2022 Analysis of Bed Sediments in Commencement Bay, Puget Sound, Washington with a Focus on Mapping the Toxic Dinoflagellate *Alexandrium catenella*

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Introduction

Algae *Alexandrium catenella* blooms produce a toxin that accumulates in shellfish, potentially causing paralytic shellfish poisoning (Greengrove et al. 2012). It is crucial to monitor the concentration and distribution of the dormant cysts to assure public health. The purpose of this project was to continue the monitoring work done by the Puget Sound Ecosystem Monitoring Program (PSEMP) to establish long-term trends.

Methods

- Bed sediment samples were collected from various stations in Commencement Bay by the Marine Sediment Monitoring Group from Washington State Department of Ecology, members of PSEMP.
- Collected samples were processed following the modified Yamaguchi et al. 1995 method.

Diluting
5ml of sediment to 1:5 with filtered sea water (FSW)

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Splitting and sonicating
Removed excess sediments

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Sieving
90 µm – 20 µm sieves

←

Preserving and etching
Preserved using formalin and etched with methanol

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Staining
Stained with primulin

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Microscopy
Epifluorescence compound microscope

Results

- None of the sample stations had any presence of *A. catenella* cysts

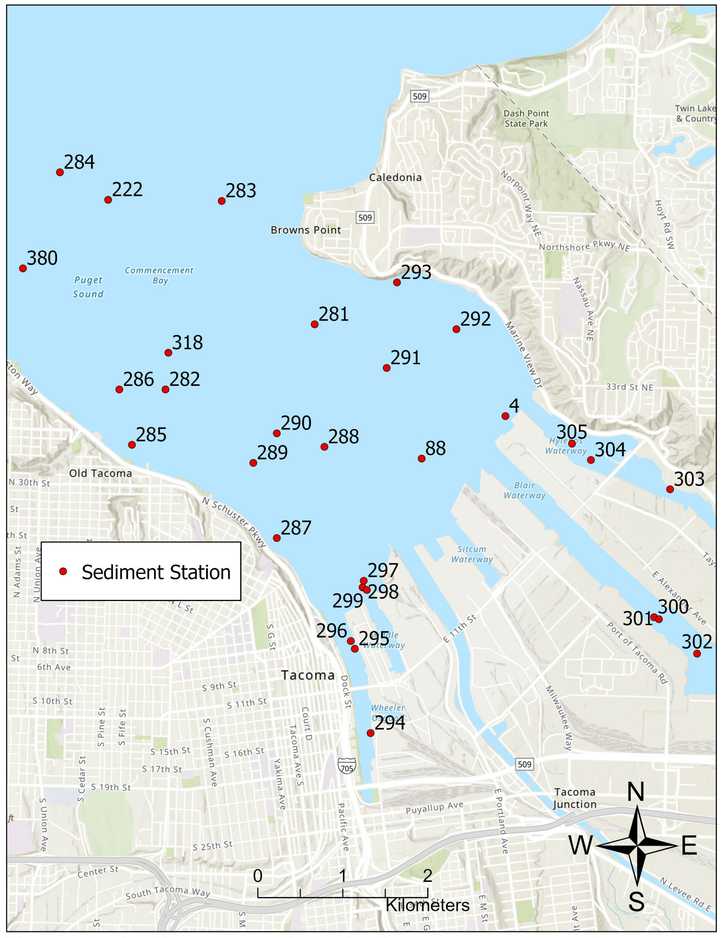
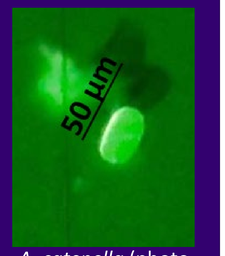


Figure 1: Sediment stations in Commencement Bay.

Left: Sieving sediment samples.
Right: Analyzing processed samples under an epifluorescence microscope.

QUICK FACTS

- *Alexandrium catenella* is a dinoflagellate with two life phases: a dormant stage in bed sediment and a vegetative swimming stage.
- *A. catenella* can produce paralytic shellfish toxins (PSTs), which have the potential to harm humans when consumed.
- Resting cysts are mapped to assess the likelihood of harmful algae bloom occurrence in the next season.
- The accumulation of *A. catenella* in Quartermaster Harbor is due to limited water circulation in the area (Greengrove et al. 2018)



A. catenella (photo by Caitlyn McFarland)

Discussion

- In Commencement Bay, no cysts of *A. catenella* were detected, in contrast to high concentrations in Quartermaster Harbor (Marino et al. 2022).
- Bryant and Genriech (2023) observed a low concentration of *A. catenella* cysts.
- The findings are consistent with previous research studies (Masura et al. 2021; Greengrove et al. 2012).
- Possible errors that could affect cyst counts: June sampling, which can activate *A. catenella* cysts due to high temperatures and increased nutrient availability.

Conclusion

- These findings highlight the differences in environmental factors between Commencement Bay and Quartermaster Harbor.
- The absence of *A. catenella* cysts in the bed sediments of Commencement Bay is positive news.
- Ongoing monitoring of *A. catenella* concentration remains crucial for officials to effectively inform the public about potential environmental threats.

References