

Monitoring Toxic Algae in Puget Sound, A Potential Human Health Hazard

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Introduction

Among the organisms that are present in the Pacific Northwest (PNW), there is a type of algae that is capable of producing neurotoxins and possibly paralytic shellfish poisoning. Understanding cysts concentrations in the PNW will allow for shellfish harvesting regulations to be further updated to protect local human population from consuming infected shellfish with *A. catenella*.

Methods

- Sediments were collected from Bellingham Bay, Skagit Bay, Whidbey Basin, Central Basin, Hood Canal, Strait of Juan de Fuca, and South Puget Sound, which resulted in a total of 50 stations.
- Samples were prepared by:
 - Sonicating to remove outer-membrane
 - Rinsing and sieving to select for specific sizes
 - Preserving with Formalin samples
 - Etching with methanol for staining
 - Staining with primulin for observation
 - Identifying under epifluorescent microscope (figure 1)

Results

- Results indicated a range from 0-43 cysts/cc, with an overall average of 5 cysts/cc (figure 2).
- 50 stations were analyzed, each station contains a colored scheme based on cyst concentrations.
- Samples were collected during spring of 2022, during this time, cyst are usually not in their dormant state due to stresses.

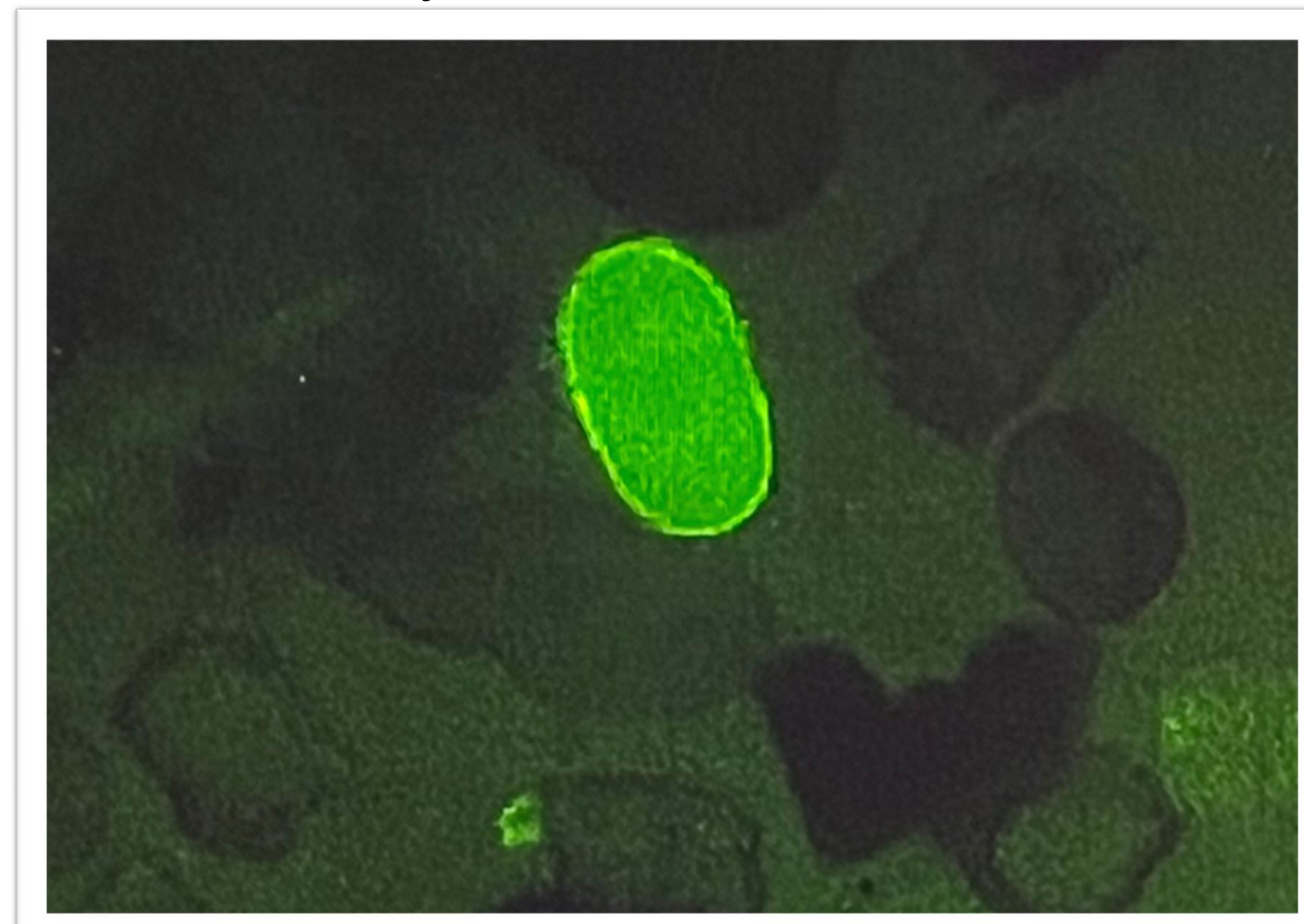


Figure 1: Epifluorescent image of an *Alexandrium* cyst captured under 63X magnification.

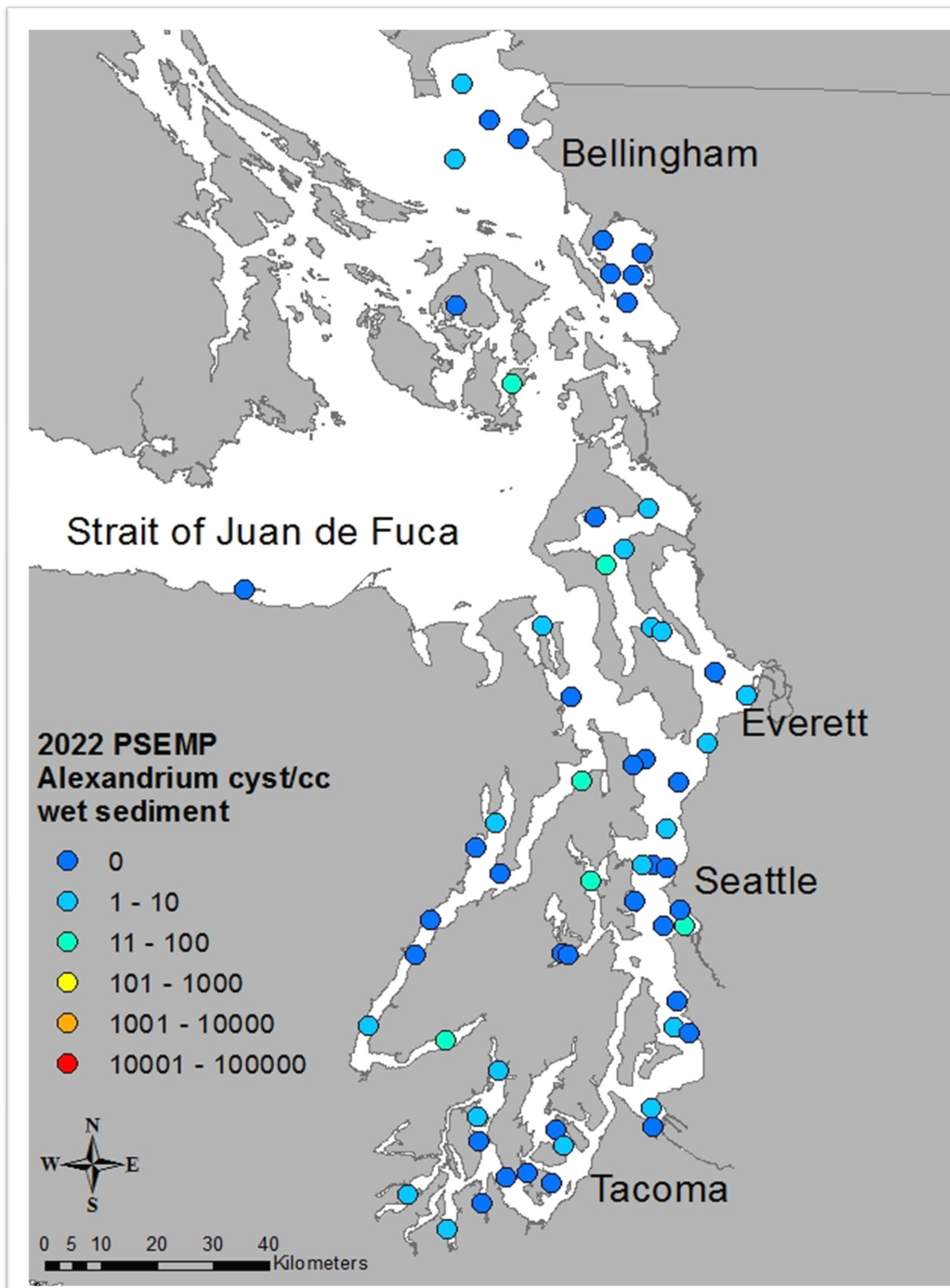


Figure 2: Wet sediment analysis for *A. catenella* cyst. Sediments were collected from Bellingham Bay to South Puget Sound, results are expressed by colored markers.

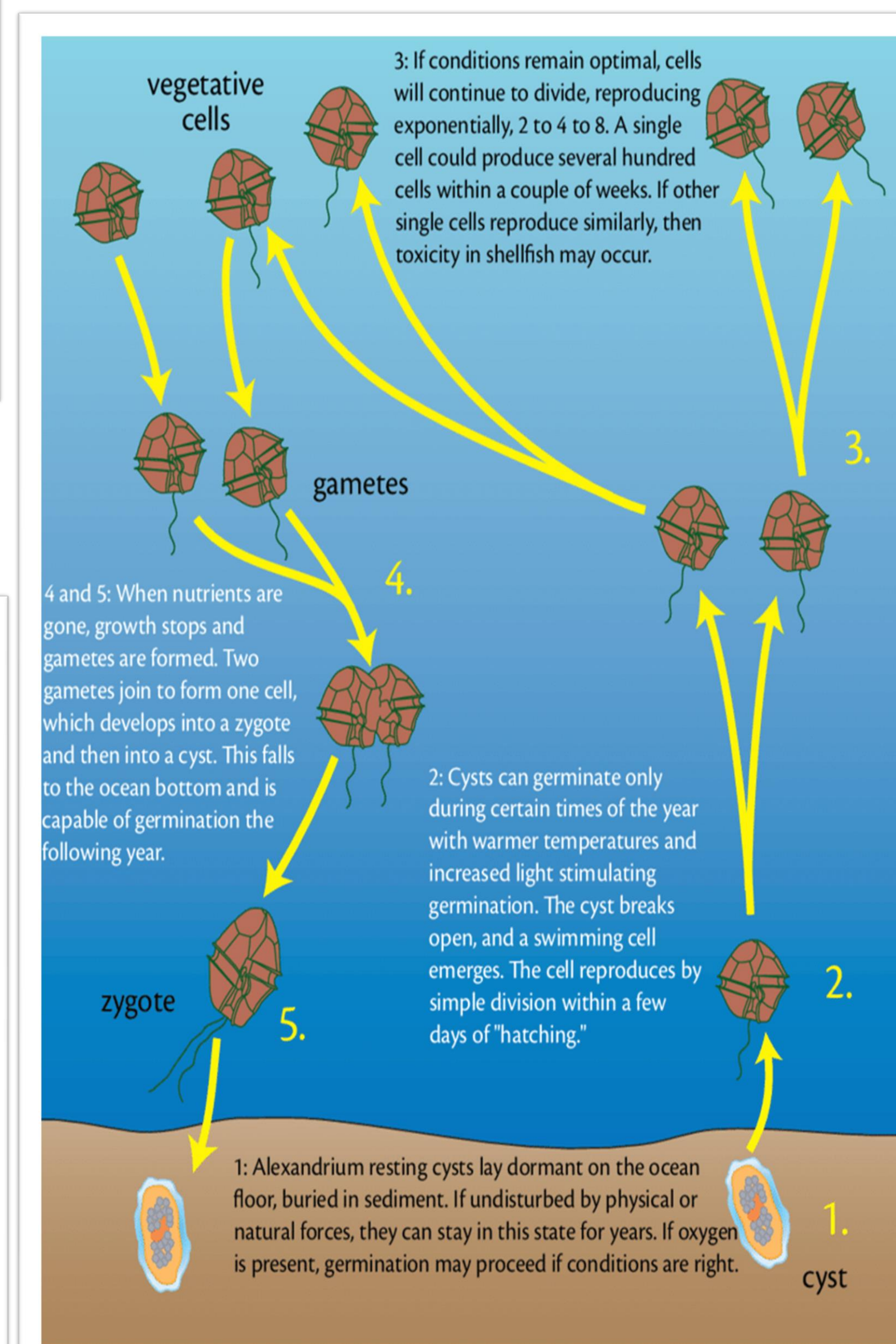


Figure 3: Life cycle of *A. catenella*. Figure provides active reproduction during suitable environmental cues, but also shows dormancy when environment is not suitable for reproduction.

Background Information

- Dinoflagellate: Unicellular algae that contains two flagella for motility.
- *Alexandrium catenella* contains two life-cycles: Dormant (on sediment bed) and vegetative (free-moving) state (figure 3).
- Paralytic Shellfish Poisoning (PSP): Infected shellfish carrying toxins capable of harming human health.
- Symptoms associated with PSP: numbness, tingling in face and limbs, ataxia, headaches, paralysis, respiratory failure, and possibly death.

Discussion

- Figure 2 shows cyst concentrations from Bellingham Bay down to South Puget Sound.
- Higher cyst concentrations may trigger bloom conditions in and around those locations.

Conclusion

- Given these results, *A. catenella* should continue to be monitored.
- Monitoring will allow further regulations to be established to protect the human population from inheriting symptoms associated with *A. catenella*.

Sources

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