

2021 South Sound Science Symposium Project Summary

Title: Mapping *Alexandrium catenella* Cysts in the Surface Sediments of Puget Sound: A Comparison of Microscopy and Molecular Methods for Enumeration

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Project website: <https://coastalscience.noaa.gov/project/application-of-quantitative-molecular-methods-to-characterize-abundance-and-distribution-of-alexandrium-cysts-for-noaas-hab-forecasting/>

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Project Summary: *Alexandrium catenella* (*Alex*) is a toxic phytoplankton species known to produce saxitoxin, potentially harmful to mammals that consume shellfish that have bioaccumulated the toxin through filter feeding. *Alex* exists in two phases, as a vegetative cell swimming in the water column and as a dormant cyst resting in the seafloor sediment. *Alexandrium*, in its vegetative state, can be found in the water throughout the year but is most abundant in the spring and late summer. The organism overwinters in the sediment as a cyst, which is the optimal time to sample to determine potential cyst beds that could produce algal blooms during warmer times of the year. The ability to predict the potential for *Alex* to bloom is useful to commercial and recreational shellfish harvesting. Researchers at the University of Washington Tacoma have been mapping the presence of *Alexandrium* cysts and reporting to stakeholders since the early 2000's.

A recent partnership with NOAA's Beaufort Lab, University of Alaska Fairbanks, and the University of Washington Tacoma involves the development of techniques to reduce the time and effort needed to monitor this toxic alga. Presently, sediment samples are collected in the field, prepared for analysis, and manually counted for cysts via an epifluorescence microscope. New methods would use molecular analytical procedures such as quantitative polymerase chain reaction (qPCR) and fluorescent in situ hybridization (FISH) to lessen the labor for cyst identification and counting. Field work includes collecting samples yearly from the Gulf of Maine, Gulf of Alaska, and Puget Sound. Samples will be analyzed manually and through chemical analysis. During 2020, a comprehensive sampling of Puget Sound was conducted (figure). Manual preparation, identification, and enumeration was completed in South Puget Sound (zoom in figure). During this field excursion, no *Alexandrium catenella* cysts were found at any locations from the Tacoma Narrows throughout the South Puget Sound. Quartermaster Harbor, just northeast of Tacoma did find the presence of cysts in the sediments sampled. This project is ongoing and will continue through 2023 (extended by one year due to the pandemic) and will be updated as to the progress at future symposia.

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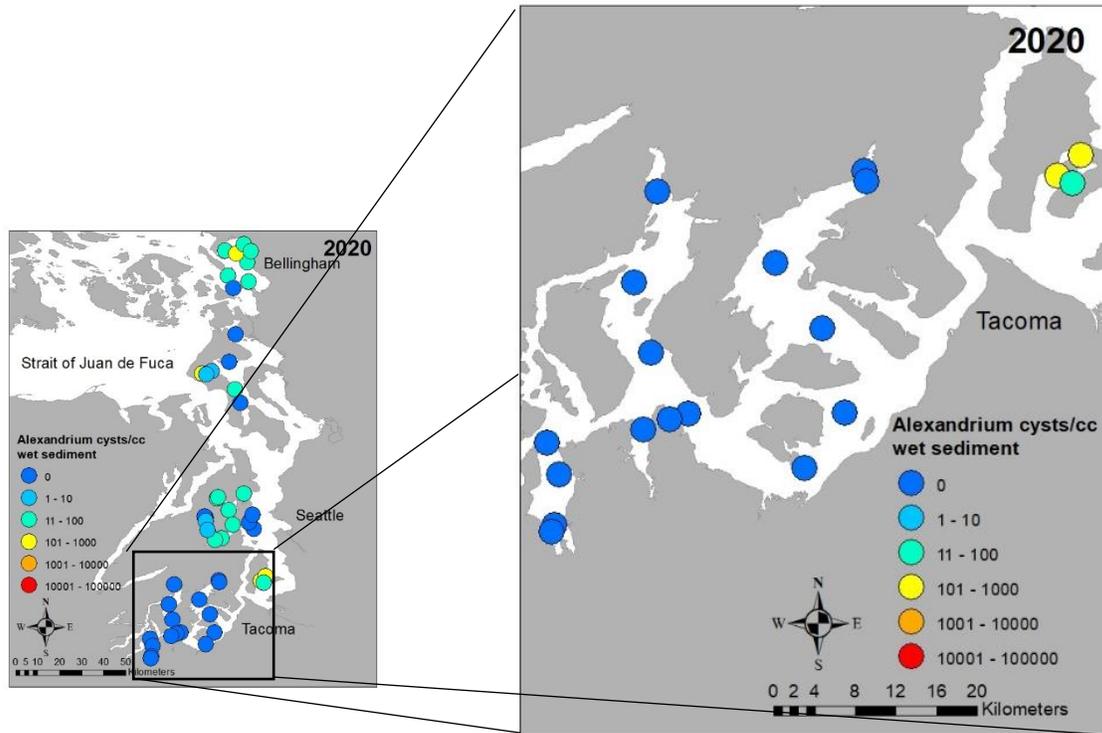


Figure. Maps representing the station locations and concentrations of *Alexandrium* cysts collected in 2020. Note, no *Alexandrium* cysts were found in the South Puget Sound locations.