

Journal of Student Research on Puget Sound



Lincoln High School – Fall, 2010

Surfactants and turbidity:
What is their relationship to
plankton abundance?



Developing curiosity and confidence through student-led
scientific research on the waters of the Salish Sea

SURFACTANTS AND TURBIDITY
VS
PLANKTON

Lincoln Center Expedition
on the *Carlyn*

October 4-6, 2010

Abstract

It was hypothesized that if there are more surfactants and higher turbidity, there would be less phyto and zoo plankton because more surfactants and higher turbidity would block photosynthesis. Plankton samples were collected by using phyto and zoo plankton nets just at the surface of the water. Plankton were examined with microscopes. To gather information about turbidity of the water, a secci disk was used. The data did not entirely support the hypothesis. It was found that the more surfactants in the water, the more plankton there was. Also the more plankton there was, the higher the turbidity was. With this information, it could be recognized if there are too many surfactants in the water. In the future, maintaining a healthier Puget Sound than it is today could be done. This experiment would continue to test for these surfactants and figure out where they're coming from.

Introduction

- Our group of Lincoln Center sophomores and one freshman boarded the Carlyn on Oct. 4, 5, and 6th to find out how Turbidity and the amount of Surfactants affect the concentration of Phyto and Zoo Plankton in the Puget Sound. We predicted that “If there are more surfactants and higher turbidity then there will be less Phyto and Zoo plankton in the Puget Sound because the process of Photosynthesis will be blocked.” We chose this experiment because we can relate to detergents in surfactants, and it seemed significant to the Puget Sounds food web when it affects the producers in the web. In the end we had several results that were refuted, some undecided, and one supported.

Experimental Design

- Hypothesis: If there is more surfactants and higher turbidity then there will be less phyto and zooplankton because photosynthesis will be blocked.
- Materials: phytoplankton net, zooplankton net, secchi disk, bucket on a rope, calorimeter.
- Procedure:
 - 1) Collect water sample using the buck on a rope by dipping it in the surface and filling up the bucket.
 - 2) Put phyto and zooplankton nets in the water for 5 minutes.
 - 3) Lower secchi disk in water until it is no longer visible. Record data.
 - 4) Sift phyto and zooplankton into separate graduated cylinder. Record amount of phyto and zooplankton.
 - 5) Use the sample water from the bucket on a rope to test for surfactants using the calorimeter.

Discussion

Photosynthesis vs. Surfactants

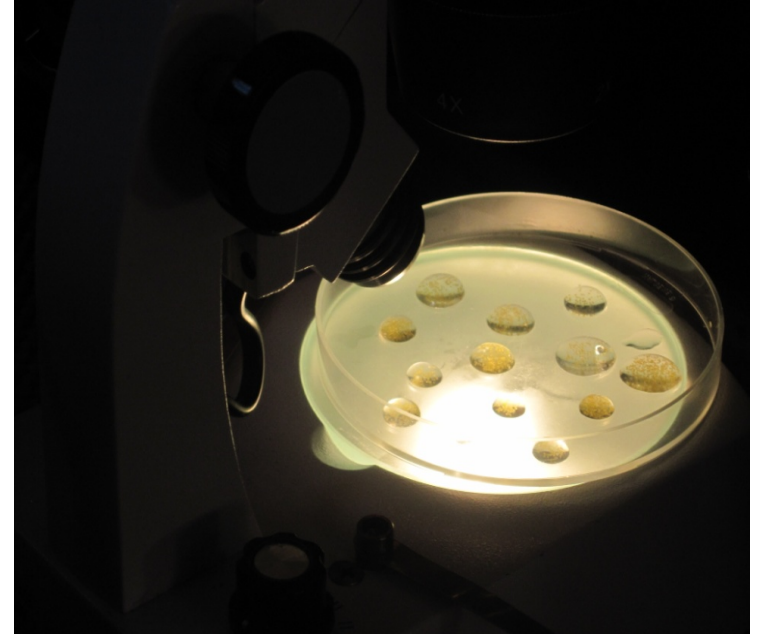
- Refuted
- Surfactants have phosphorus which helps phytoplankton grow more rapidly

Zooplankton vs. Surfactants

- Refuted
- Surfactants can harm fish eggs by weakening the outer layer of the eggs.

Zooplankton vs. Turbidity

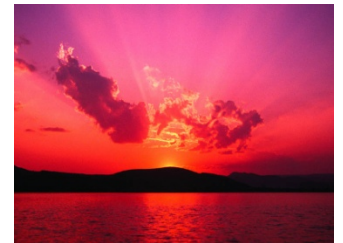
- Supported
- Over population of zooplankton can block photosynthesis and can cause an imbalance in the ecosystem.



Cruise Summary



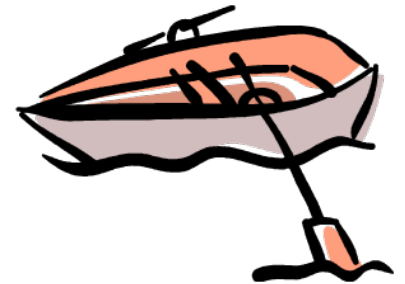
- Camping was really fun!
- The tents weren't really hard to put up and were really big.
- We played tons of games while on land.
- The food was really good and well prepared
- Our surroundings were very nice and we were close to the water and got to see a beautiful sunset!



Boat



- Being on the boat a very new experience for all of us and it was awesome.
- We had the chance to go out on the smaller boat and go rowing on the water.
- Dinner was great and the food delicious.
- Also, the bunks were very comfortable

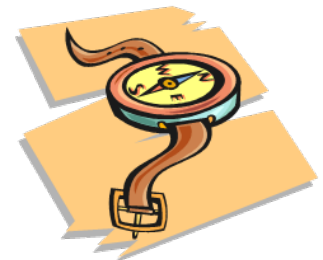




During the Day

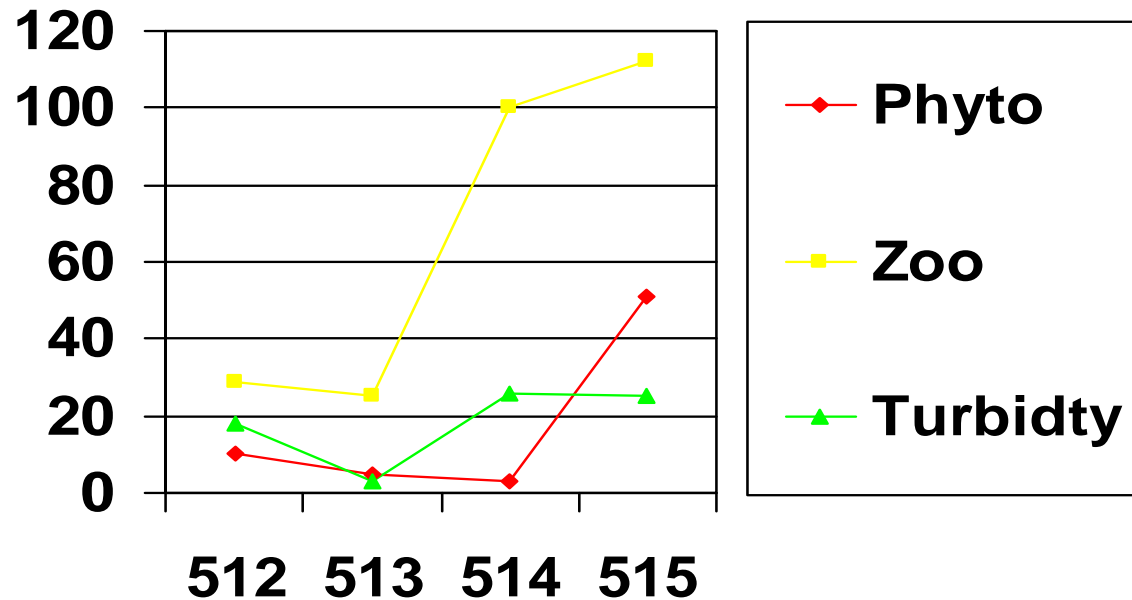


- We had two watches, or groups - wind and water
- We were split up into our watches and did either science or sailing
- In science we started our experiment
- In sailing we learned how to sail and navigate
- After lunch the two watches would switch groups



Results

- As turbidity goes up, so do plankton
- Units are in milliliters
- Turbidity units are in meters
- Results vary on location



Conclusion

- Taking the opportunity of boarding the Carlyn was a very unique experience. We learned to a large extent and had fun while doing it. We learned that as turbidity goes up the amount of plankton increases. We also had a chance to explore and control the boat and to also cooperate with our fellow peers.