



Apr 26th, 4:30 PM - 5:00 PM

Species abundance and conditions of plankton blooms in Possession Sound

Maci Larsen
Everett Community College

Follow this and additional works at: <https://cedar.wwu.edu/ssec>



Part of the [Fresh Water Studies Commons](#), [Marine Biology Commons](#), [Natural Resources and Conservation Commons](#), and the [Terrestrial and Aquatic Ecology Commons](#)

Larsen, Maci, "Species abundance and conditions of plankton blooms in Possession Sound" (2022).
Salish Sea Ecosystem Conference. 174.

<https://cedar.wwu.edu/ssec/2022ssec/allsessions/174>

This Event is brought to you for free and open access by the Conferences and Events at Western CEDAR. It has been accepted for inclusion in Salish Sea Ecosystem Conference by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.

Noctiluca presence relative to temperature and phosphate levels in Possession Sound, 2016-2021

AUTHOR
Maci E. Larsen

AFFILIATIONS
Ocean Research College Academy, Everett Community College

Introduction

Noctiluca scintillans is a microscopic organism nicknamed "The Sea Sparkle" for its unique ability to cause bioluminescence when it blooms. Noctiluca has never been a noteworthy part of Puget Sound's ecosystem until a massive bloom of these dinoflagellates occurred in May of 2019. Ever since then, the overall presence of Noctiluca has increased steadily in Puget Sound. The rapid increase in a species that had been uncommon at best in the Puget Sound area needs to be explored and investigated.

Results

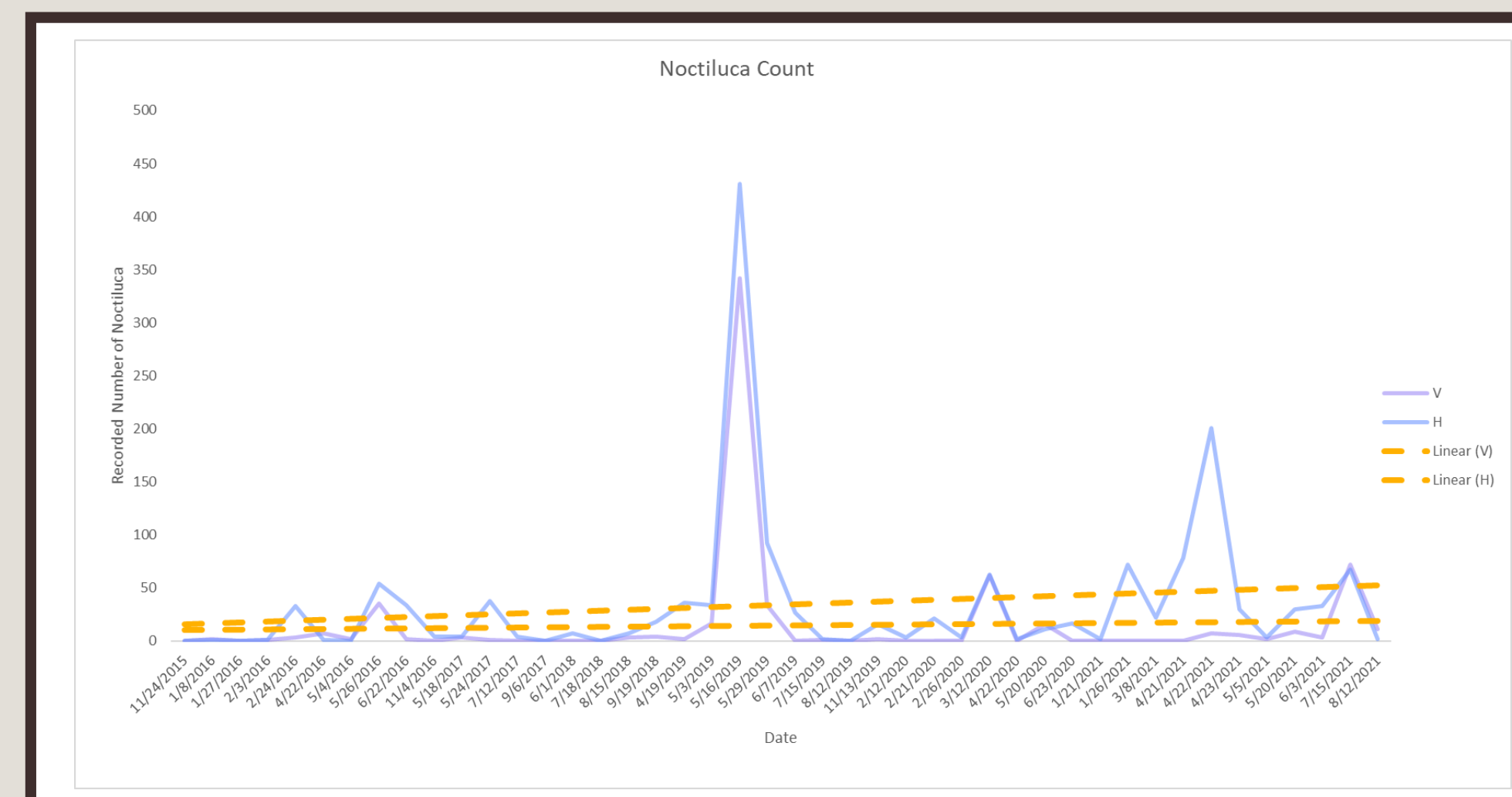


Figure 1) Hand counted samples from the Ocean Research College Academy's archives. The highest count displayed was taken the day following most news stories regarding the Noctiluca bloom of 2019.

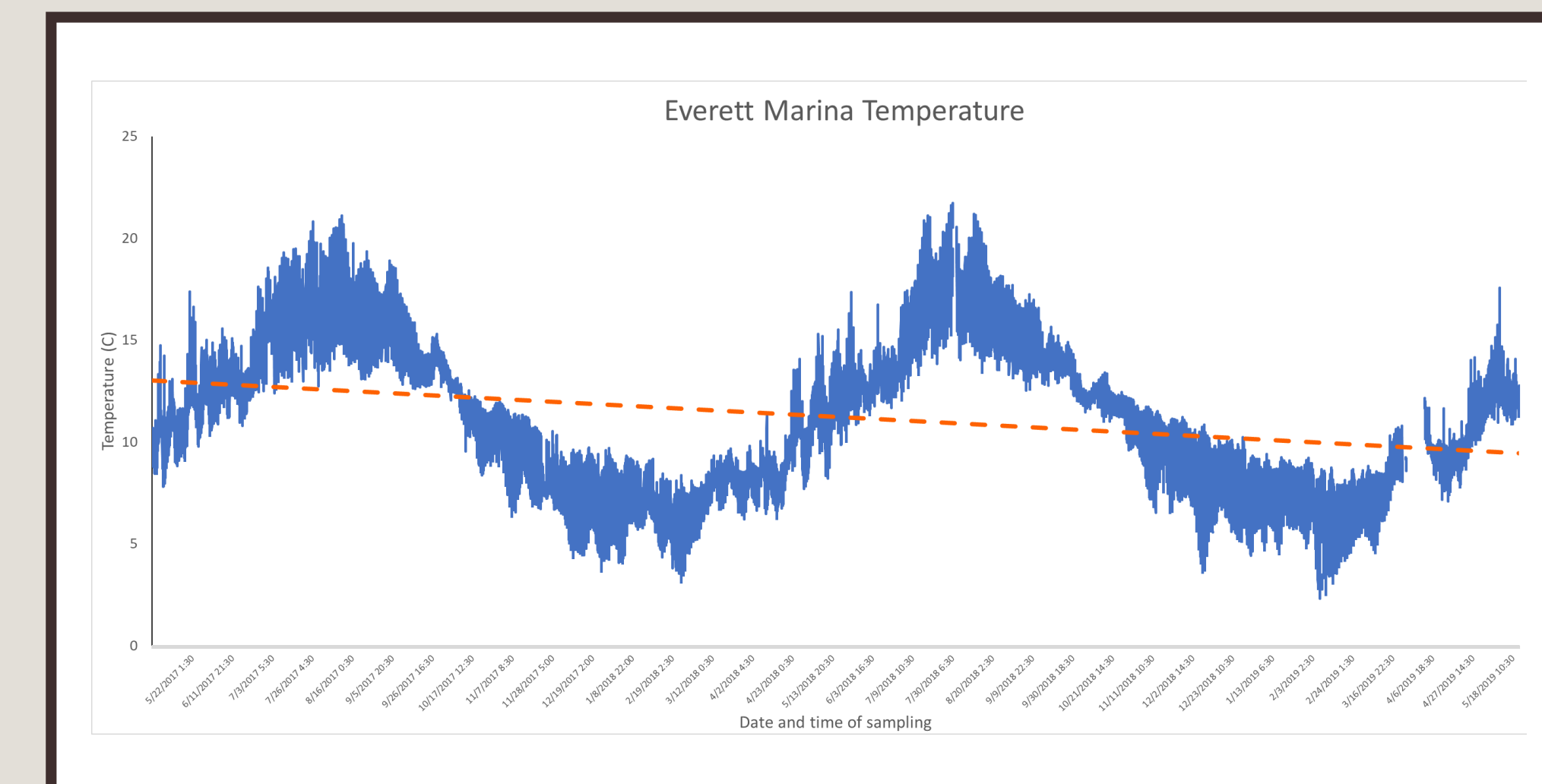


Figure 2) Temperature of the Everett Marina recorded in Celcius. The correlation between temperature and the amount of Noctiluca recorded show a clear disconnection.

Site Map

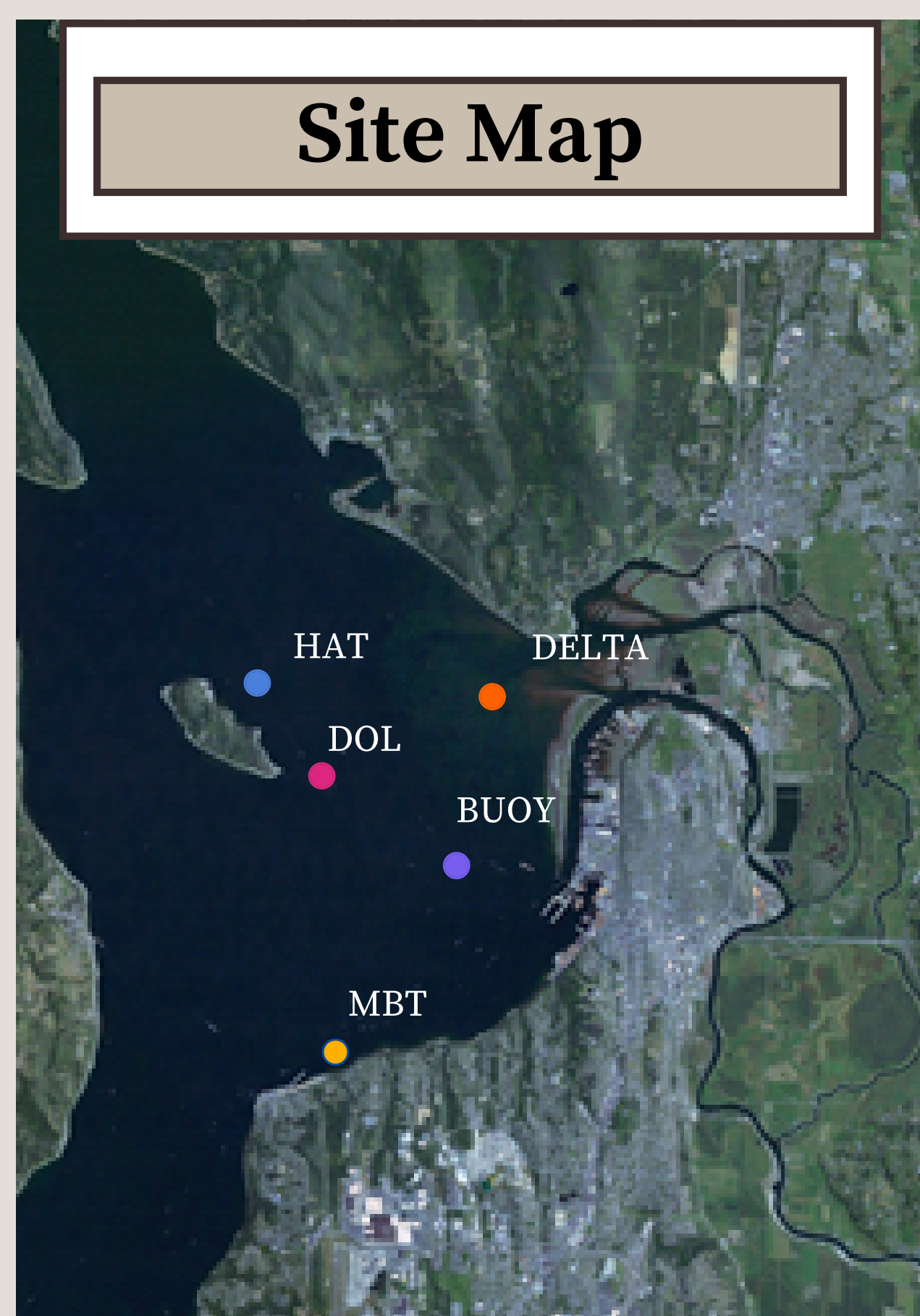


Figure 5) Map of sample sites recorded by ORCA faculty and students.



Figure 6) A image of a large Noctiluca bloom in the area of Padila Bay.



Figure 7) Another image of a large Noctiluca bloom in the area of Padila Bay.

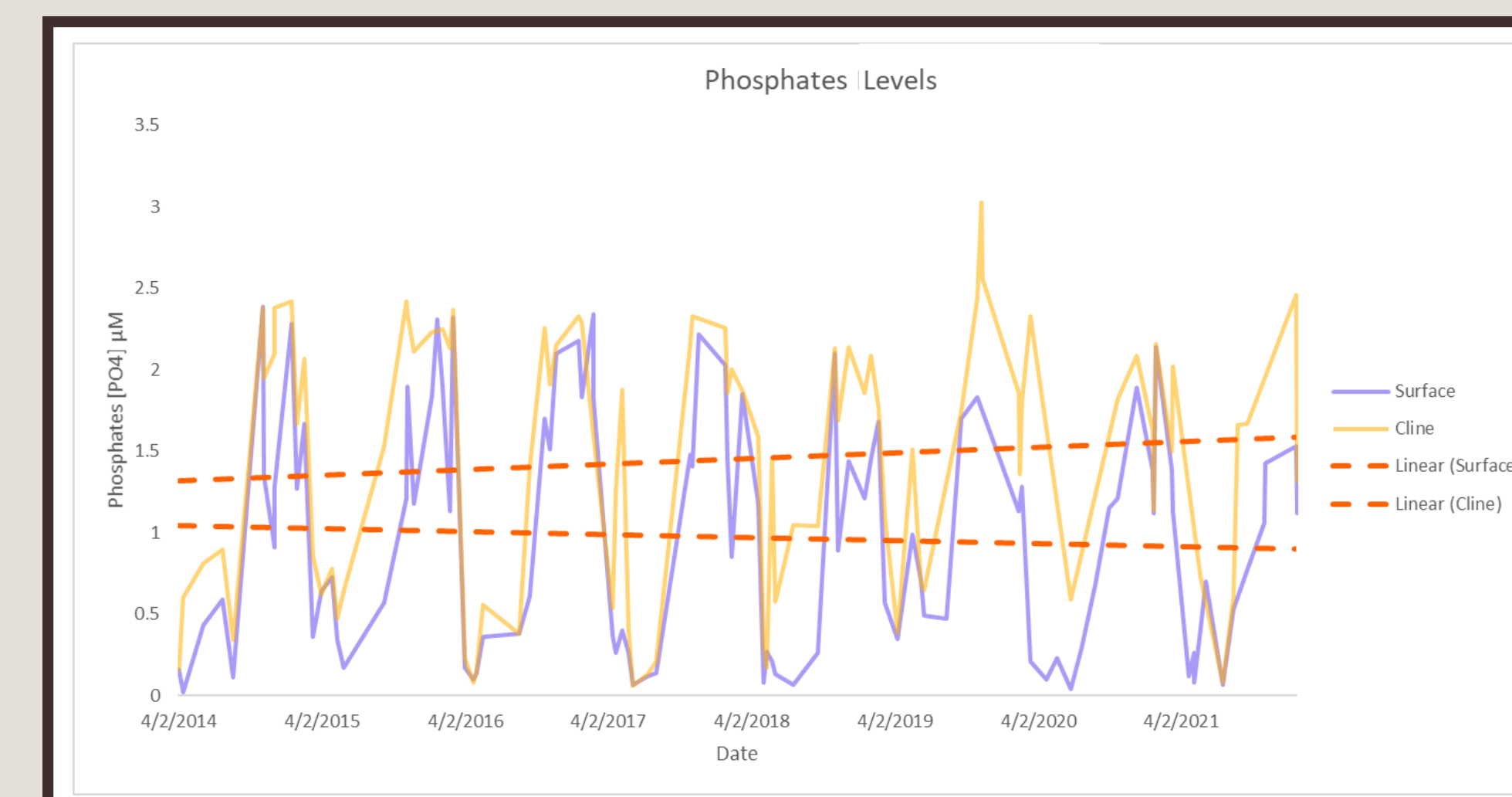


Figure 3) Phosphate levels taken from Puget Sound are not linkable with the increasing Noctiluca presence seen from the sample counts. The difference in trends between the surface and cline is possibly inaccurate.

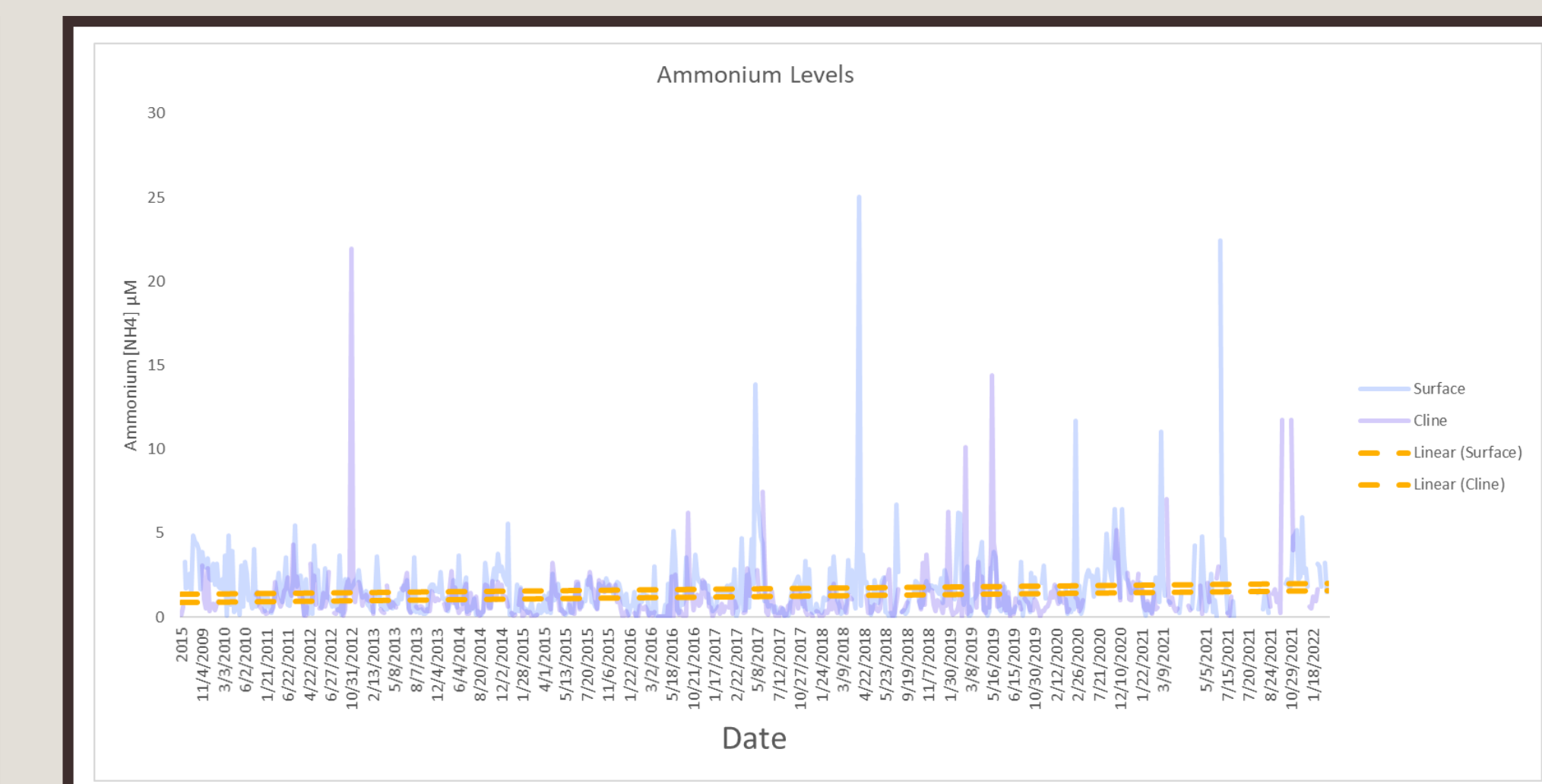


Figure 4) Measurements of ammonium levels in saltwater. The trends are very similar to the trends seen in Noctiluca's presence. Noctiluca produces ammonium, increasing noctiluca would also raise the ammonium levels in water samples, which is proven true.

Methods

- I took water temperatures in Puget Sound over the last seven years from a long-term deployed CTD (Conductivity, Temperature, Depth.) in the Everett Marina. There is a set amount of time the CTD waits between samplings.
- This graph measures the recorded count of Noctiluca in samples taken by the staff and students of ORCA from 2015 to 2022. The two sample types are based on the tow used, either horizontal(H) or vertical(V). The two tows use two different nets, with either 20 microns or 335-micron holes in the mesh.
- The levels of Phosphates and ammonium recorded by ORCA students and staff from the Mount Baker Terminal site (MBT) were compiled.

Resources

Russell, Samantha. "Puget Sound Nutrient Watch: Algal Blooms." Washington State Department of Ecology, Washington State Department of Ecology, 17 June 2018, <https://ecology.wa.gov/Blog/Posts/June-2018/Puget-Sound-Nutrient-Watch-Algal-Blooms>.

Pool, Suzan S, et al. "Physical, Chemical, and Biological Conditions during Noctiluca Blooms in an Urban Fjord, Puget Sound." <https://apps.ecology.wa.gov/Publications/Documents/1503040.Pdf>, Department of Ecology, 2015, <https://apps.ecology.wa.gov/publications/documents/1503040.pdf>.

Zhang, Shuwen et al. "Effects of prey of different nutrient quality on elemental nutrient budgets in Noctiluca scintillans." Scientific reports vol. 7, 17622. 8 Aug. 2017, doi:10.1038/s41598-017-05991-w

- Noctiluca while normally present in warmer waters has shown an increase in abundance within cooler temperature water.
- Noctiluca's recorded to bloom more frequently in waters with high levels of phosphates. However, the data collected is inconclusive due to the double-sided result of both a notable increase and decrease in overall levels.
- The levels of ammonium are increasing as expected given Noctiluca produces ammonium when blooming, and thus the increasing number of Noctiluca seen matches up to the increasing levels of ammonium.
- There is a lack of a conclusion to come to from this study. The topic of how Noctiluca Sillicants have and are becoming more common in the Puget Sound area requires more in-depth investigation and larger data sets to compare and contrast. For future studies on this topic, it is key to find a reliable source of Noctiluca abundance, which is also the hardest dataset to compile reliably, as no matter how the count is performed each sample and recordings are subject to machine or human error. Data needs to be more frequent and closely reviewed on this topic.