1999-2015

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DEPARTMENT OF ECOLOGY State of Washington

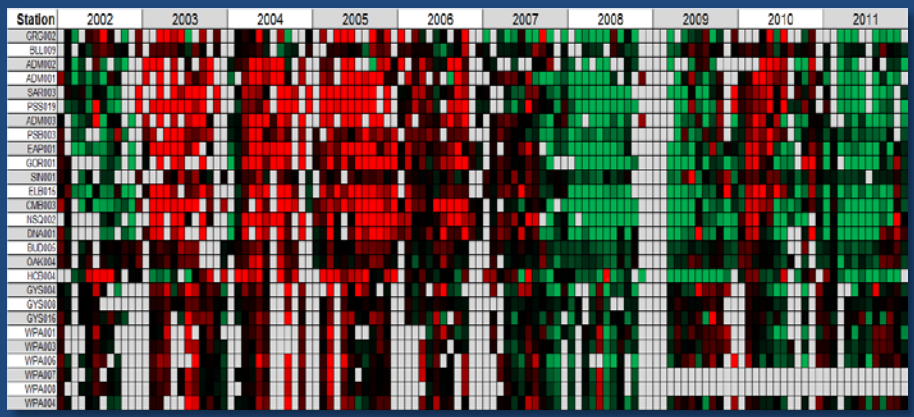
Long-Term Nutrient Trends

Puget Sound	*Trends in nutrients, nutrient ratios and algal biomass*
Willapa Bay	*Trends in nutrients, nutrient ratios and algal biomass*
Grays Harbor	*Trends in nutrients, nutrient ratios and algal biomass*
Figure Explanation	*Overview of variables and trend analysis*

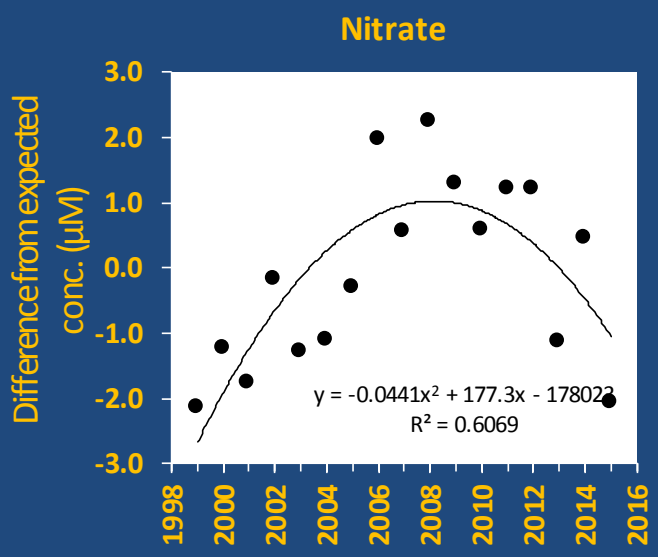
Anomaly patterns in monthly station data

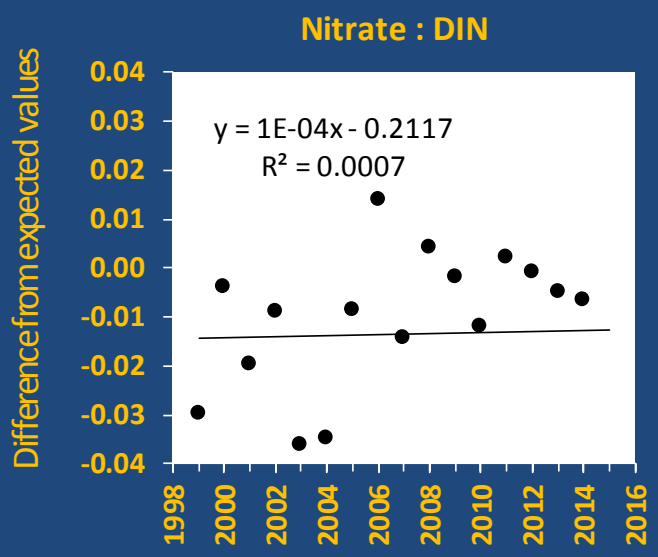
Explore the patterns of all variables

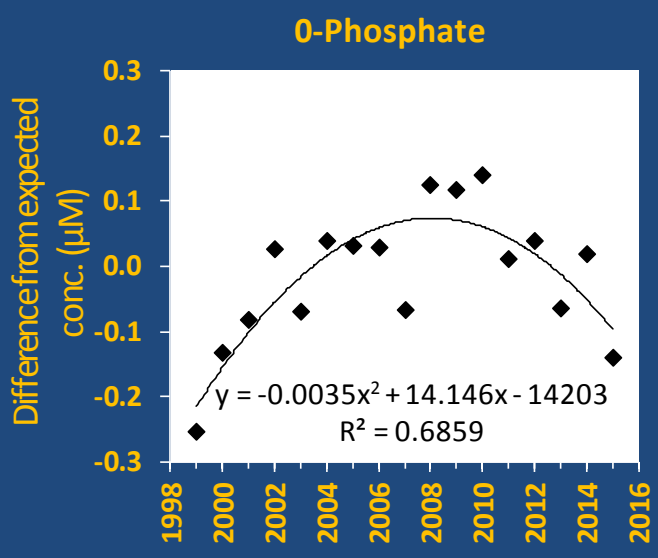
Download the data of all variables.

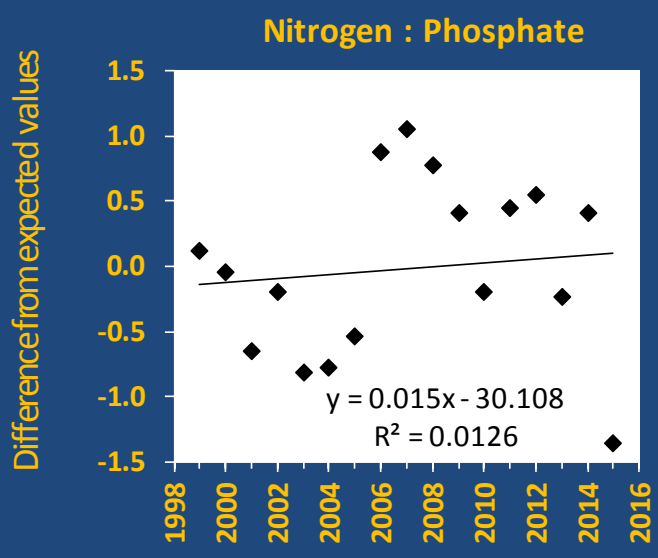


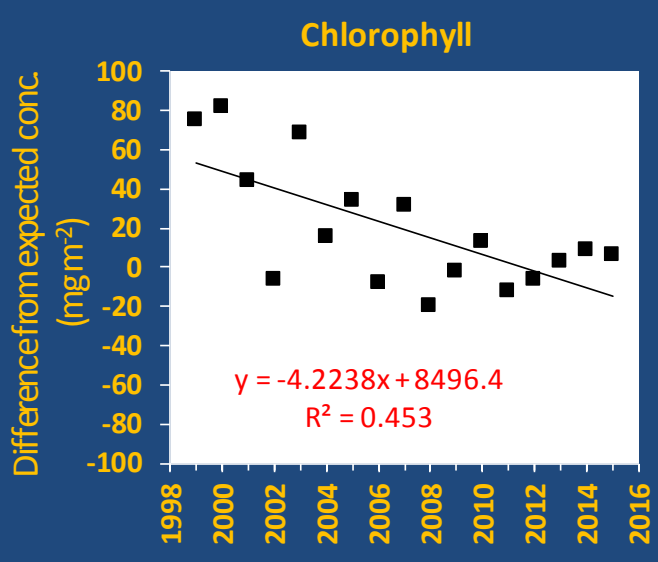
Puget Sound wide trends 1999-2015

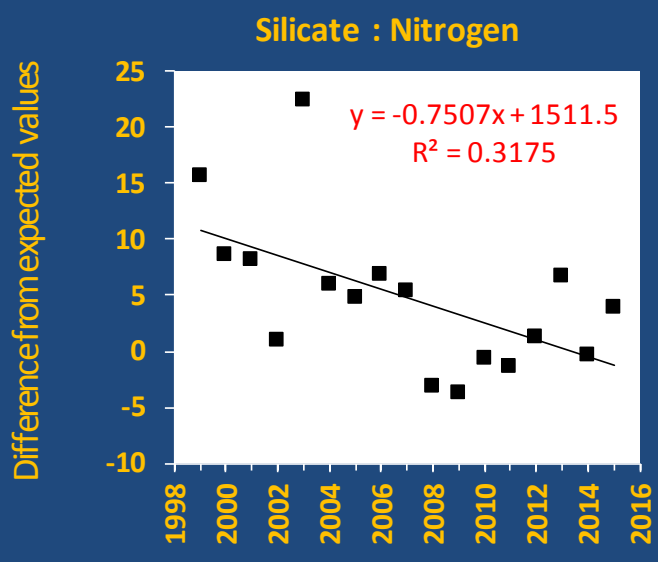






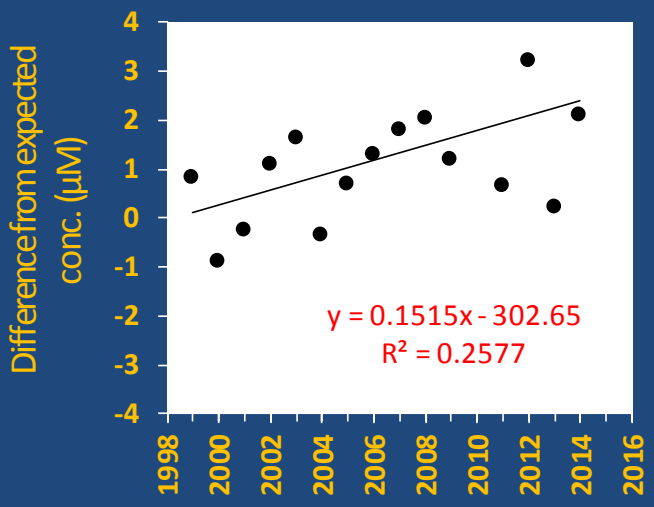




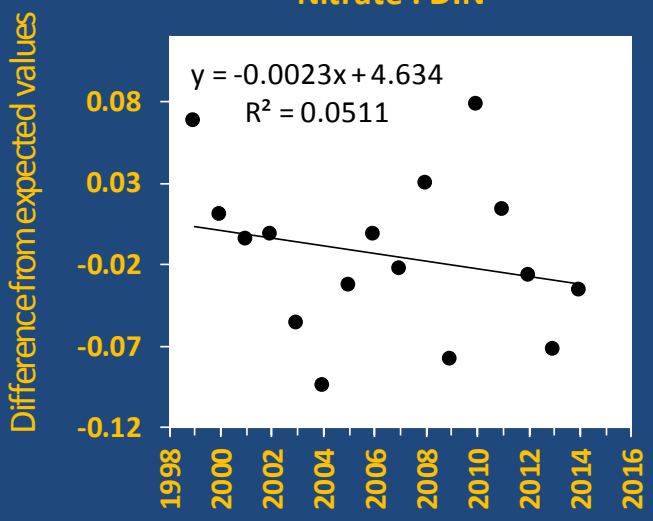


Willapa Bay wide trends 1999-2015

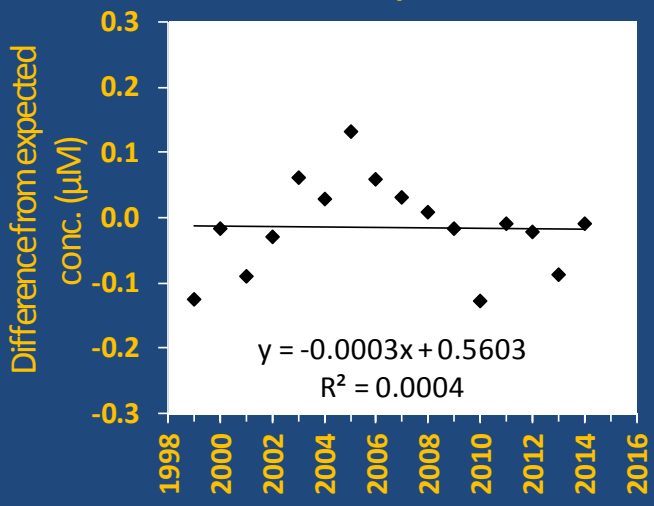
Nitrate



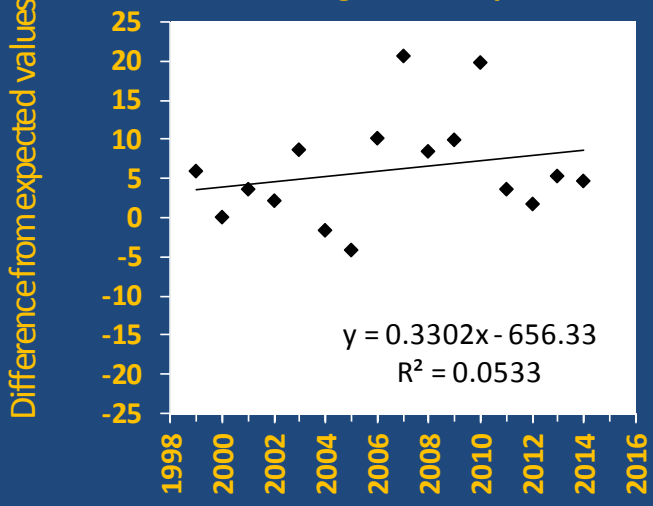
Nitrate : DIN



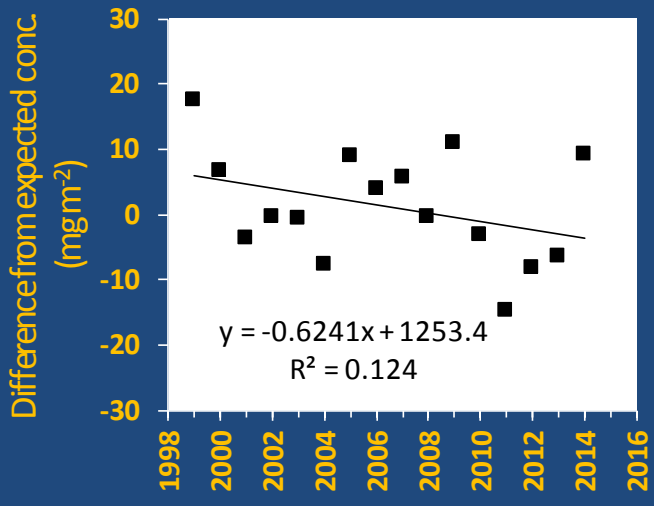
0-Phosphate



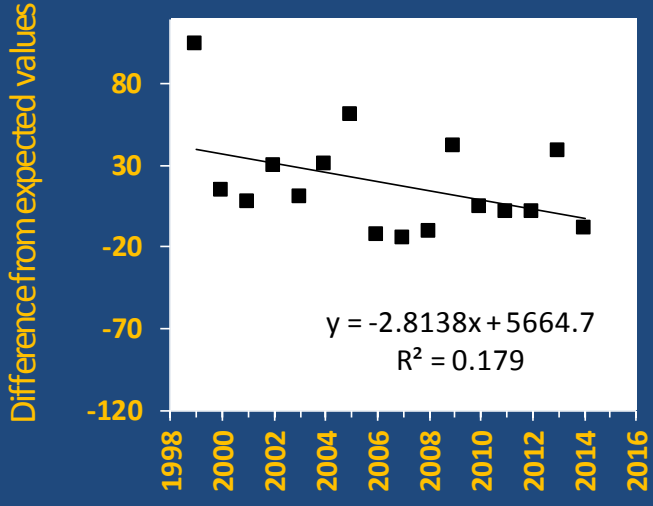
Nitrogen : Phosphate



Chlorophyll

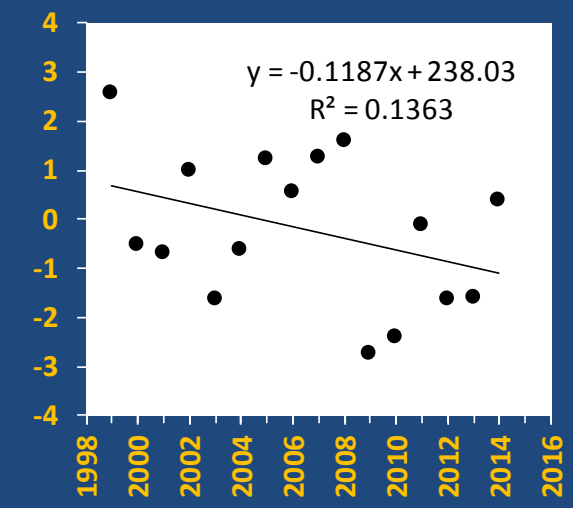


Silicate : Nitrogen

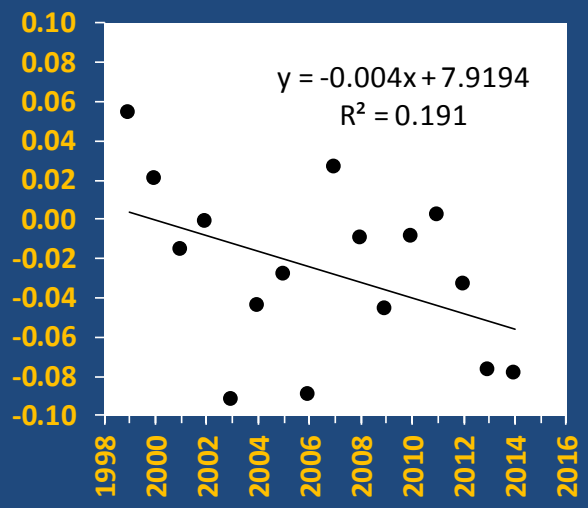


Grays Harbor wide trends 1999-2015

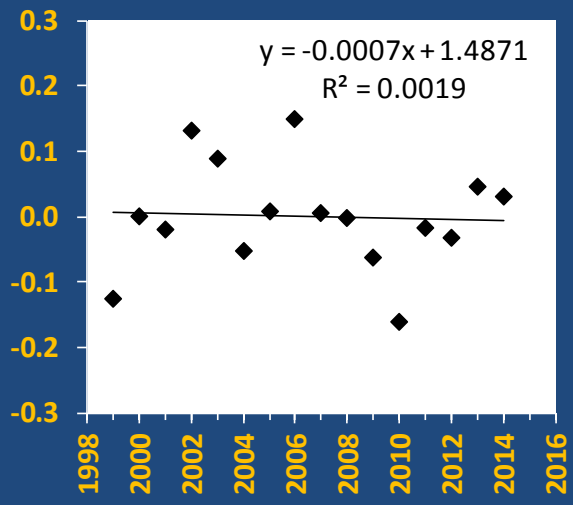
Nitrate



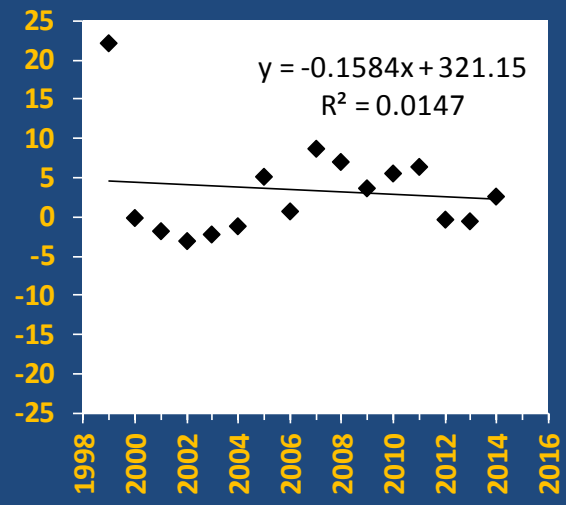
Nitrate : DIN



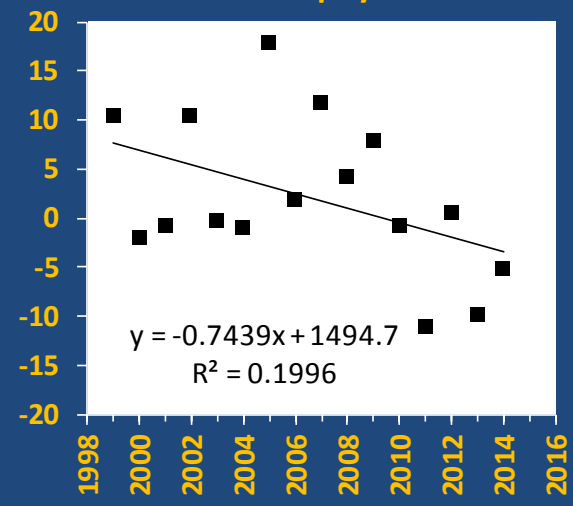
0-Phosphate



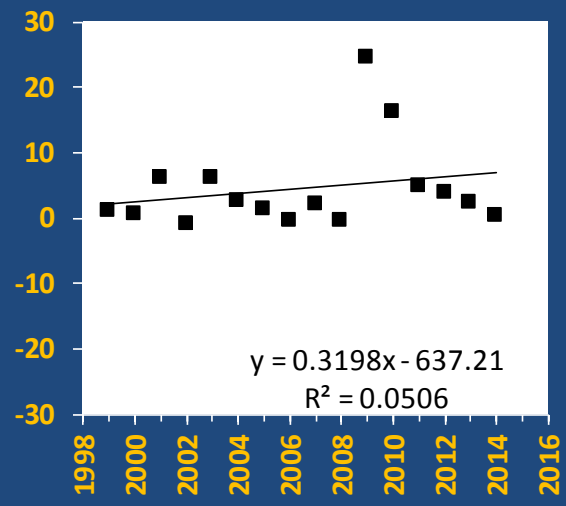
Nitrogen : Phosphate



Chlorophyll



Silicate : Nitrogen



Long-term tend is significant: Spearman Rank Correl., $p<0.05$ (slope is estimated)

Nitrate

Nitrate is a growth limiting nutrient for phytoplankton in the ocean. We use median monthly concentrations at 0, 10, and 30 m depth and subtract a time- averaged seasonal cycle (13 yrs) from the dataset that is specific to each station. From monthly de-seasonalized data we calculated yearly averages for each region.

O-Phosphate

Phosphate is a macronutrient for phytoplankton in the ocean. We use median monthly concentrations at 0, 10, and 30 m depth and subtract a time- averaged seasonal cycle (13 yrs) from the dataset that is specific to each station. From monthly de-seasonalized data we calculated yearly averages for each region.

Chlorophyll

Chlorophyll is a proxy for phytoplankton biomass in the ocean. We use depth integrated (0-50 m) concentrations and subtract a time-averaged seasonal cycle (13 yrs) from the dataset that is specific to each station. From monthly de-seasonalized data we calculated yearly averages for each region.

Nitrate : DIN

The ratio nitrate to dissolved inorganic nitrogen (DIN) describes the quality and source of nitrogen that phytoplankton use for growth. We measure trends similar to nitrate using the ratio of Nitrate : DIN at 0, 10, and 30 m depth.

Nitrogen : Phosphate

The ratio nitrate to phosphate describes the balance of macronutrients and affects phytoplankton species composition and nutrient limitations. We measure trends similar to nitrate using the ratio of Nitrate : Phosphate at 0, 10, and 30 m depth.

Silicate : Nitrogen

The ratio silicate to nitrogen describes the balance of macronutrients and affects phytoplankton species composition and their sinking rates. We measure trends similar to nitrate using the ratio of Silicate : Nitrate at 0, 10, and 30 m depth.