

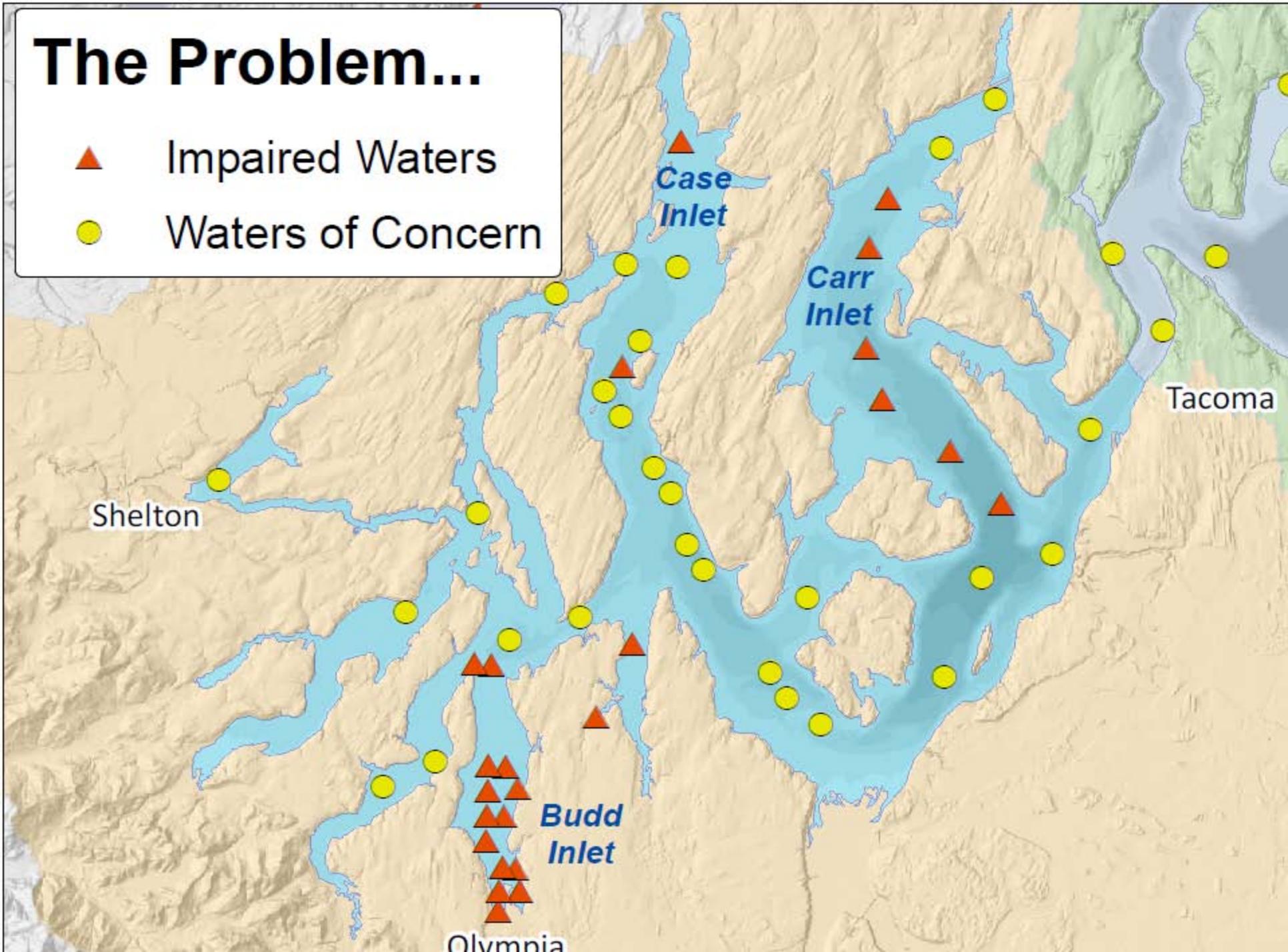
South Puget Sound Dissolved Oxygen Study



www.ecy.wa.gov/puget_sound

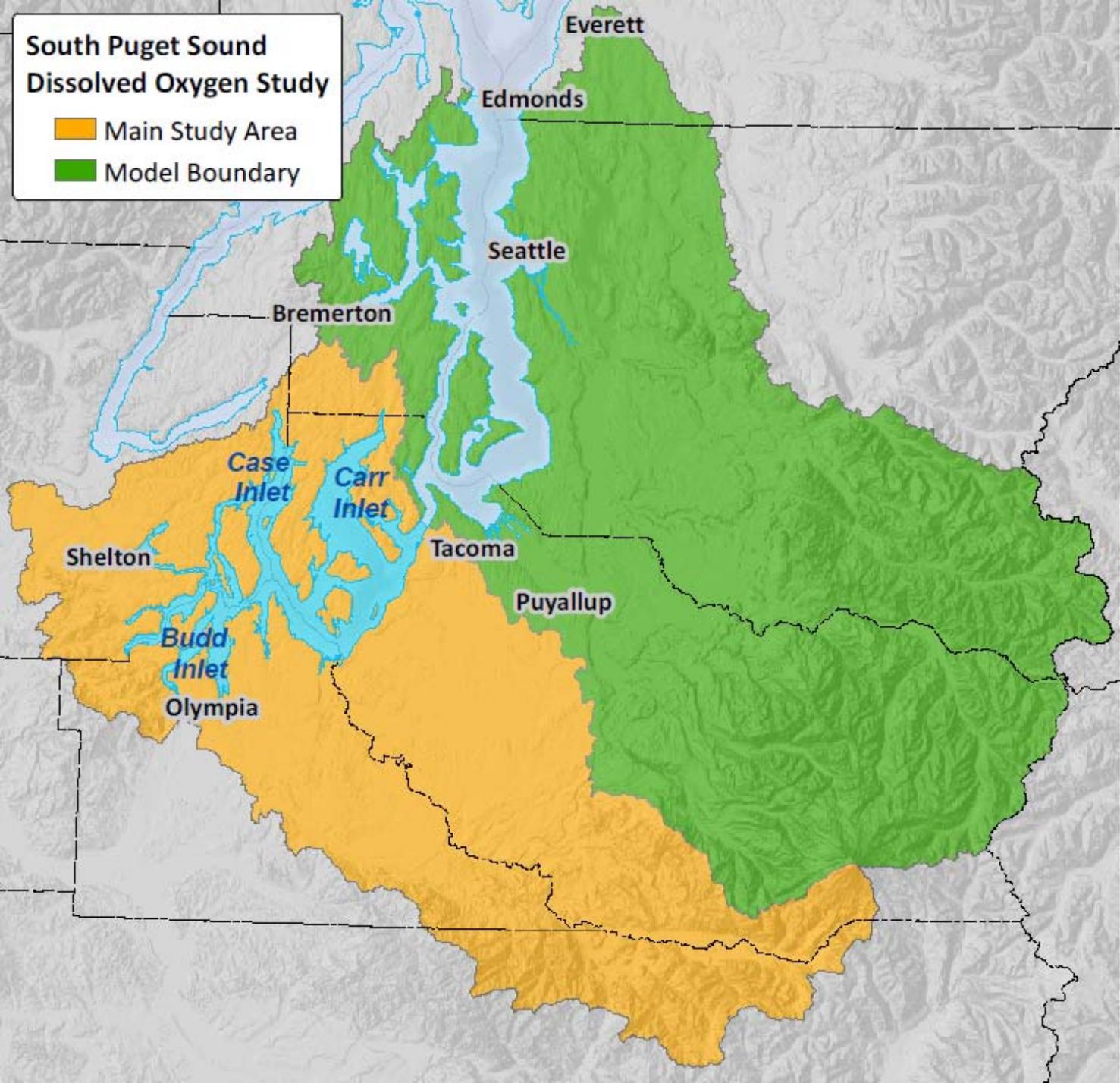
The Problem...

- ▲ Impaired Waters
- Waters of Concern



**South Puget Sound
Dissolved Oxygen Study**

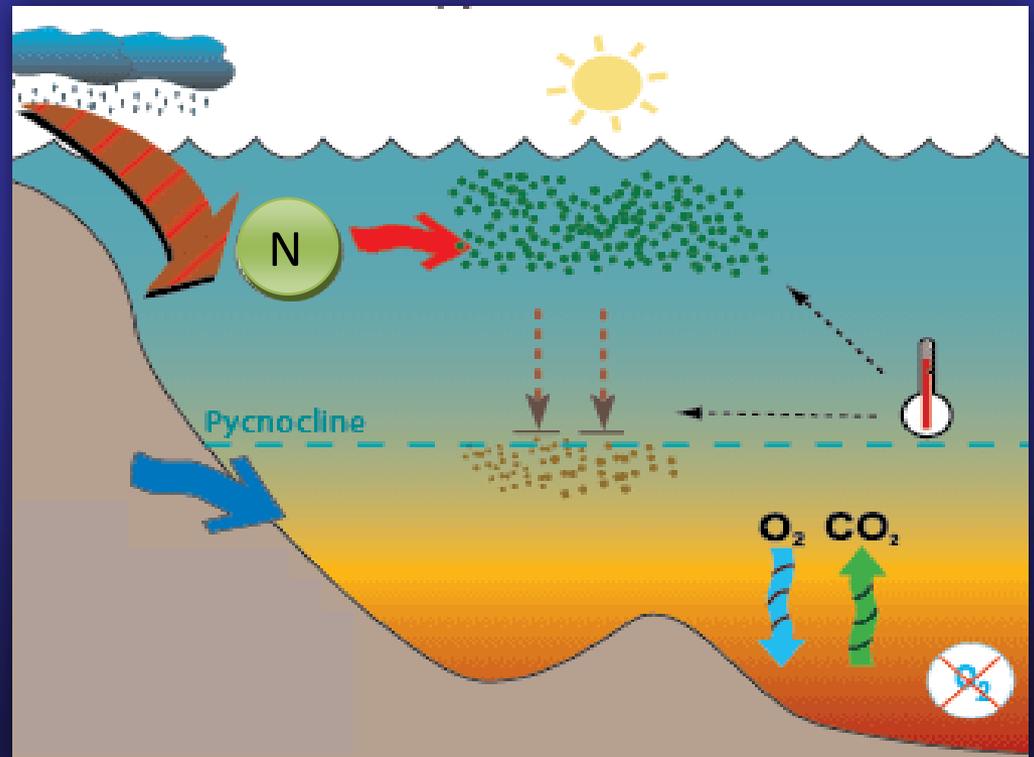
-  Main Study Area
-  Model Boundary



**Study
Area**

Primary Issues

- Many factors involved
- Nitrogen is the main pollutant causing low dissolved oxygen levels
- Fish need oxygen



Goal of the Study

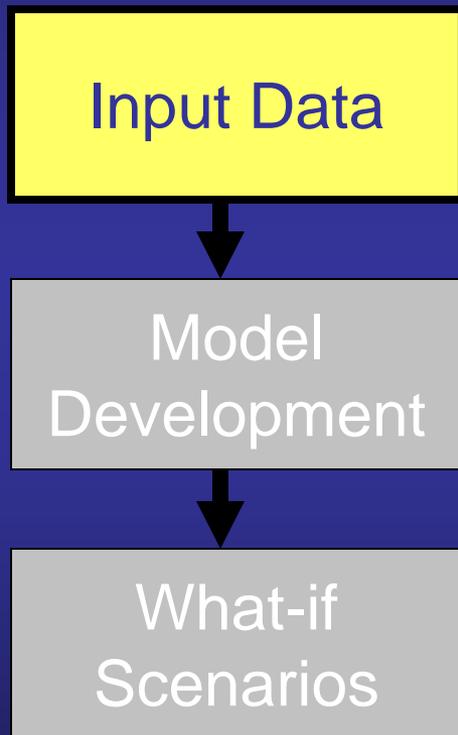
Determine how human activities (along with natural factors) affect low dissolved oxygen levels in South Puget Sound.



Long Term Goal

If the study shows that something needs be done to protect dissolved oxygen levels in South Puget Sound, a plan to improve water quality will be necessary.

1. Collect data to set up model



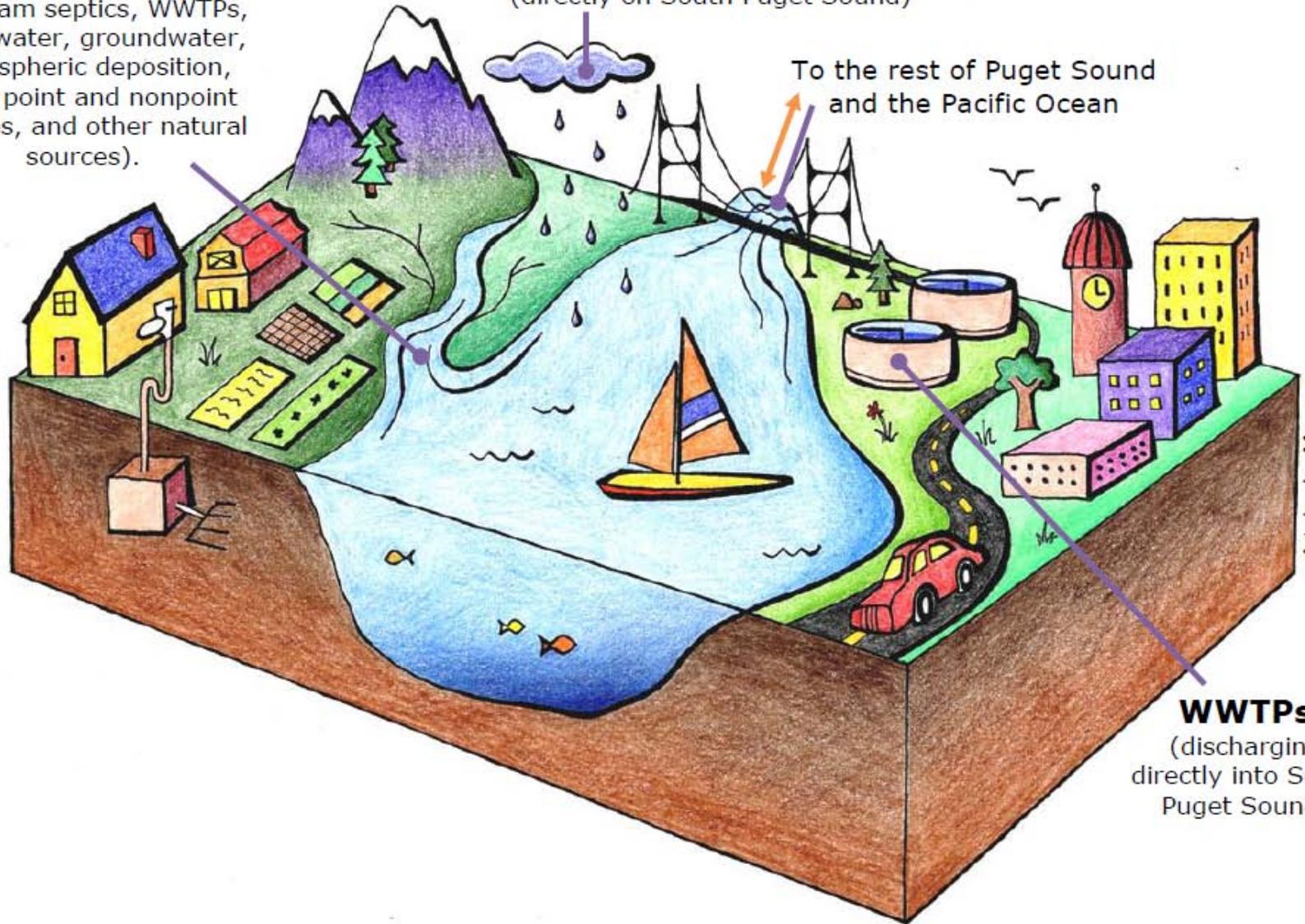
- Rivers/Streams
- Wastewater Treatment Plants
- Atmospheric deposition
- Marine Water Quality Data

Sources of Nitrogen in South Puget Sound

Watersheds (includes upstream septics, WWTPs, stormwater, groundwater, atmospheric deposition, other point and nonpoint sources, and other natural sources).

Atmospheric Deposition
(directly on South Puget Sound)

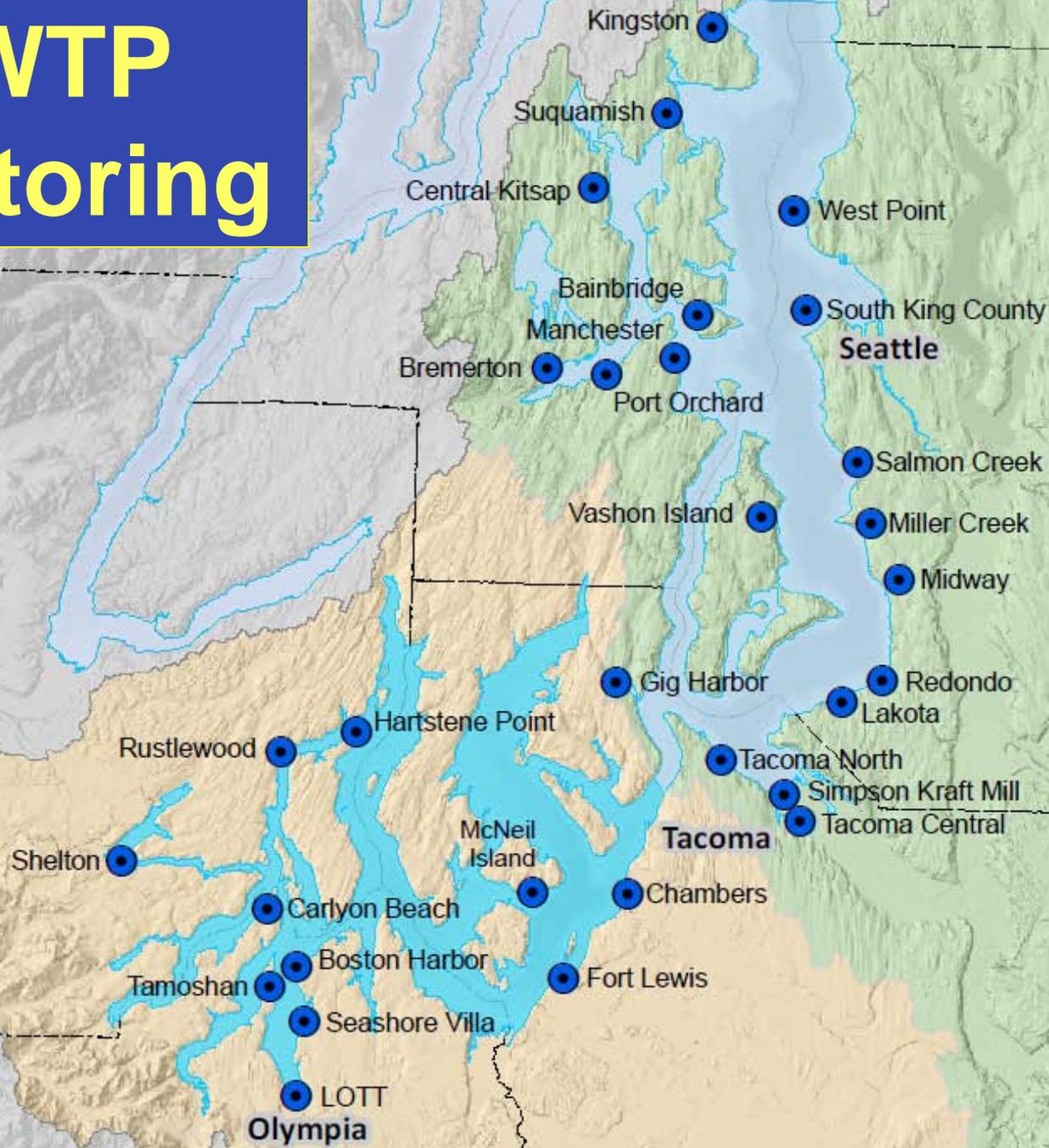
To the rest of Puget Sound
and the Pacific Ocean



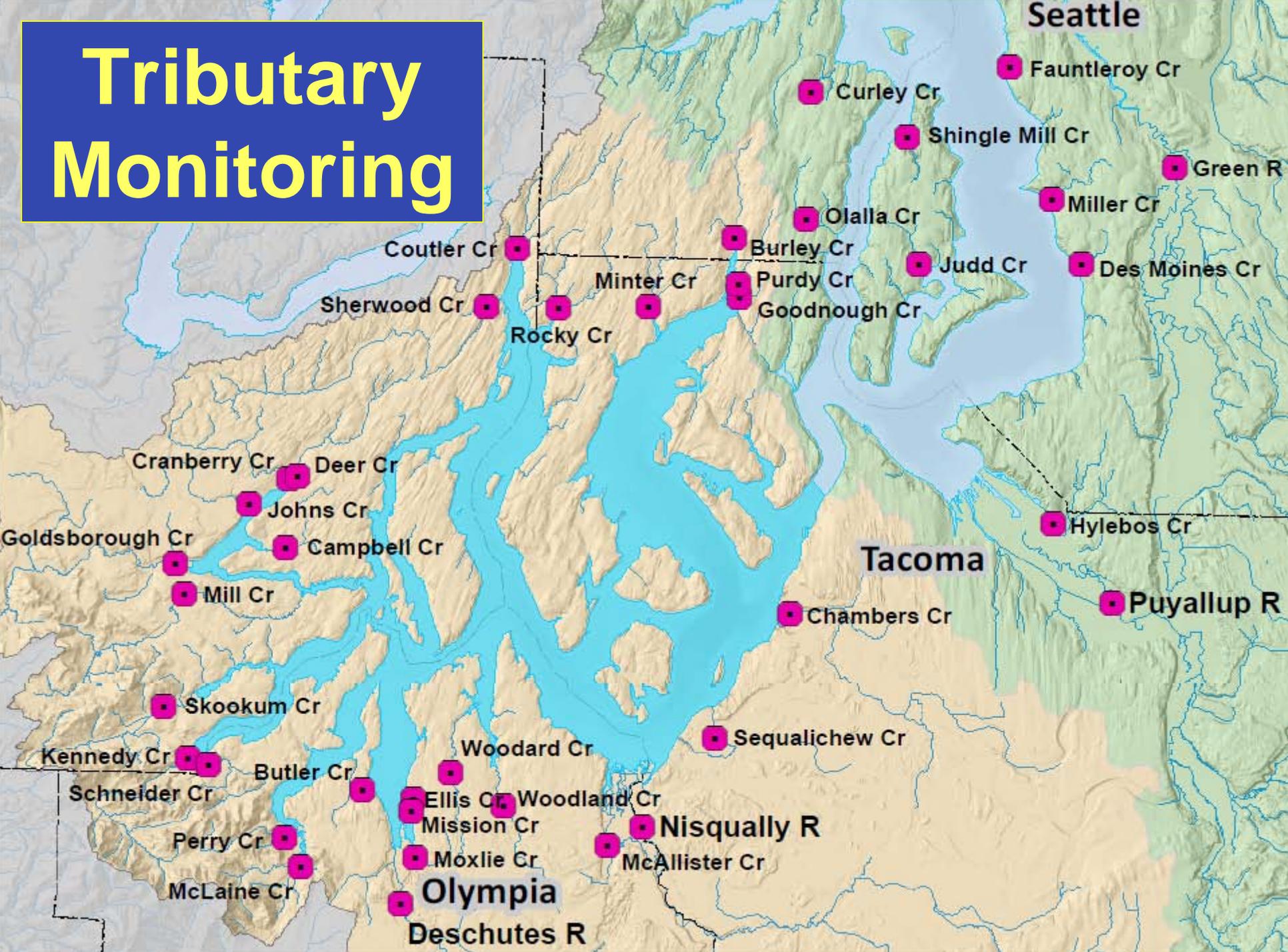
Art: Jessica Moyer

WWTPs
(discharging
directly into South
Puget Sound)

WWTP Monitoring

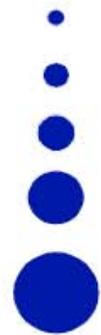


Tributary Monitoring

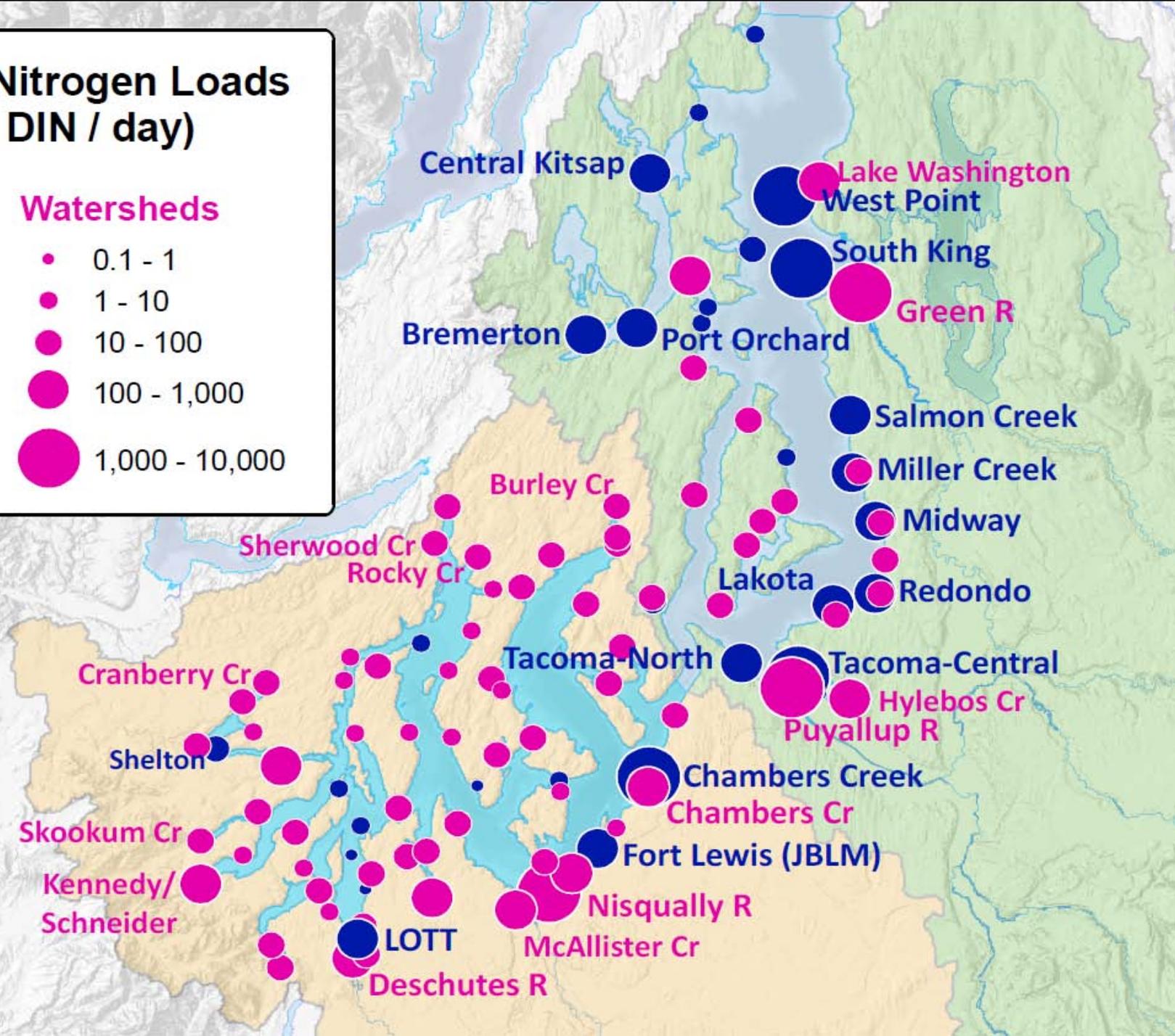
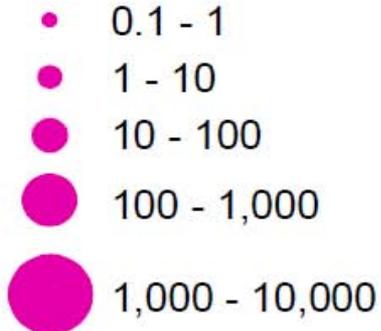


Annual Nitrogen Loads (kg DIN / day)

WWTPs

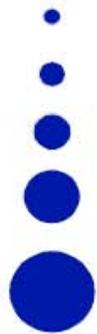


Watersheds

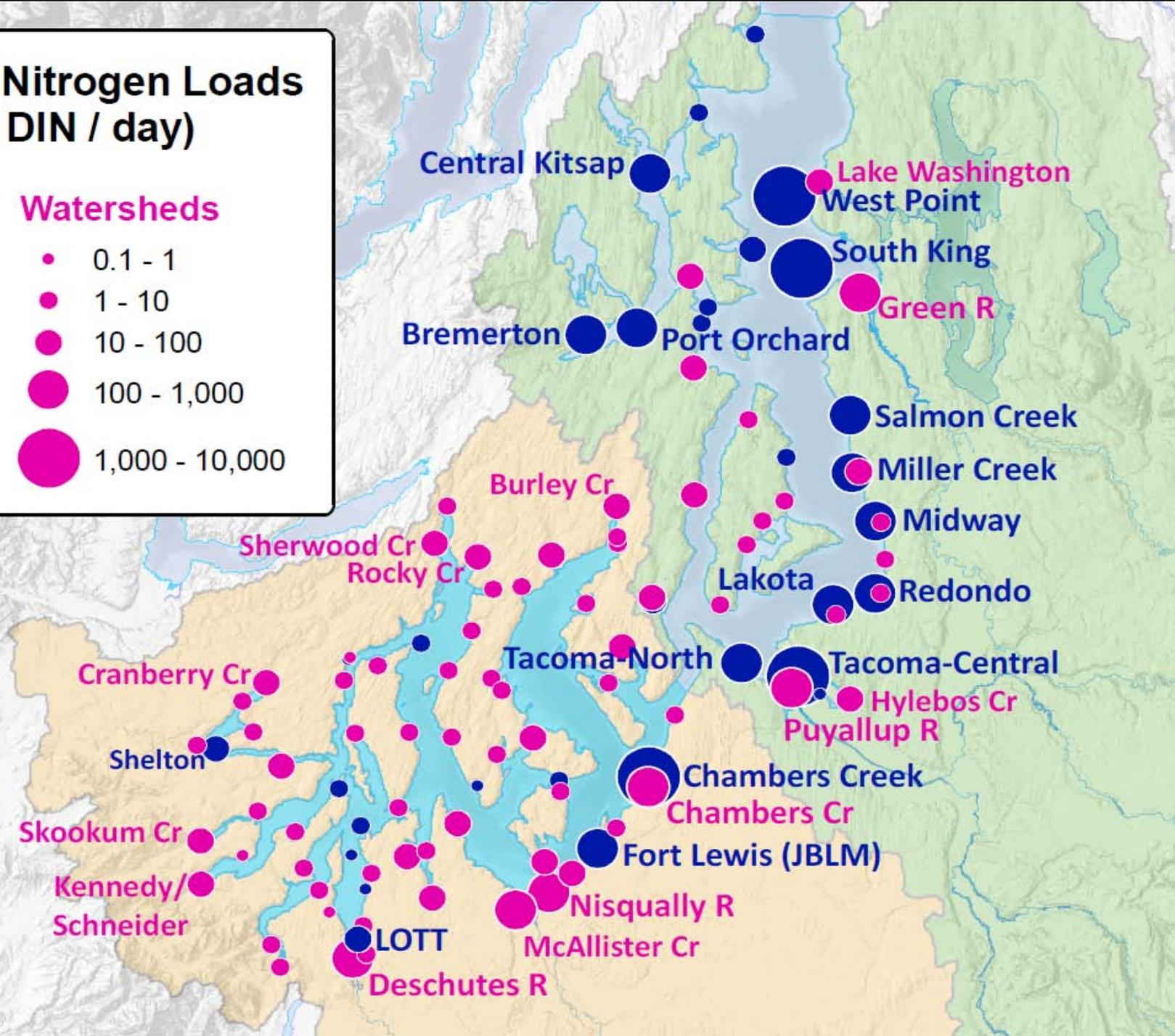
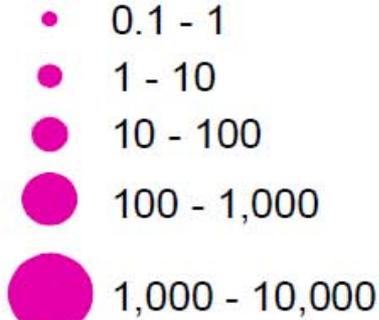


Summer Nitrogen Loads (kg DIN / day)

WWTPs

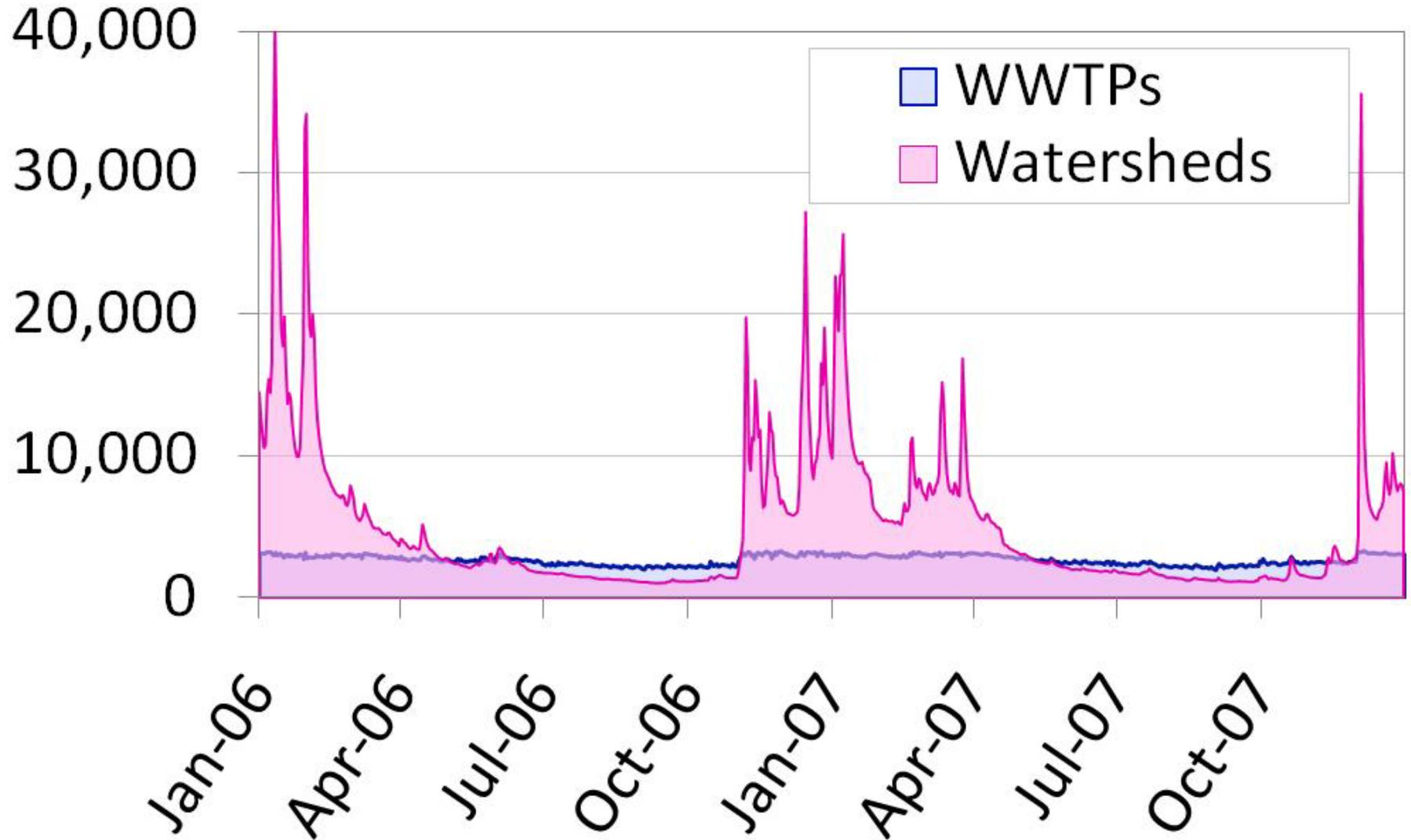


Watersheds



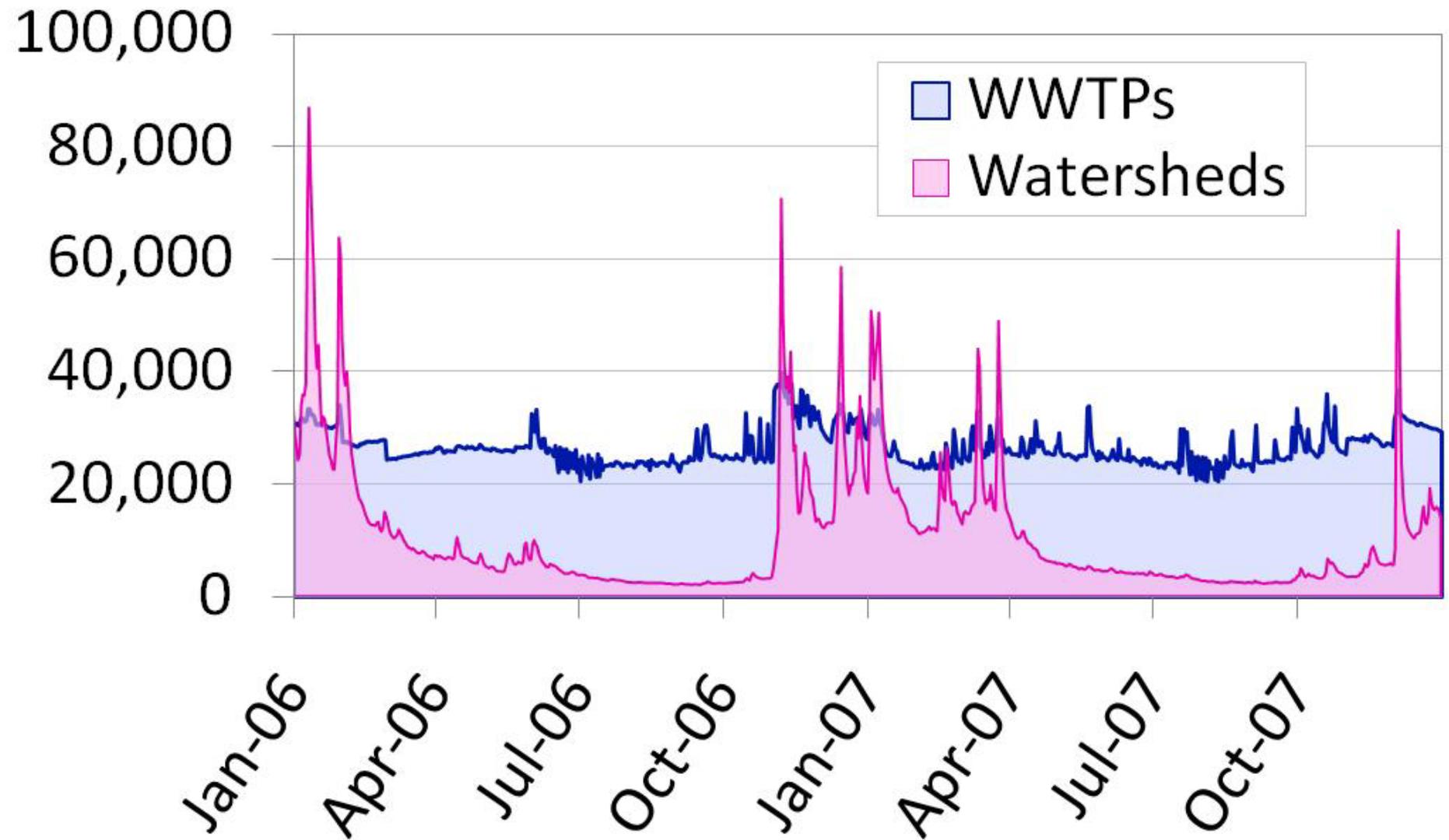
Nitrogen Load

(kg DIN per day in South Puget Sound)

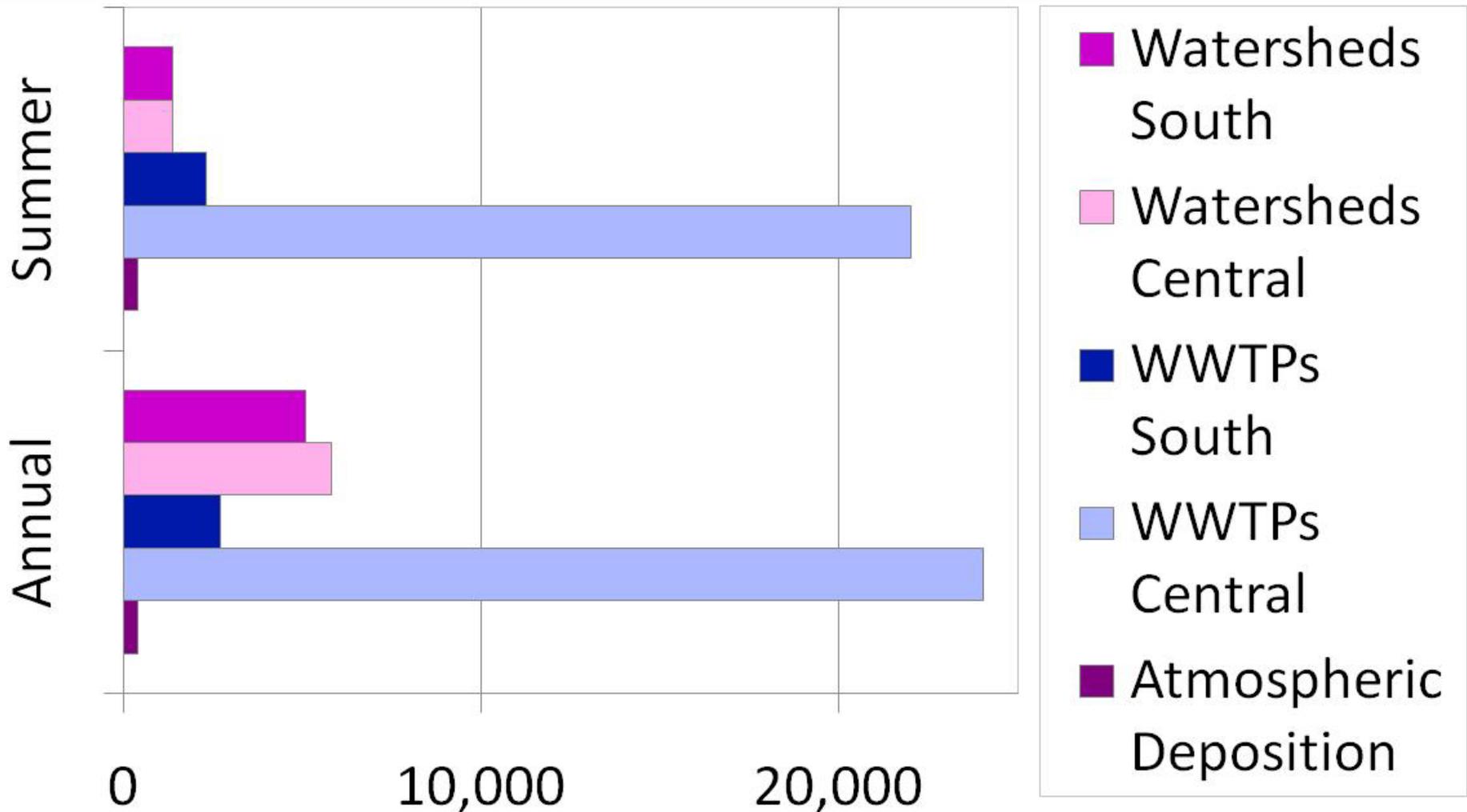


Nitrogen Load

(kg DIN per day in South and Central Puget Sound)

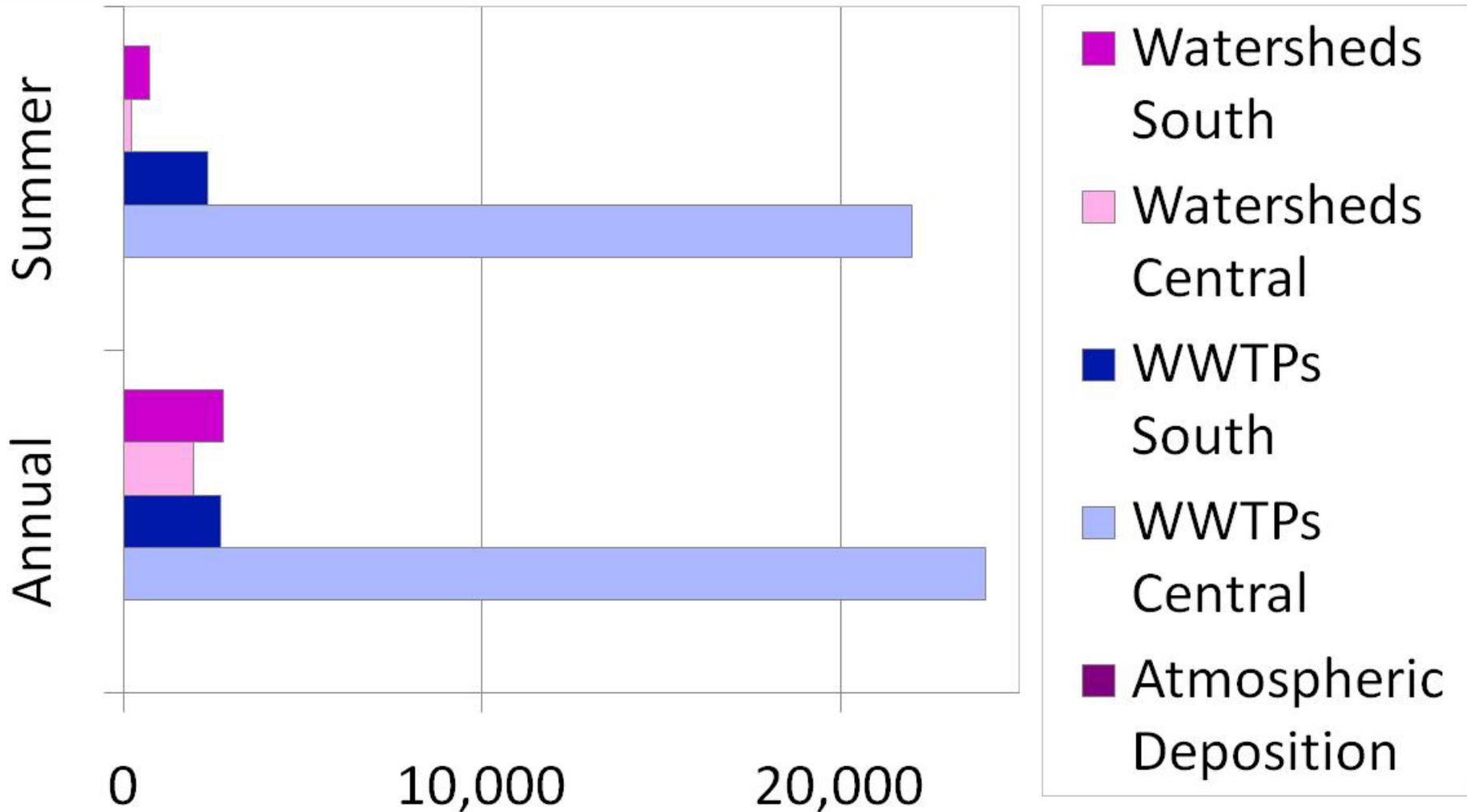


Nitrogen Load - (kg DIN per day)



Nitrogen Load - (kg DIN per day)

Only Human Sources of Nitrogen



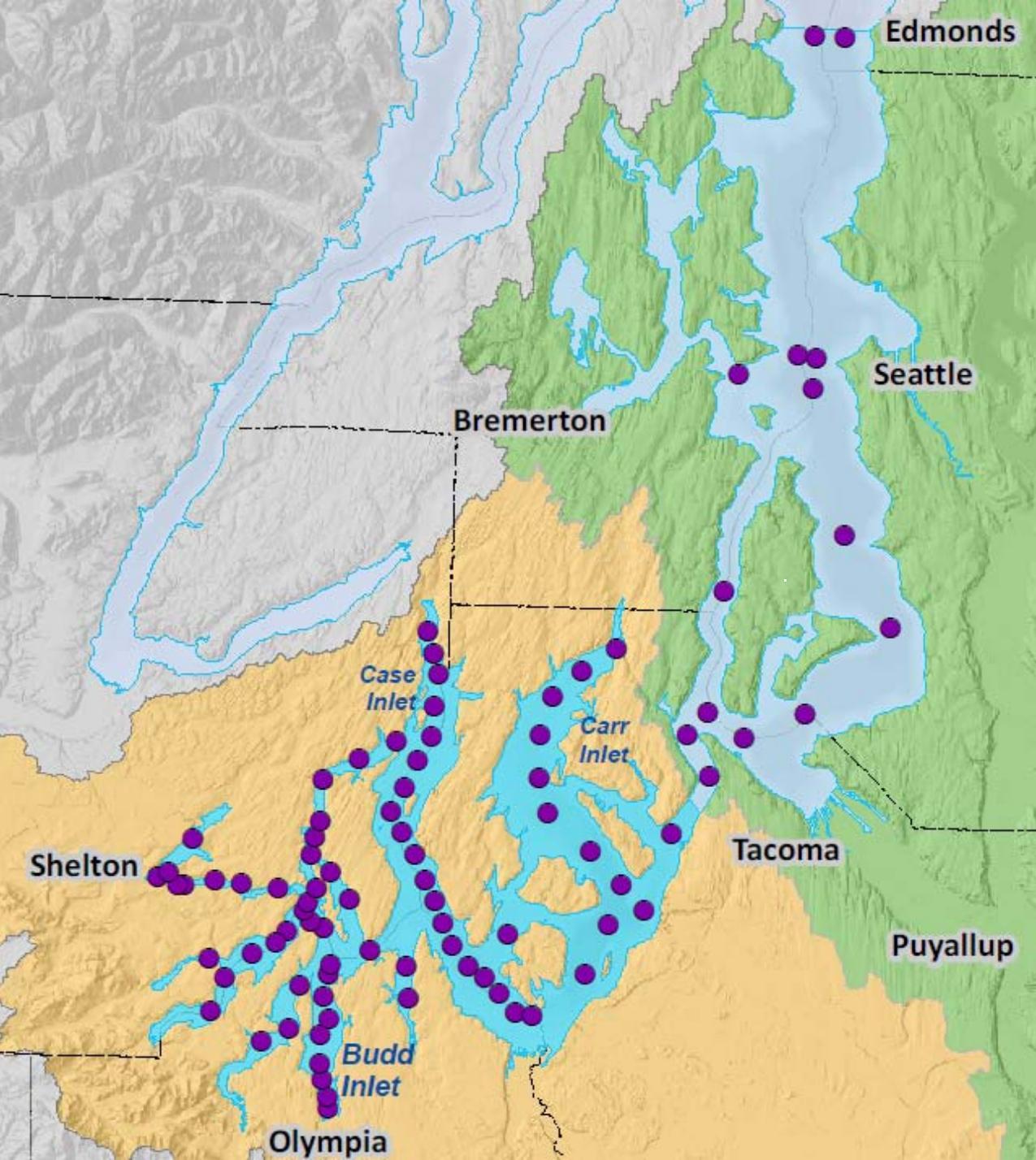
Human Sources of Nitrogen

“Human actions considered cumulatively may not cause the dissolved oxygen of that water body to decrease more than 0.2 mg/L.”

Human Sources of Nitrogen in Rivers

Calculated by subtracting out natural sources. Natural sources calculated using:

- Historic river data
- Forested basins
- Hood Canal estimates
- Rainfall data
- Lower levels in current data

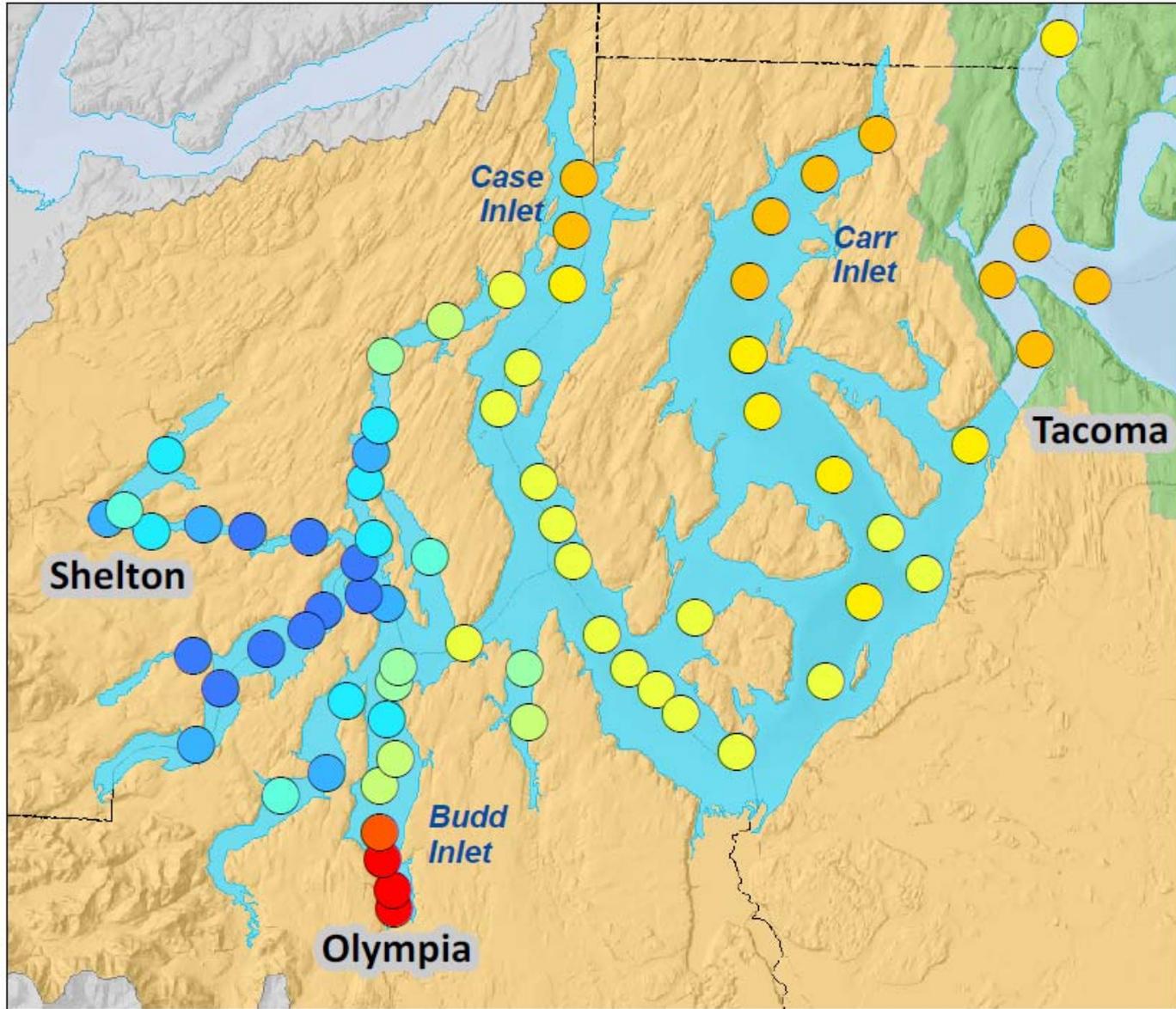


South Sound

Marine Monitoring Stations



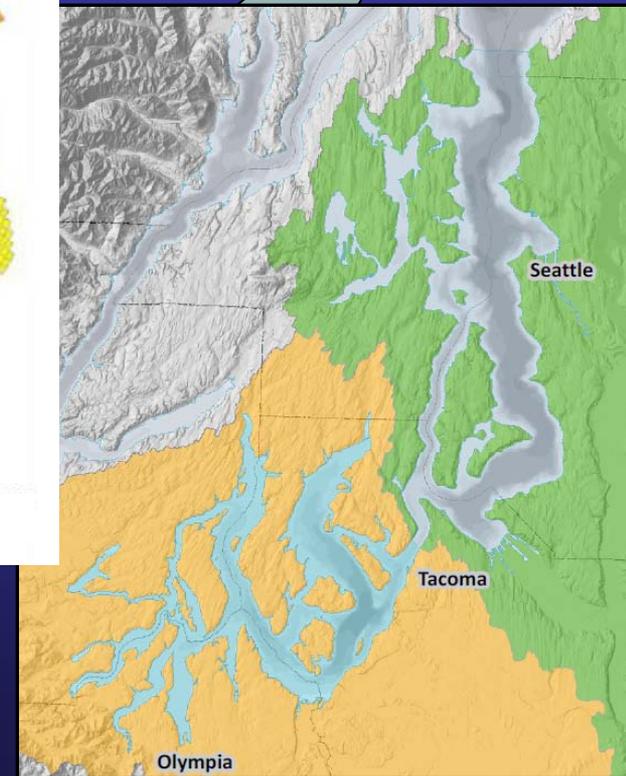
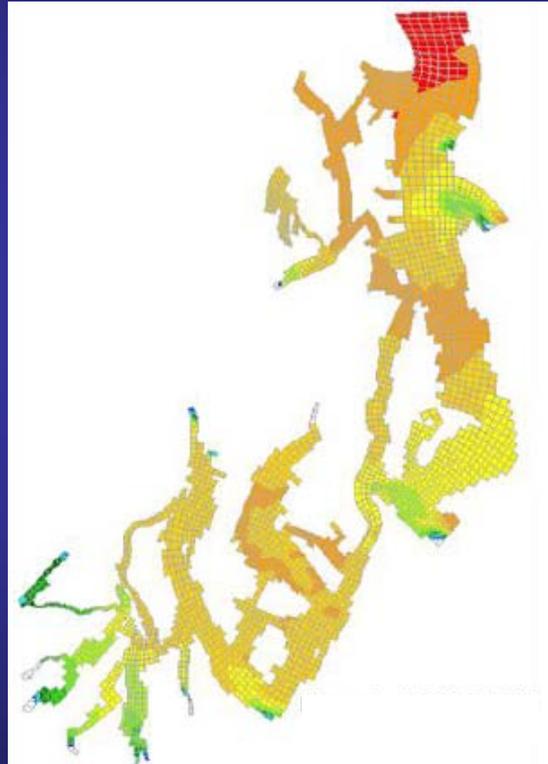
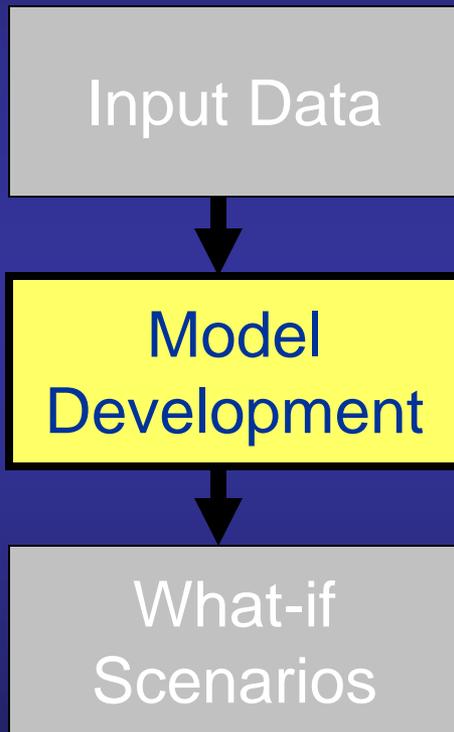
September Bottom Dissolved Oxygen - 2006

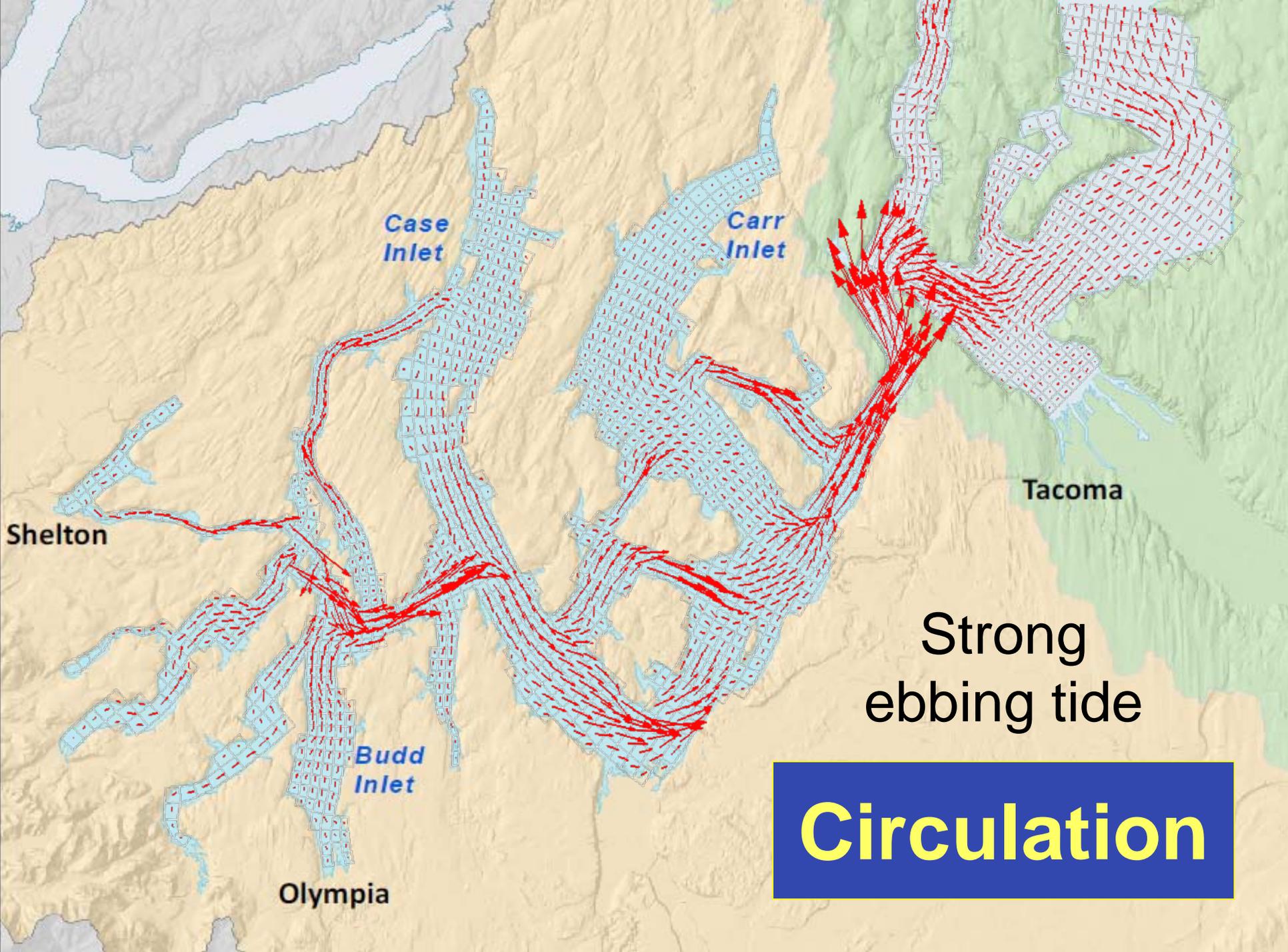


Dissolved Oxygen in mg/L



2a. Develop a model to represent complex physical structure of Puget Sound





Case Inlet

Carr Inlet

Tacoma

Shelton

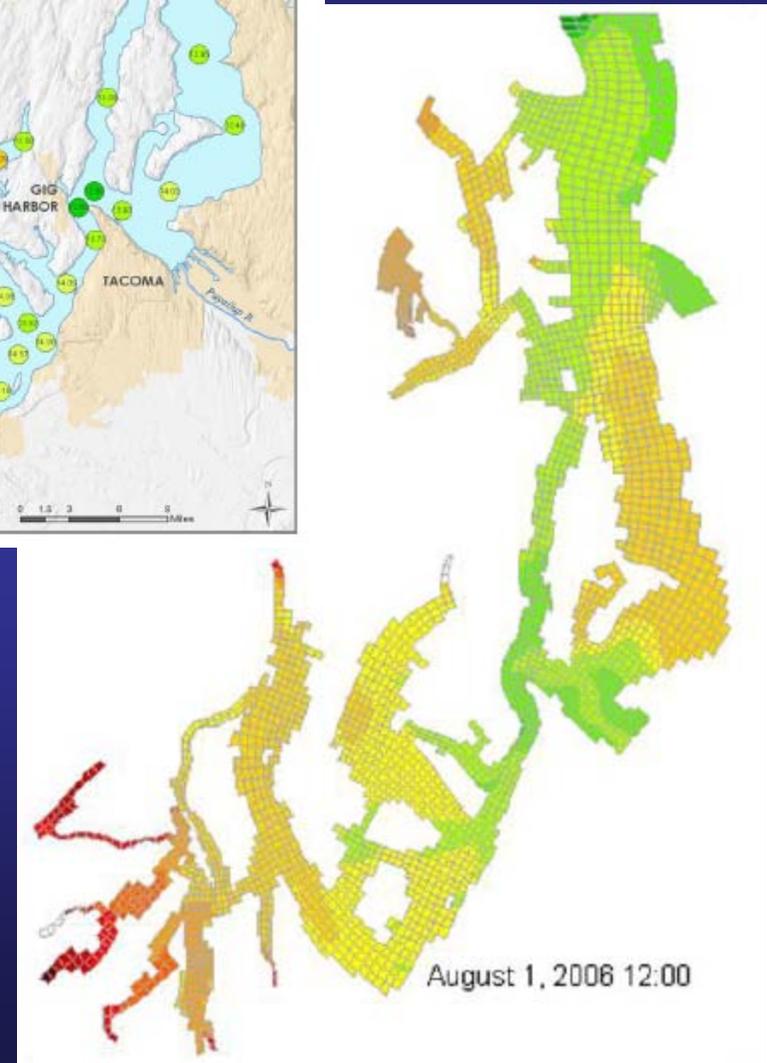
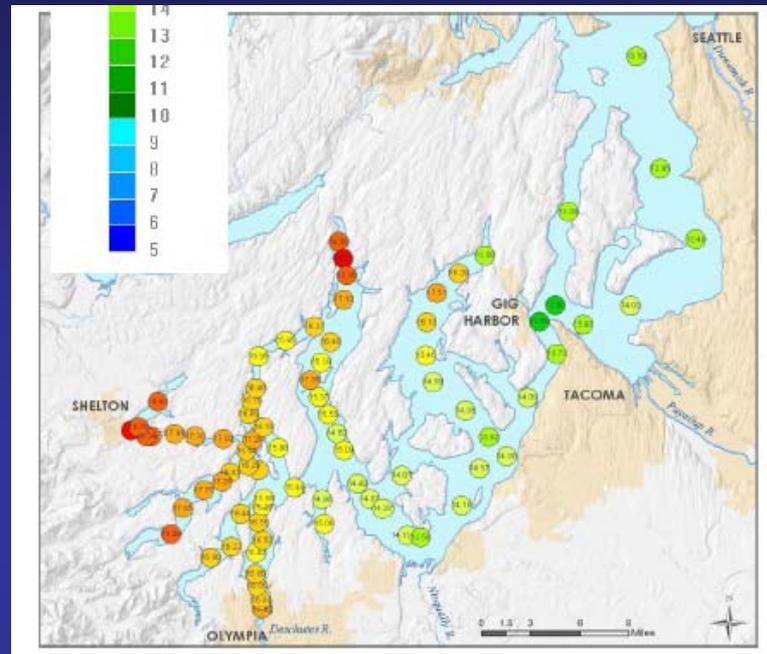
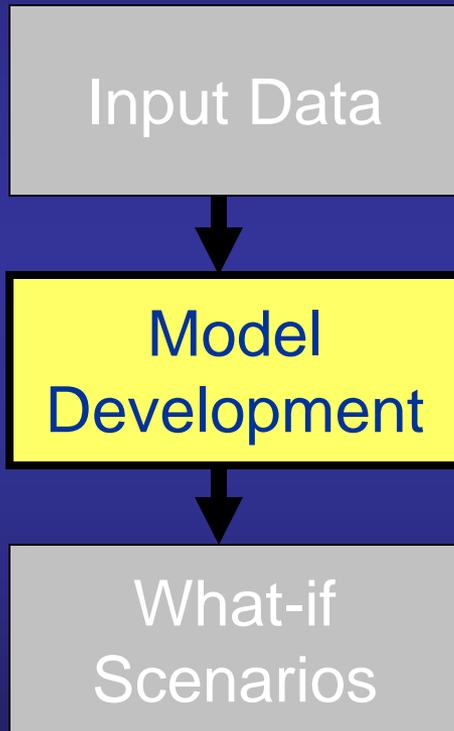
Budd Inlet

Olympia

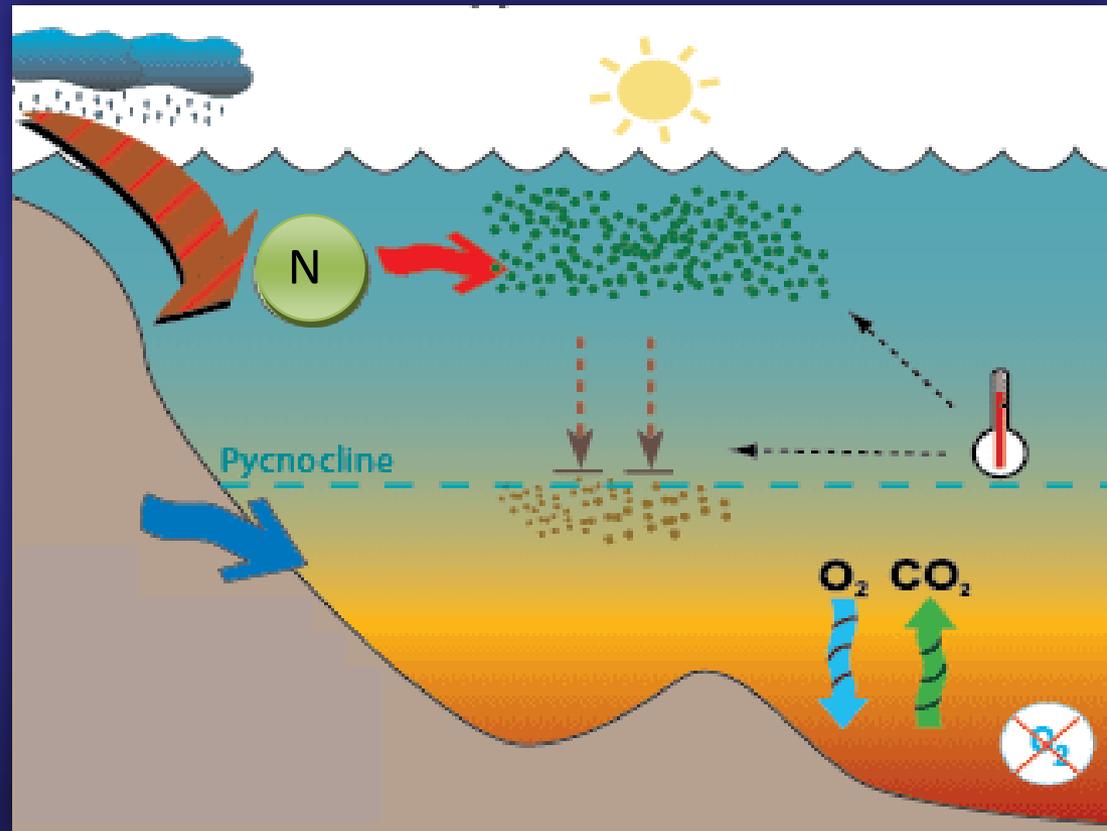
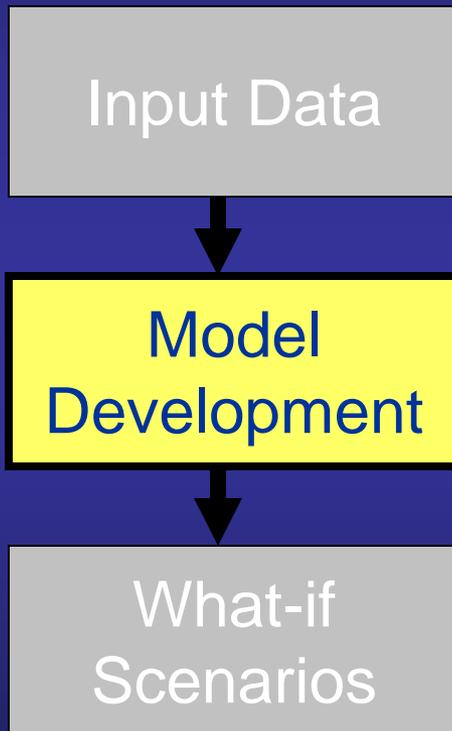
Strong ebbing tide

Circulation

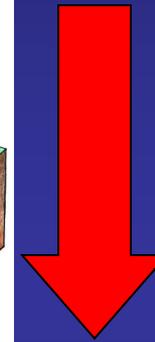
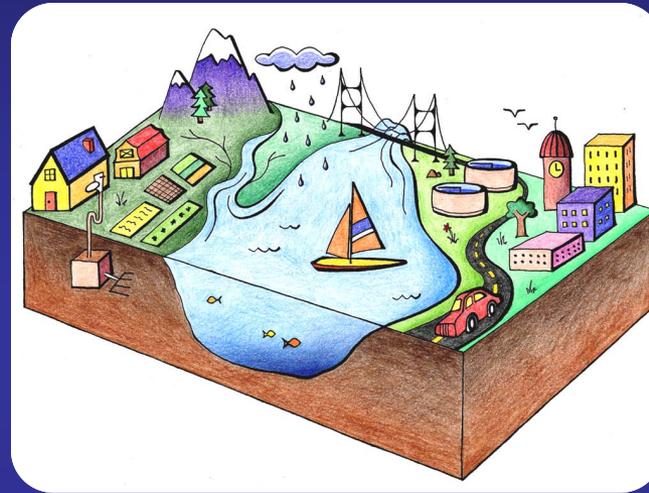
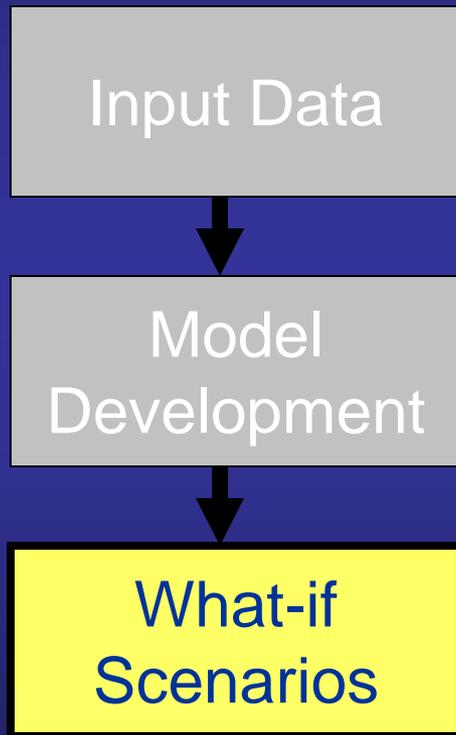
Compare model output to data



2b. Develop model to represent water quality processes



3. Apply model to various “what-if” scenarios



What if nitrogen loads decrease?



Will South Sound DO levels...

... improve markedly?

... remain low?

Schedule

- 
- 1. Data Reports** Done
 - 2. Circulation Report** Draft Done
 - 3. Final Report** 2011-2012



Saving Puget Sound

SAVING PUGET SOUND

Overview

Sound Science

Water Quality:

[South Sound Dissolved Oxygen](#)[Dissolved Oxygen Model](#)[Coordinated Monitoring Program](#)[Control of Toxic Chemicals Study](#)[Puget Sound Initiative \(PSI\) Site Cleanups](#)

Actions

Education

What You Can Do

Reports

Publications

News

Partners

Contacts

[Puget Sound](#) > [Water Quality Activities](#) > [Dissolved Oxygen](#) > [South Puget Sound Study Overview](#)

South Puget Sound Dissolved Oxygen Study

Ecology is conducting a water quality study on low dissolved oxygen levels in South Puget Sound. This study will help determine how human activities, along with natural factors, affect low dissolved oxygen levels in South Puget Sound.

Overview presentation of the South Sound study:
(double click to open full screen)



South Puget Sound Dissolved Oxygen Study:

[Overview of the study](#)

[Overview presentation \(video\)](#)

[South Sound Data](#)

[Publications](#)

[Other South Sound Activities](#)

Additional information:

[What is the problem?](#)

[Advisory Committee](#)

NEW! [Independent Audit](#)

[Draft Circulation Report \(pdf\)](#)

[Data Report](#)

[Key Findings of the Data Report](#)

[Focus Sheet](#)

Website:

www.ecy.wa.gov/puget_sound

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