How did large scale climate anomalies impact 2015 phytoplankton blooms in Puget Sound?

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How did a large-scale climate anomaly impact phytoplankton blooms in Puget Sound in 2015?

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Background

What can we learn from large scale climate anomalies?

In 2015 we observed changes in marine water quality due to the large-scale climate anomaly ‘The Blob’ – a mass of warm water that entered Puget Sound in the fall of 2014. In conjunction with the Blob, higher than normal air temperatures altered patterns of river discharge in 2015, changing water column stratification and salinity. Changes to hydrological patterns in Puget Sound have the ability to influence nutrient levels and water column stratification, indirectly affecting the timing and amplitude of phytoplankton blooms.

Factors Influencing Phytoplankton Blooms

1. The Physical Environment

- Spring Bloom: Earlier timing, higher amplitude
- Summer Bloom: Expected timing, higher amplitude

2. River Flow

- Higher levels of salinity in Summer
- Low river flows
- Higher levels of salinity in both regions

3. Nutrient Cycling

- More research on lower trophic level food web dynamics is needed to understand how ecosystem functioning in Puget Sound is affected by changes in the timing and amplitude of phytoplankton blooms.

Methods

- Long-term monitoring stations are visited monthly via floatplane and boat.
- Standard operating procedures are followed for seawater sampling, analysis and data QA/QC.
- Data collected from Central and South Sound in 2015 was compared to an established historic baseline (1999-2008).
- ‘Heat’ maps were generated to show anomalies in 2015 water quality data.

Conclusions

- Large-scale climate anomalies provide useful information about how warming global and ocean temperatures will impact phytoplankton blooms in Puget Sound.
- Regions in Puget Sound may respond differently to future climate impacts.

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