

2023 Analysis of Harmful Algae in Bed Sediments of Elliott Bay near Seattle, WA



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Introduction

Alexandrium catenella can be a potential danger to public health, which could cause paralytic shellfish poisoning, PSP, (Greengrove et al. 2012). The purpose of this project is to continue to monitor the *Alexandrium catenella* cyst concentrations and report any findings to the King County sediment monitoring program. Elliot Bay is sampled every 2 years, which allows for officials to build data and make the best assessment to maintain public health.

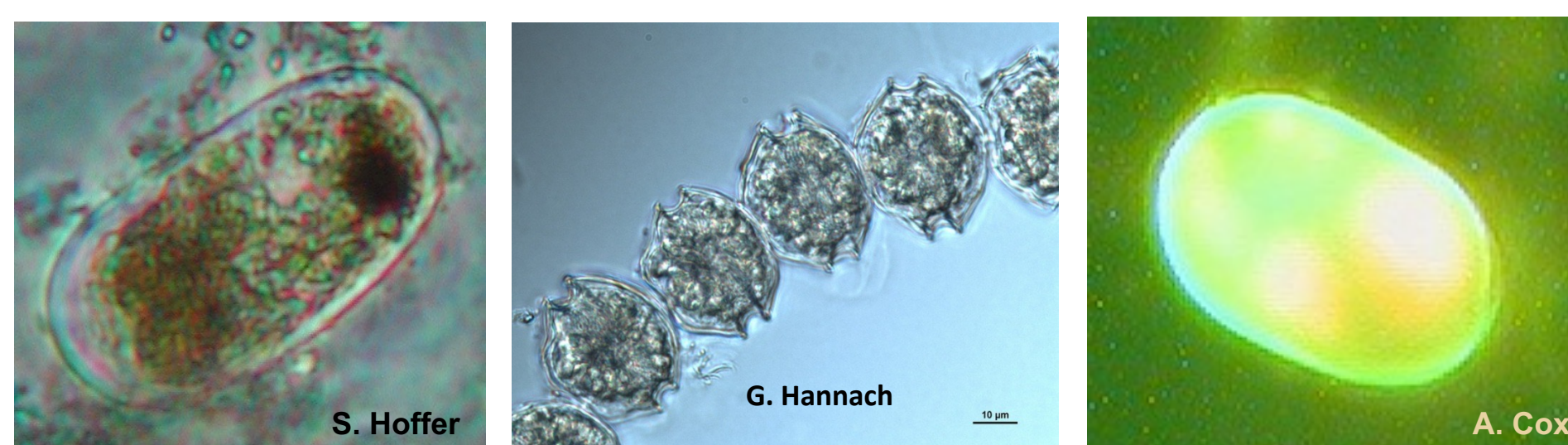
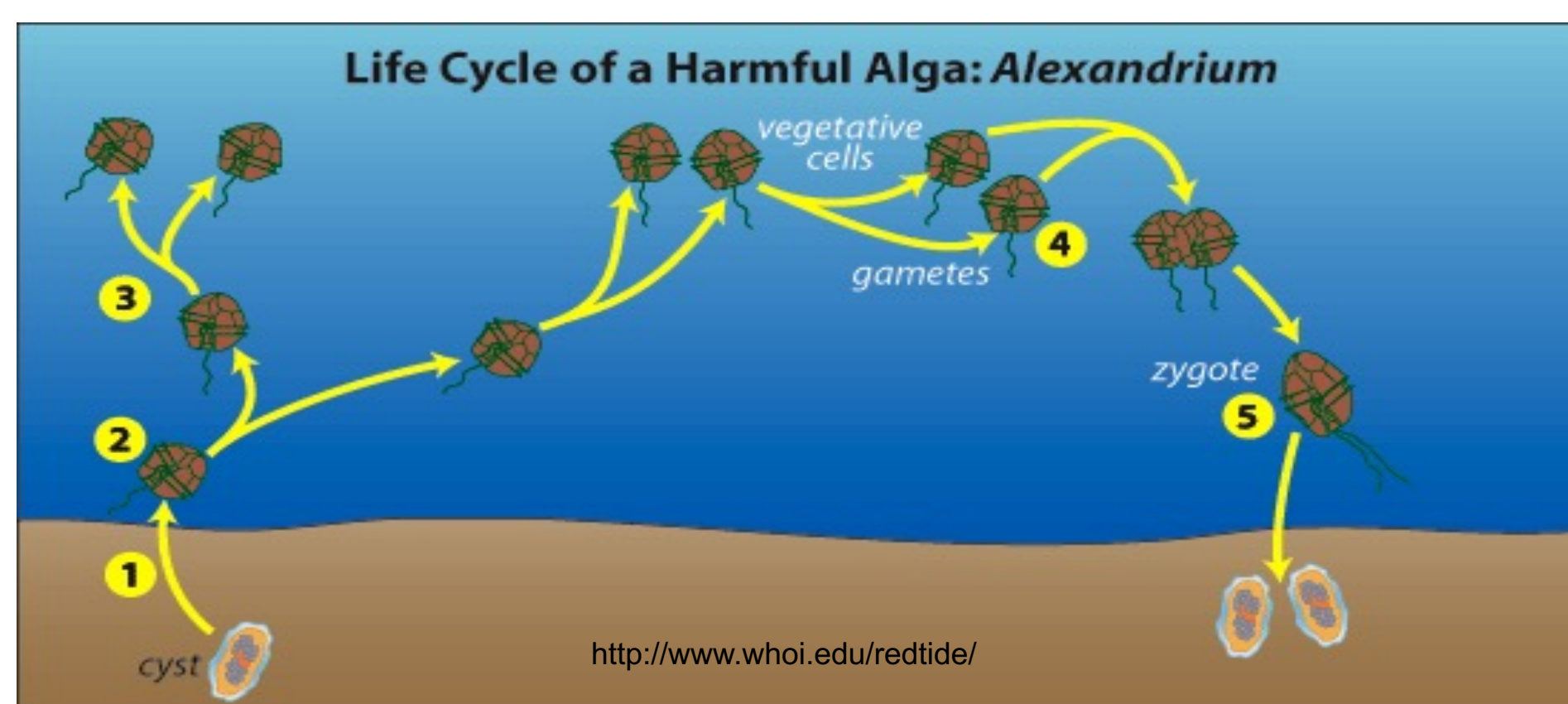


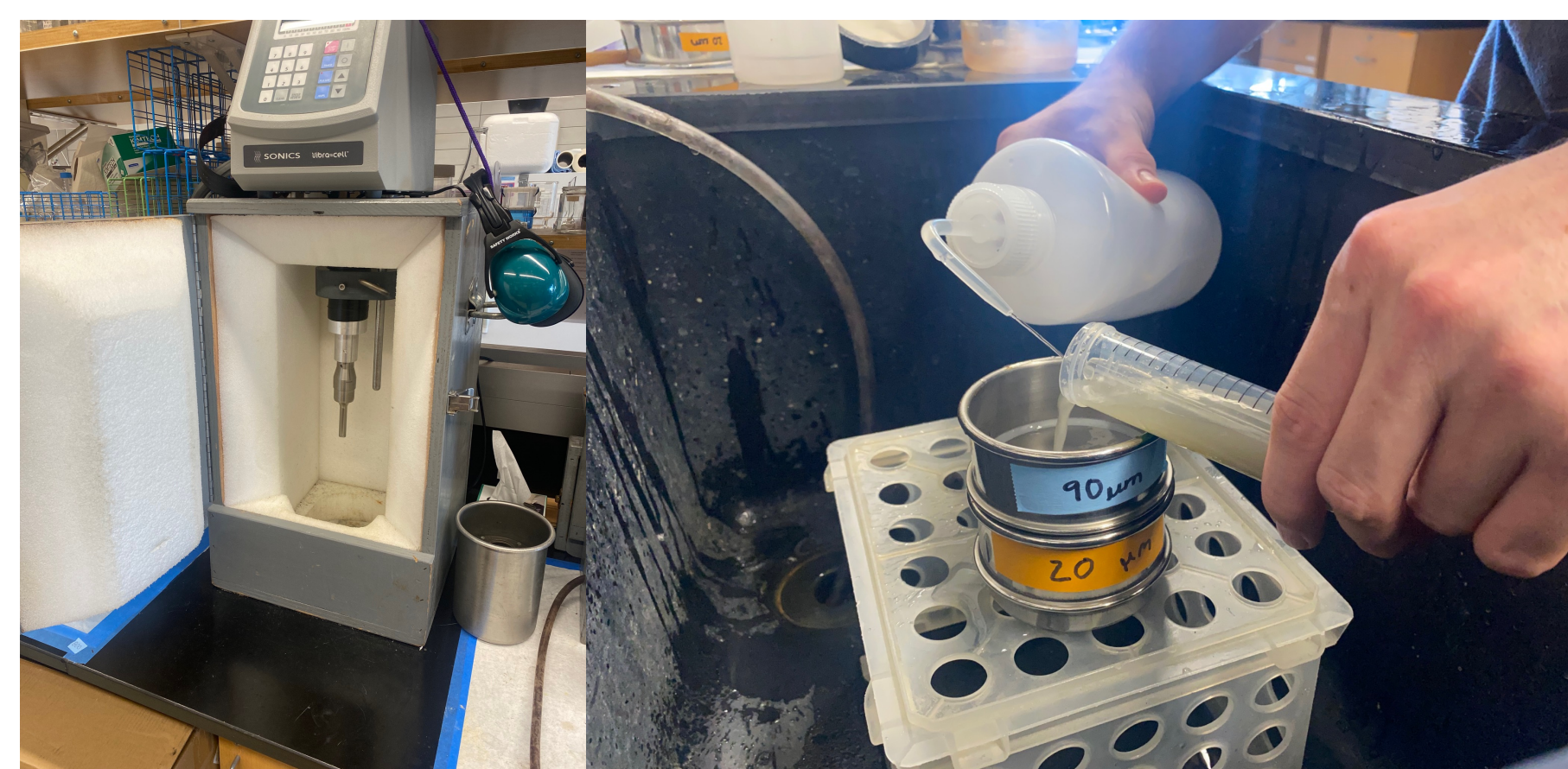
Figure 1. Lifecycle of *Alexandrium catenella*, with microscope images.

ALEXANDRIUM CATENELLA QUICK FACTS

- > *Alexandrium catenella* is a dinoflagellate that can either be in a dormant cyst stage or a vegetative swimming stage.
- > *Alexandrium* produce the paralytic shellfish toxin, saxitoxin, which accumulates in shellfish like clams, mussels, and scallops.
- > Organisms can multiply to form harmful algal blooms (HABs).
- > Symptoms of PSP include tingling, numbness, burning, ataxia, drowsiness, fever and or death.
- > Cysts are mapped in order to help predict potential future blooms.

Methods

- > Collected by King County's Marine Monitoring Program using a van Veen sediment scooper, transferred cold and in the dark to UWT for processing.
- > Processed using the modified Yamaguchi et al. method (1995).
- > Diluted 5 mL of sediment to 1:5 with filtered sea water.
- > Sonicated to remove mucous layer surrounding cysts, easier to etch and stain.
- > Sieved through 90 μm and 20 μm sieves with filtered sea water.
- > Preserved using formalin.
- > Etched using methanol, ensures stain will stick.
- > Stained with Primulin and rinsed with filtered sea water.
- > Viewed and counted under epifluorescence microscope.



Left: Sonicator setup used for sediment samples. Right: Sieving of sediment samples.

Results

- > No *Alexandrium* cysts were found at any of the stations within Elliot Bay.
- > Maps of results were made to show distribution of cysts at each of the 8 stations collected, see right.

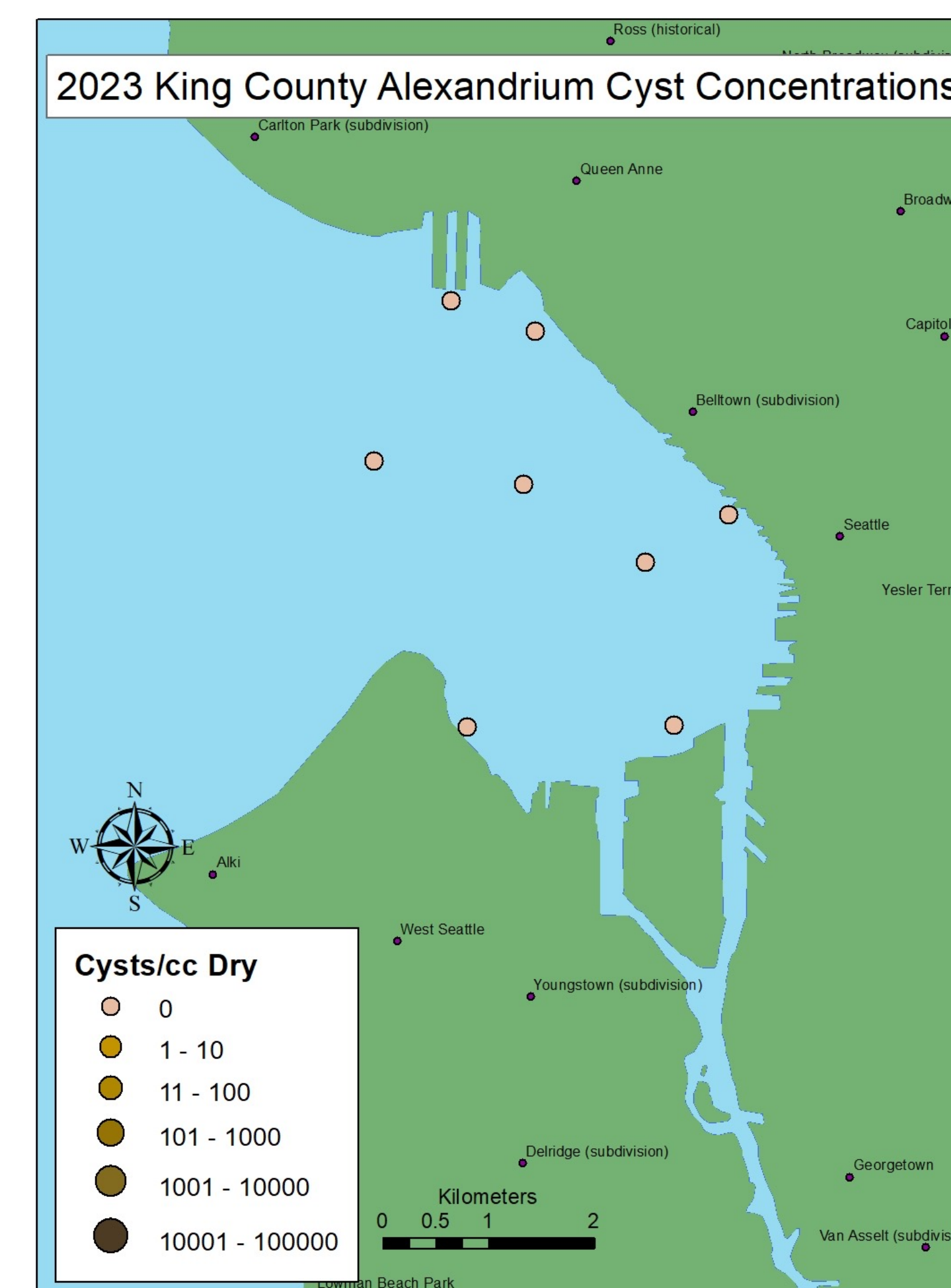


Figure 2: Cyst distribution in dry sediment, Describes cysts in solids, with no water fraction.

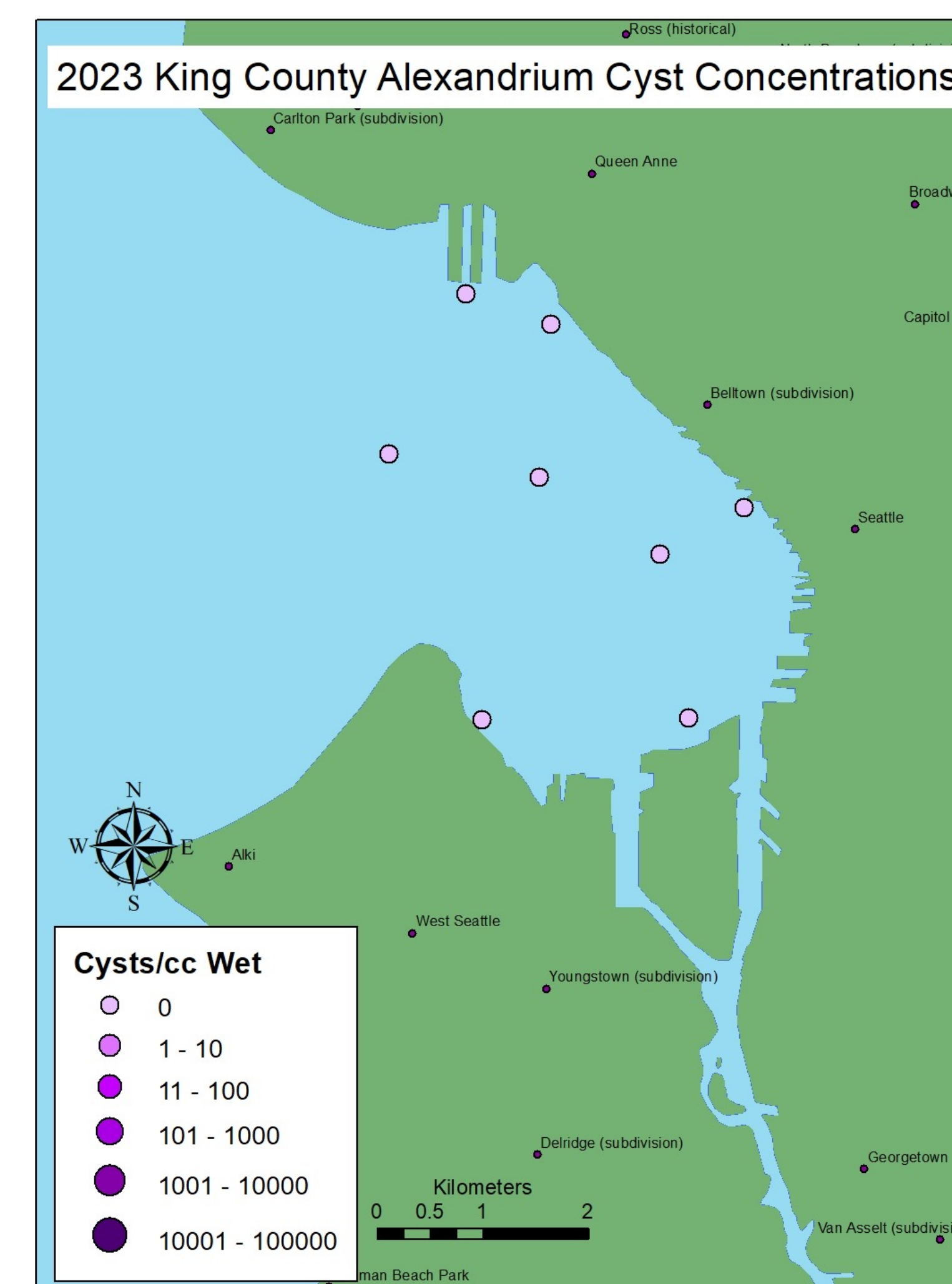


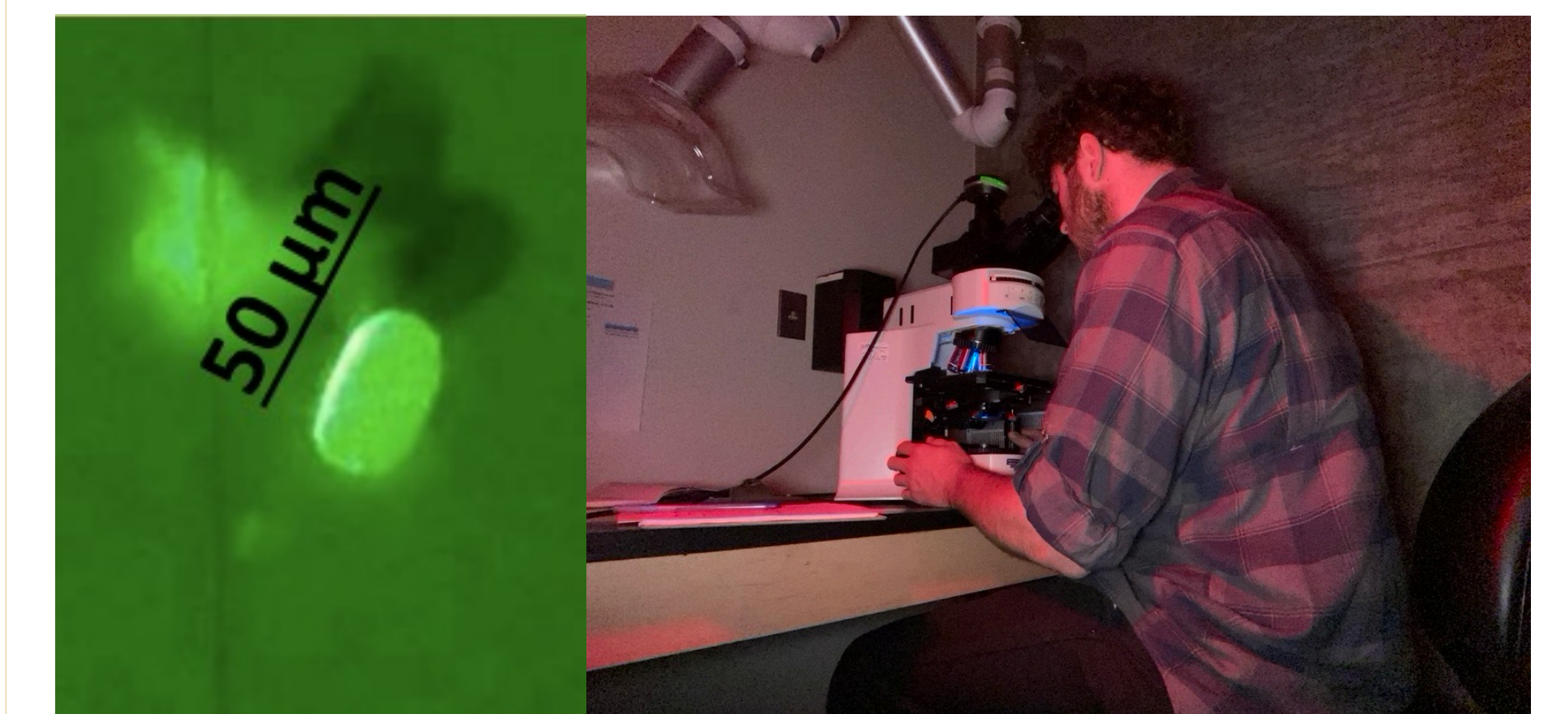
Figure 3: Cyst distribution in wet sediment. Describes the spatial distribution of cysts.

Discussion

- > Figures 2 and 3 compare the concentrations of *Alexandrium* cysts in dry and wet sediments. As seen in both Figures, wet and dry concentrations were calculated out as 0.
- > 2019 data of the same stations shows more activity of *Alexandrium*, with a high average count of 7 cysts and low end of 1 cyst per slide (McFarland et al. 2019).
- > Factors that may have altered *Alexandrium* cyst count include the collection of samples during the Spring/Summer season, warmer weather and more resources may cause cysts to enter vegetative state.

Conclusion

- > The lack of *Alexandrium* cysts indicated that no immediate action needs to be taken within Elliot Bay.
- > Monitoring should be continued within Elliot Bay, to keep an understanding of the cyst population and ensure public health.



Left: *Alexandrium catenella* (photo by C. McFarland). Right: Use of epifluorescence microscope.

References

Sources available with QR code.

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