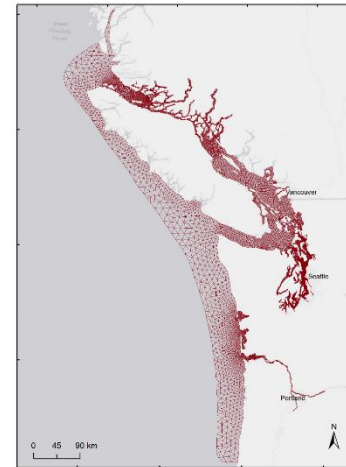




Puget Sound Nutrient Source Reduction Project



Presentation to
King County Regional Water Quality Committee
May 2, 2018

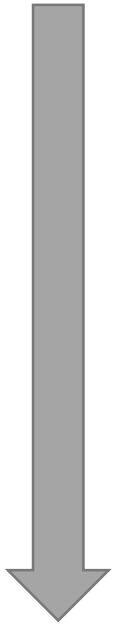
Presented by: Heather Bartlett, Water Quality Program Manager
Elie Key, P.E., Permitting Policy Lead

Why focus on nutrients now?

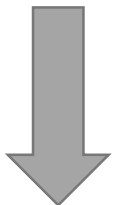
- Reducing nutrients is a **national priority** for EPA
- **Ten years of science** show us:
 - Human sources of nutrients are impacting Puget Sound
 - That we need to do something about it
- Public comments **question a lack of requirements** to reduce nutrients in WWTP permit renewals
- **EPA has been petitioned** to revoke Ecology's NPDES program delegation for failing to address nutrients

Dissolved oxygen work in Puget Sound

**Develop
model**



**Apply
model**



- **2003-2006**
 - Deschutes River/Budd Inlet TMDL shows us that dissolved oxygen and human sources of nutrients are a regional problem
- **2006-2014**
 - South Sound Dissolved Oxygen Model developed
 - Salish Sea Model (SSM) preliminary development
- **2014-2017**
 - Sediment Diagenesis Module added to SSM
 - Ocean Acidification Module added to SSM
- **2017**
 - Project scoping and stakeholder outreach
 - Puget Sound Nutrient Dialogue
- **2018-2022**
 - Develop a nutrient reduction plan

Puget Sound Nutrient Source Reduction Project

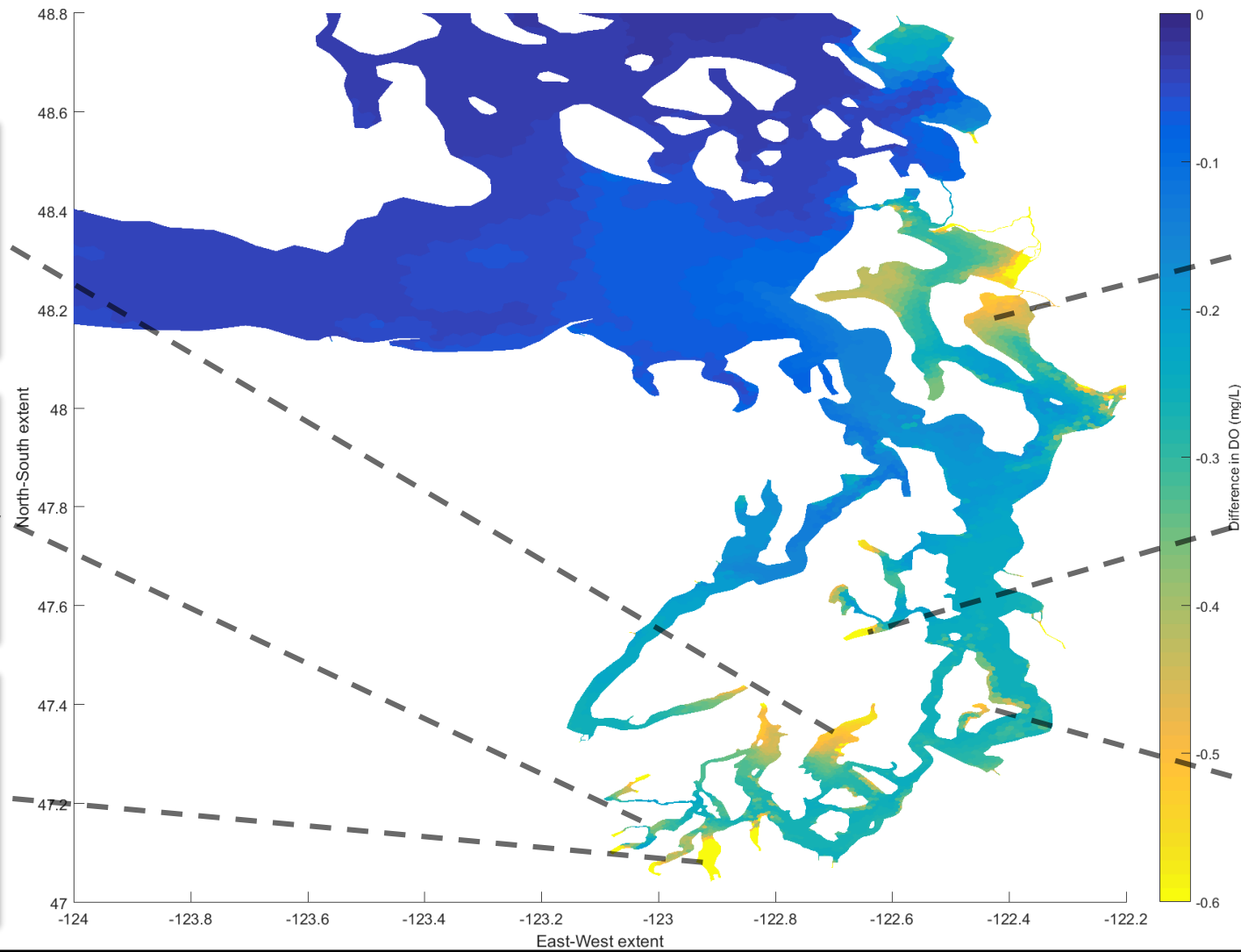
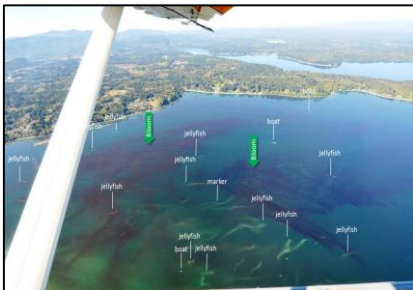
Project Vision:

Develop and implement a plan to reduce nutrient sources in Puget Sound to ***guide regional investments*** in point and nonpoint source nutrient controls so that Puget Sound will ***meet water quality criteria*** and ***protect aquatic life*** designated uses by 2040.

Model and monitoring results agree – human sources of nutrients are having an impact on Puget Sound

Maximum depletion of DO by regional anthropogenic sources
Jan. 1, 2016 to Dec. 31, 2016

Indicators of eutrophication



Indicators of eutrophication



Nitrogen in Puget Sound story map

Explore this story map at [Bit.ly/nitrogenstorymap](https://bit.ly/nitrogenstorymap)

Nitrogen in Puget Sound

A story map of nitrogen in Puget Sound, created by the Washington State Department of Ecology



Overview

Excess Nitrogen

Nitrogen Sources & Pathways

Monitoring Nitrogen

River Trends

Marine Trends

Acknowledgements & References

This story map was created by scientists at the [Washington State Department of Ecology](#) to allow you to explore what we know about nitrogen in Puget Sound.

Puget Sound is the second largest estuary in the United States and is part of the Salish Sea. It is a dynamic system influenced by a variety of local and global processes. The system is sensitive to changes in the Pacific Ocean, but excess local human nitrogen inputs also have an impact on its water quality.

We are involved in various efforts to understand how, and to what extent, excess nitrogen and other nutrients are a problem. This involves identifying nitrogen sources, monitoring nitrogen levels, analyzing how things are changing, and determining what we need to do to improve water quality as part of the [Puget Sound Nutrient Reduction Strategy](#).

What we know about nitrogen in Puget Sound:

- The Pacific Ocean is the largest source of nitrogen to Puget Sound. These oceanic nitrogen contributions can be considered part of the 'baseline' nitrogen load, and our local human sources add to this amount.
- Wastewater effluent is the largest local source of nitrogen to the Sound.
- Upstream watershed activities that generate nitrogen are the second largest local source of nitrogen and get delivered to the Sound via rivers and streams.
- Nitrogen (and other nutrient) levels in marine waters are changing.
- We are observing more frequent algae blooms.
- Levels of oxygen are low in many places, and human nitrogen inputs further deplete oxygen levels in bottom waters and contribute to acidification.
- Population growth and climate change will further stress the ecosystem.



How does the region continue to grow



and reduce nitrogen and carbon impacts

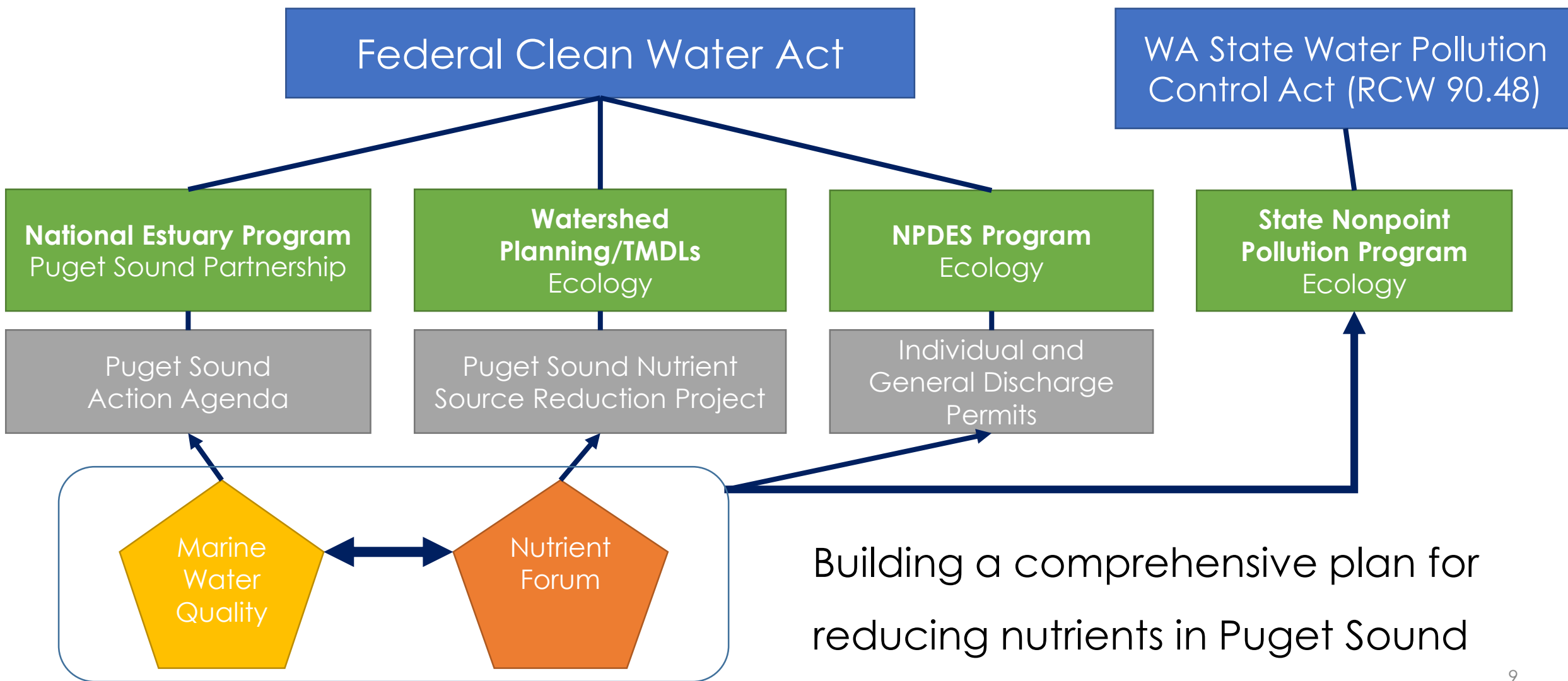


so that we **protect this**

Feedback sought on key high-level issues

- Extent of available science
- Application of water quality standards
- Nutrient sources and options to reduce
- Strategies used in other parts of the country to reduce human sources of nutrients
- Options for Puget Sound to reduce both point and non point sources of nutrients
- Opportunities and challenges for addressing human sources of nutrient loading in Puget Sound

Regulatory connections



Integrating two processes

Puget Sound Partnership Action Agenda Process

Marine Water Quality Implementation Strategy

- Interdisciplinary group
- Broader Puget Sound restoration focus and connection with EPA's National Estuary Program
- Develop BIG picture implementation strategy
- Part of Action Agenda

Ecology's Public Advisory Committee Process

Puget Sound Nutrient Forum

- Broad representation of stakeholders and tribes
- Examine regulatory aspects of solutions for reducing point sources
- Identify ways to implement solutions for point and nonpoint nutrient sources

Inform and
collaborate

- Cross-membership
- Both have input on work products
- Both will inform exploration of potential solutions

Salish Sea Model

- Run scenarios for different source reduction strategies
- Quantify benefits and ensure investments will meet water quality criteria and Puget Sound recovery goals

Objectives of the Nutrient Forum

Inform the development of a nutrient reduction plan and find the best solutions for reducing human sources of nutrients.

Ensure solutions are:

- Effective
- Implementable
- Efficient

Achieve this objective by:

- Being transparent
- Engaging others
- Listening

Hold about 10 meetings over the next year.

What will implementation look like?

- Putting activities into practice on the ground that reduce nutrients from point and nonpoint sources
- Setting nutrient load allocations that meet Puget Sound water quality objectives
- Solutions will drive how implementation happens

Objective:

Implement the **right actions** – in the **right order** – to start improving water quality **as soon as possible**.

What this could mean for King County?

- Nutrient reduction requirements for wastewater treatment facilities
 - Focus on total inorganic nitrogen and CBOD reductions
 - Phased approach with many possible permitting solutions
- Nutrient controls in municipal stormwater permits
- Identifying opportunities for reducing nonpoint sources of nutrients within key watersheds
- Prioritizing regulatory requirements
- Opportunities to find creative and effective solutions

Questions?



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