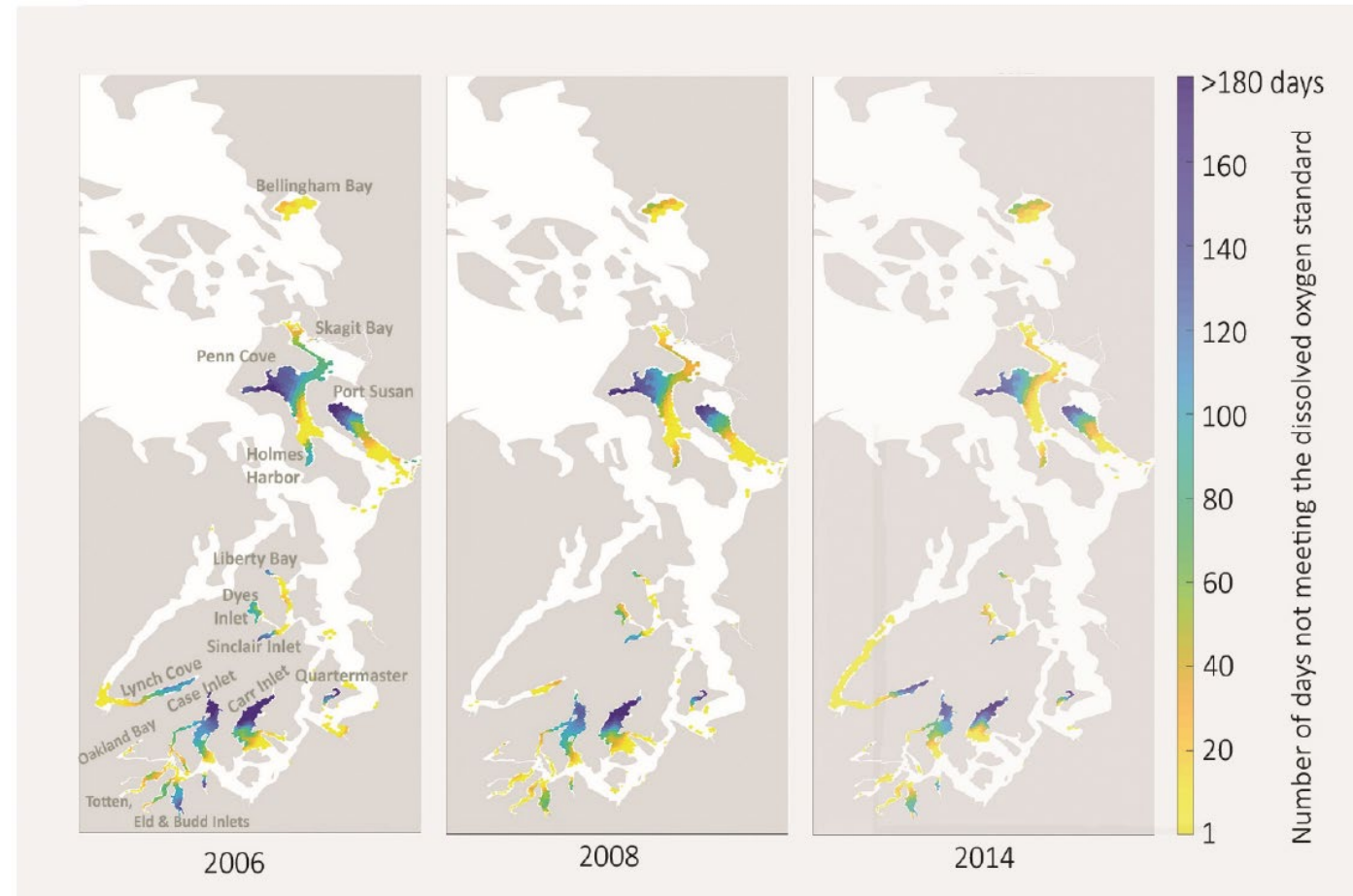
Developed by PNNL in collaboration with WA Department of Ecology, funded by EPA



Newly published Salish Sea Model results

- Total human sources cause DO depletions below standards for extended durations
- Most impacted areas are also biologically productive areas
- Reducing wastewater nitrogen concentrations to 8mg/L in effluent can reduce the low DO problem by around half.

Explore results at <http://bit.ly/ssmresultsmap>

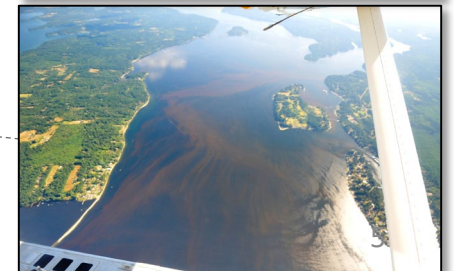
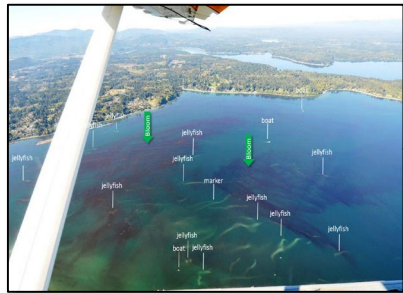
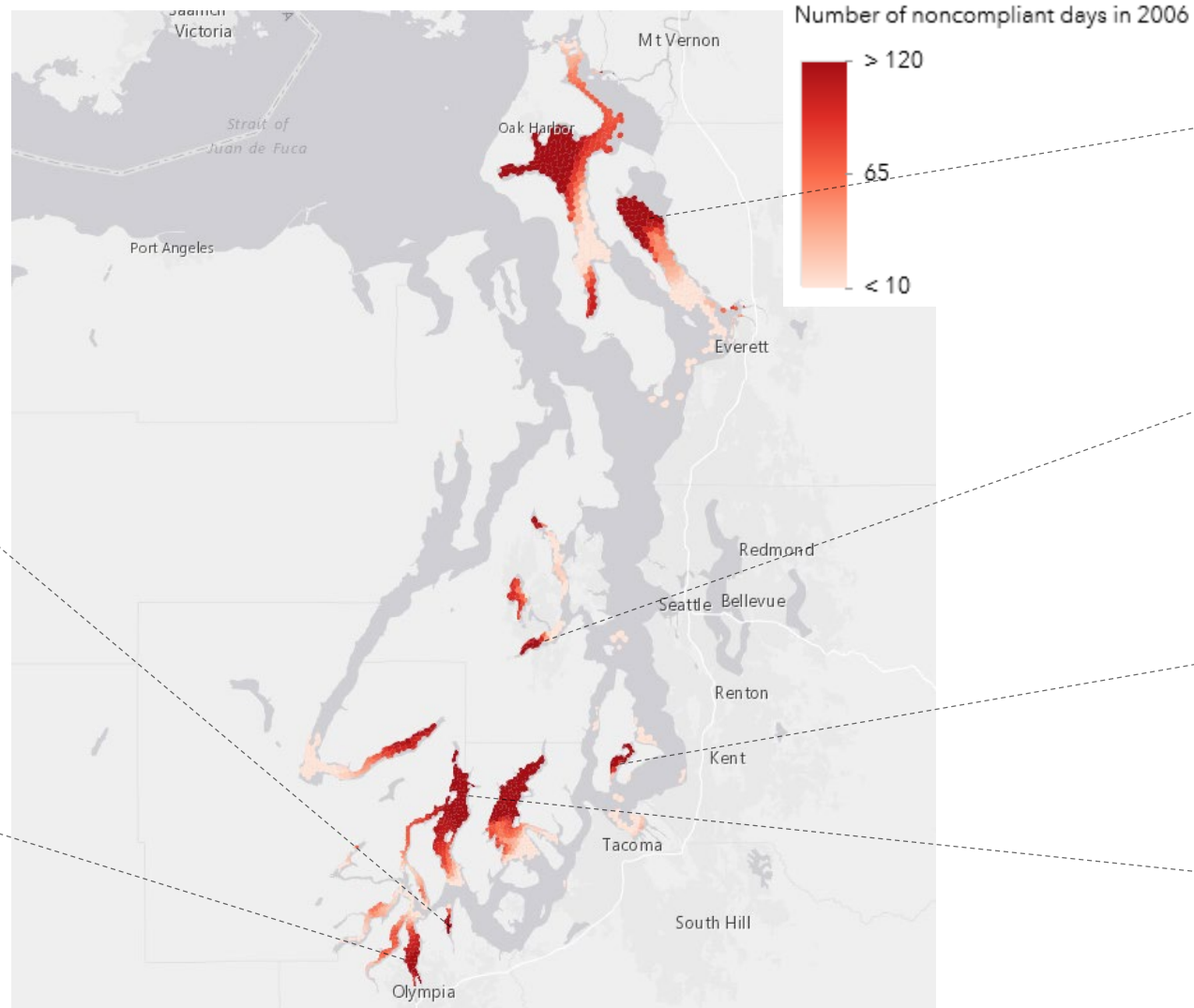


* Figure ES2. Number of days not meeting the dissolved oxygen water quality standards for the years 2006, 2008, and 2014.

Monitoring and observations complement Salish Sea Model findings

Eutrophication Indicators

- Algae blooms
- Jellyfish Smacks



Nutrient Forum

Collaborative meetings for stakeholder and tribal engagement with Ecology engineers, scientists, and policy-makers

➤ 2018 Forums

- Discussed the science, water quality objectives, and the Salish Sea Model

➤ 2019 Forums

- Learning from other U.S. coastal estuaries examples
- **Opportunity for input to the next phase of modeling and evaluation – April 30**
- Sharing and learning from current nutrient reduction examples in Puget Sound – June 4
- Identifying creative opportunities for implementation and funding – August 7

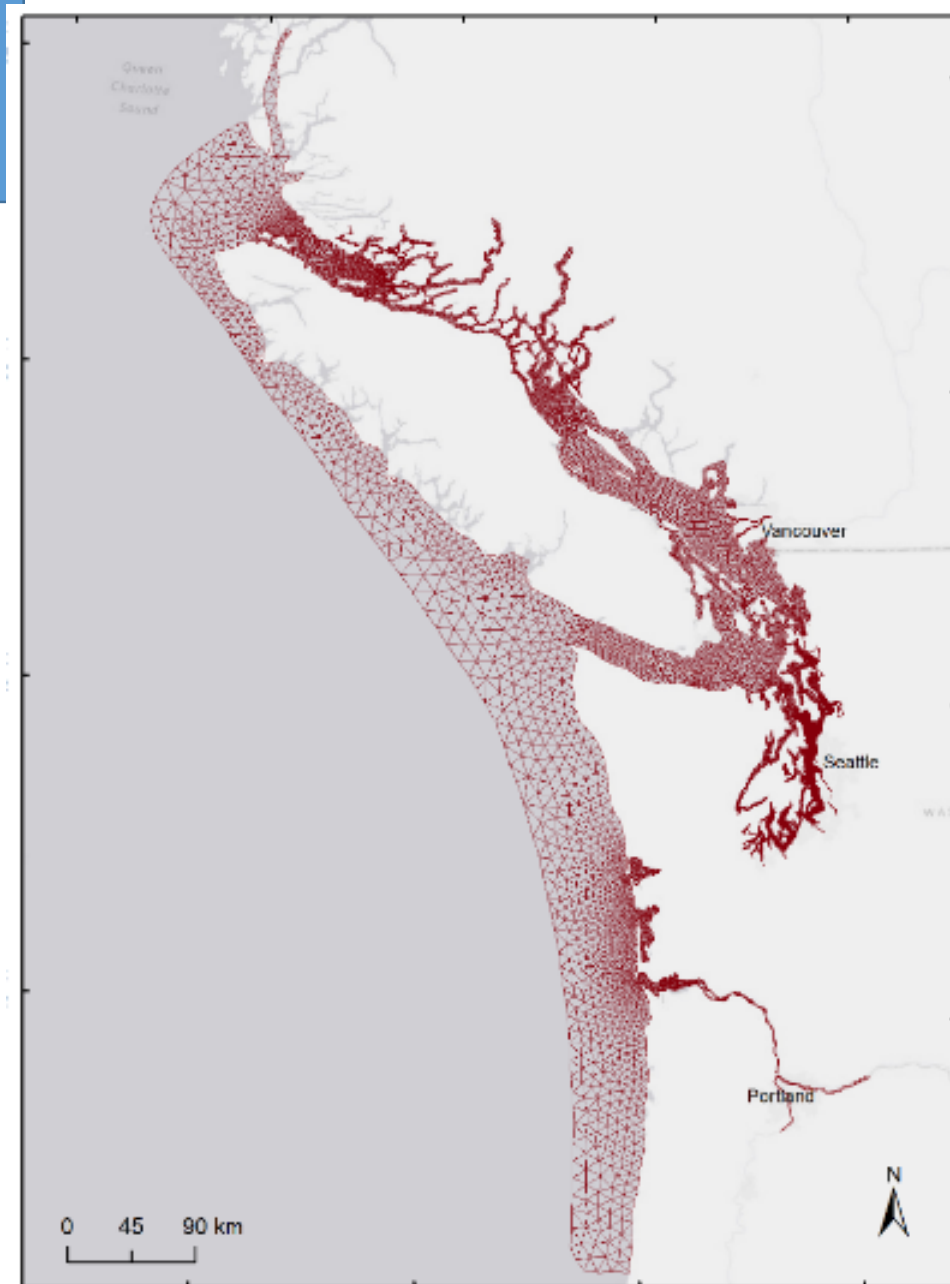


Modeling Phase 2

- First year objectives (*Jul '19 – Jun '20*):
 - What does it take to meet water quality standards
 - Explore the significance of local watersheds on sensitive areas
 - Explore effects of sources within Puget Sound basins
 - Understand the range of future conditions

Model Milestone – Share first year results and refine year 2 scenarios

- Second year objectives (*Jul '20 – Jun '21*):
 - Evaluate combinations of reductions from marine and watershed sources
 - Evaluate a final set of nutrient load reductions for both marine and watershed sources that meet water quality standards



Puget Sound Action Agenda & MWWQ Implementation Strategy

Interdisciplinary team of local experts helping to:

- Identify nutrient sources, stressors, and contributing factors that affect the dissolved oxygen Vital Sign
- Identify strategies and priorities to improve dissolved oxygen for the Puget Sound Action Agenda



**Connect Puget Sound recovery goals with Ecology's Puget Sound
Nutrient Management Plan**

A range of necessary solutions

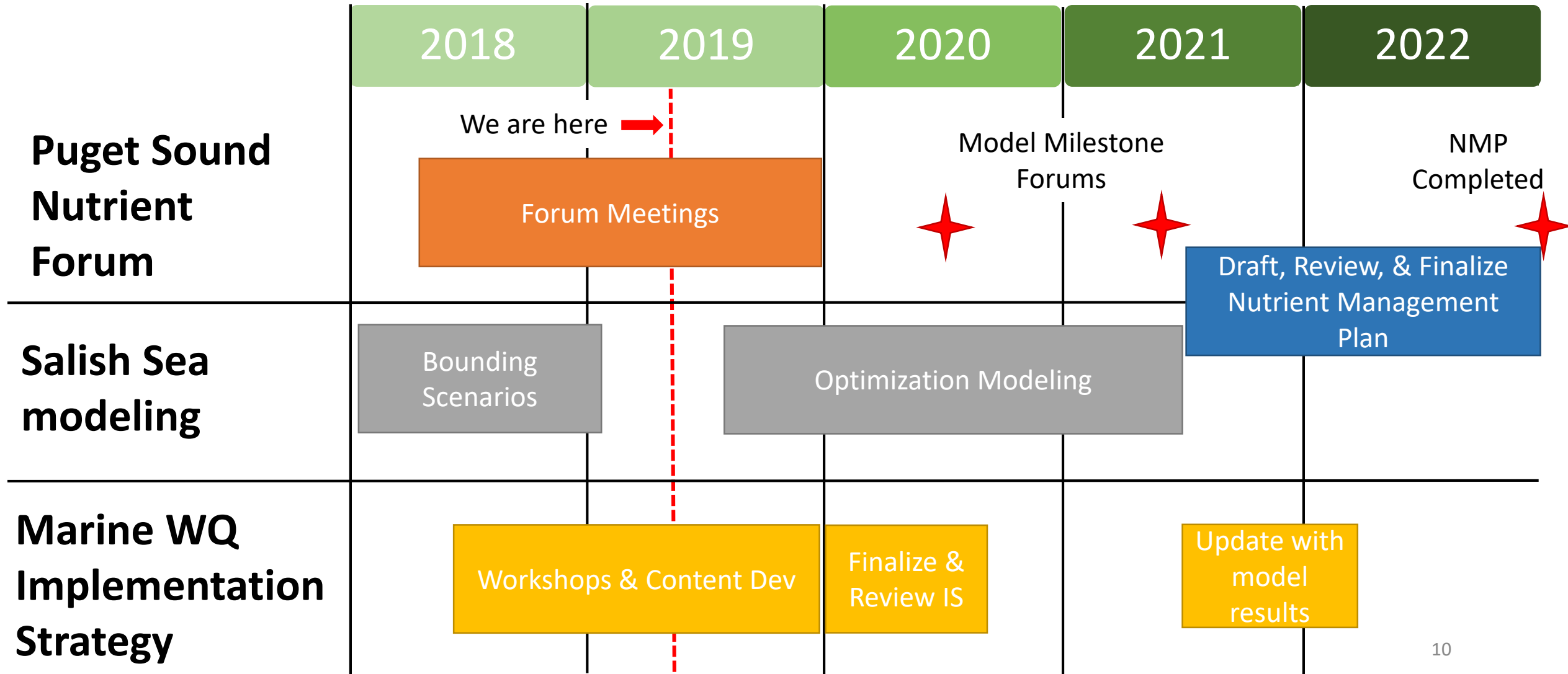
Both point and nonpoint source reductions are needed



And we must continue to protect and restore ecological function



High-level Project Schedule



Primary Contact



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Project webpage: <https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Helping-Puget-Sound/Reducing-Puget-Sound-nutrients>

Phase 1 Salish Sea Model Results webmap: bit.ly/ssmresultsmap