Eelgrass Beds and Pseudo Nitzschia Population Correlation

Kyle T. Petersen
Ocean Research College Academy,
Everett Community College

Introduction

Eelgrass holds a special place within the aquatic ecosystem as it connects to almost all aquatic factors whether biological or chemical. Eelgrass is known to serve as nursery for many species and helps sequester and slowly release heavy metals. An influenced factor not explored thoroughly is the effect of eelgrass on plankton in the surrounding water column. This led me to question if there is a correlation between eelgrass and phytoplankton. While the eelgrass in Puget Sound commonly is Zostera marina L., the choice of plankton species was entirely my decision. I chose to focus on Pseudo nitzschia because of its role as a toxin producer making it a priority to understand and find ways toe hopefully mitigate or control their population in blooms. I hypothesized that the larger the adjacent eelgrass bed; the lower concentrations of Pseudo nitzschia will be observed.

Study Site

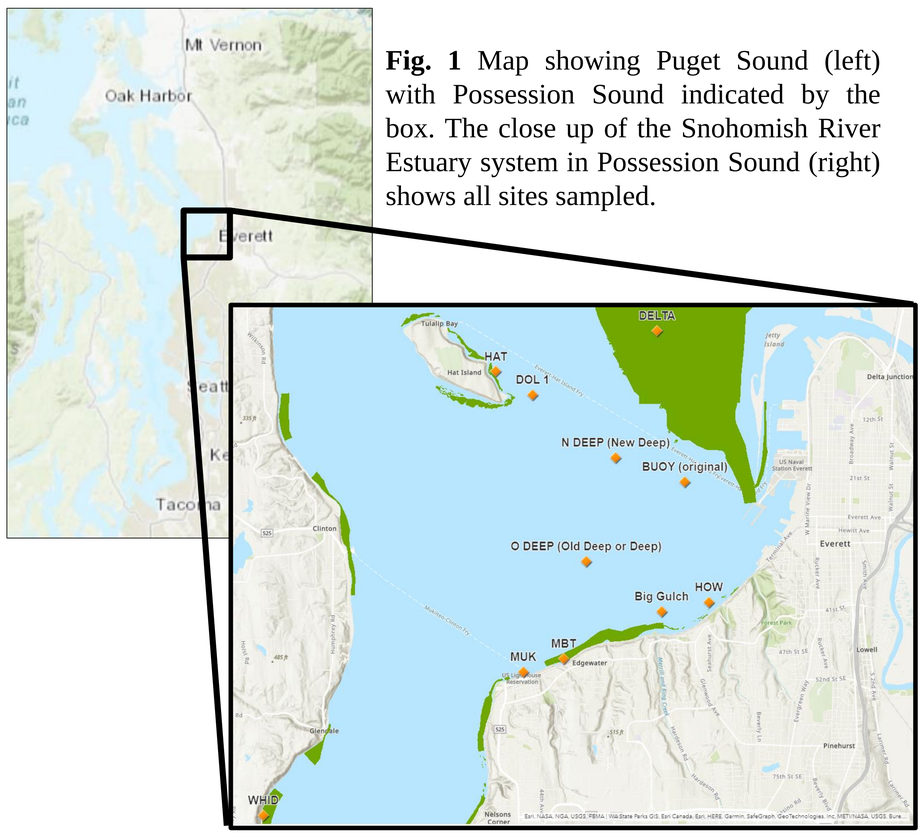

Fig. 1 Map showing Puget Sound (left) with Possession Sound indicated by the box. The close up of the Snohomish River Estuary system in Possession Sound (right) shows all sites sampled.

Methods

This study utilizes ORCA Pseudo nitzschia data from 2015-2020 and Pacific States Marine Fisheries Commission ARCGIS plankton Eelgrass bed data from 2018. ORCA Pseudo nitzschia data was collected by students aboard the Research Vessel Phocoena at predetermined sites. Data from ORCA were collected using 20 micrometer for three minutes at the pycnocline. Counting of this Data was facilitated by faculty and students.

Fig. 3 Phytoplankton Net.

ORCA

The Ocean Research College Academy is a dual enrollment program where high school juniors and seniors experience innovative, interdisciplinary and student-centered learning. A longitudinal study of the local estuary forms the backbone of the first-year experience, and leads students to conduct independent research in their second year of the program. ORCA has received grants for a research lab, research vessel, and summer research funded by the National Science Foundation.

Results

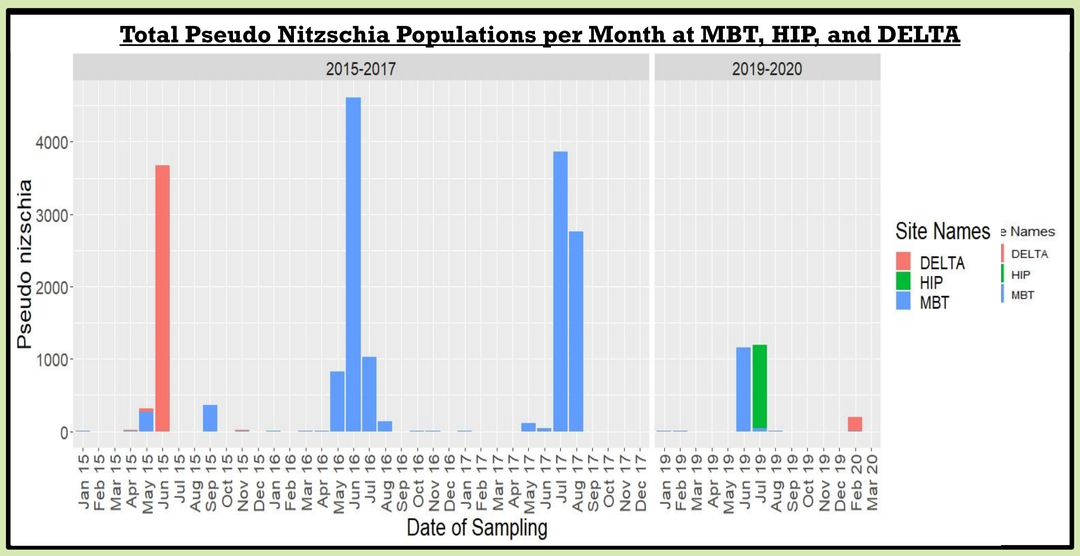

Fig. 2 This graphic shows signs of a seasonal trend. It also confirms a bias in site sampling. The graphic consists of stacked bars for the three sites DELTA, HIP, and MBT. This graphics represents my first iteration of this project that was changed because of lack of Pseudo nitzschia data across the sites.

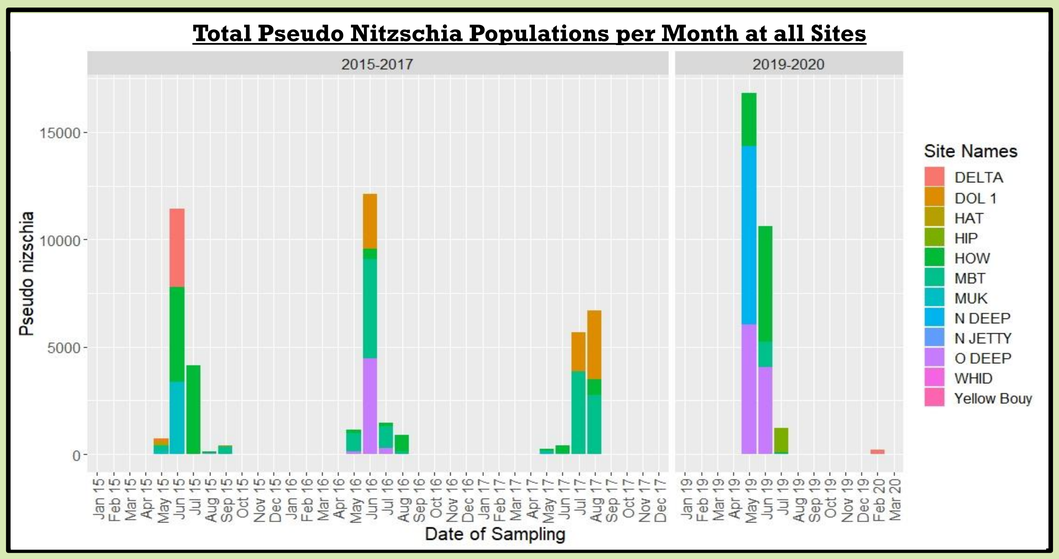

Fig. 3 This graphic demonstrates monthly totals of Pseudo nitzschia at all sites monitored by ORCA. The total fluctuates between zero and approximately 1800 identified specimens. There is a gap for 2018 due to no samples being recorded that year but the seasonal trends are shown. Similarly, some stations did repeatedly have higher counts than others in a similar pattern, specifically DOL1, HOW, and MBT during 2016 and 2017.

To-Date Summary

Seasonal trends are apparent in observed Pseudo nitzschia populations. Within these spikes, site stratification can be observed. When overlap occurs, a trend following DOL1 = HOW > MBT>O Deep is observed. While this indicates little direct relationship between eelgrass and Pseudo nitzschia, Delta's Pseudo nitzschia levels were higher than any other site. This is only for sites within its spike as each spike seemingly has unique high and low boundaries. This does lead to question why this stratification is present. What other factors hold stronger power over Pseudo nitzschia then Eelgrass? Why does DOL 1 have such high values when compared to HOW, MBT, or MUK, which all could be answered by runoff? Could DELTA show greater concentrations because it is located next to an immense bed of Eelgrass or is directly within Snohomish River outflow, which could affect both eelgrass beds and plankton concentrations?

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