



Journal of Student Research on Puget Sound

The collected reports of the student scientific explorations aboard the *SV Carlyn*

Salish Sea Expeditions is a catalyst for students in their inquiry of Puget Sound through boat based-scientific exploration.

If there is more nitrates in the water then there will be less plankton because plankton do not like pollution.

**WILD 10th-12th Grade
Seattle, Washington**



Fall 2006

Salish Sea Expeditions
647 Horizon View Pl. N.W.
Bainbridge Island, WA 98110

phone: 206.780.7848
www.salish.org

School: WILD (Wilderness Inner-city Leadership Development)
Dates: October 11th, 2006
Grade: 10-12th grade
Teacher: Amalia, Joyce Pisanont

I. Title

A WILD Salish Seas Adventure

II. Abstract

The WILD (Wilderness Inner-City Leadership Development) group went on a trip with Salish Seas on October 11, 2006. The group spent time with Salish staff and learned how to tie rope/line in different styles, set the sails, drive the ship and use different equipment to examine various specimens in the water.

Our hypothesis was that if there were more nitrates in the water then there would be less plankton because plankton do not like pollution (too much nitrate). We picked this topic because it was something new to explore and to discover, and we wanted to know how plankton react to nitrates. We used different equipment such as the Niskin Bottle, Nitrate Test Kit and Surface Plankton Net to test and collect data for the hypothesis.

When the experiment came to a conclusion, we found out that there were less plankton closer to Seattle and more plankton further from Seattle. But the only conclusion that we weren't able to come to was the amount of nitrates in the water. The data did not reject or accept our prediction. In the future we would check our equipment and take the samples from more places so we have less error in our data.

The WILD youth had fun and would love to do this again.

III. Introduction

Our topic was the effect of nitrates on plankton. At first, we were asked to pick a few pieces of equipment that we wanted to use for the experiment on the Salish Sea trip. Then, we were divided into two groups to think of an experiment we wanted to conduct that was related to the equipment we had chosen. One group came up with an idea about nitrates and the other group's idea was about plankton. Both of the groups were interested in using the Niskin bottle—we thought it was a laser or a rocket launcher. Then we decided to combine the two ideas into this hypothesis: "If there are more nitrates in the water, then there will be less plankton because plankton do not like pollution".

Plankton are important to Puget Sound because they are the starting point for the food chain. The plankton might also be the start for some sea animals; maybe humans were plankton billions of years ago.

IV. Experimental Design

Locations: Elliot Bay (Duwamish River mouth), Magnolia (near the shipping lanes)

Equipment Deployed/Used: Surface Phytoplankton Net
Zooplankton Net
Niskin Bottle
Microscope
Nitrate Kit

The first thing we did was start dropping the equipment into the water of Puget Sound. We needed to tie the line to the safe holding of the boat to make sure the equipment would not be lost in the water. To use the Surface Phytoplankton Net we needed to make sure we did not let air into the bottle. If the air got into the bottle we would have to redo it, because we didn't want the bottle to float on the water. We deployed the equipment for five minutes.

After five minutes we pulled the net out of the water. There were some plankton stuck on the net so we used a bottle that was full of fresh water and we sprayed the net. Then the plankton fell out from the net into the bottle. We took the bottle off the net and poured the water and the plankton into a graduated cylinder. We did the same thing with the zooplankton net to collect the big plankton from the water.

We also put some plankton on a slide and put it under a microscope to see it. Then we waited for the plankton in the graduated cylinder to settle. We measured the level of plankton in the cylinder after the plankton settled.

We used the Niskin bottle twice to collect the water from 5 meters deep. We used the water in the Niskin bottle to see how many nitrates there were, and we used the nitrate kit to combine the water with chemicals. It was supposed to turn a pink color if there were nitrates, but it turned orange. If the water had turned pink, we would have known the amount nitrates in the water by comparing our sample to the samples in the nitrate kit.

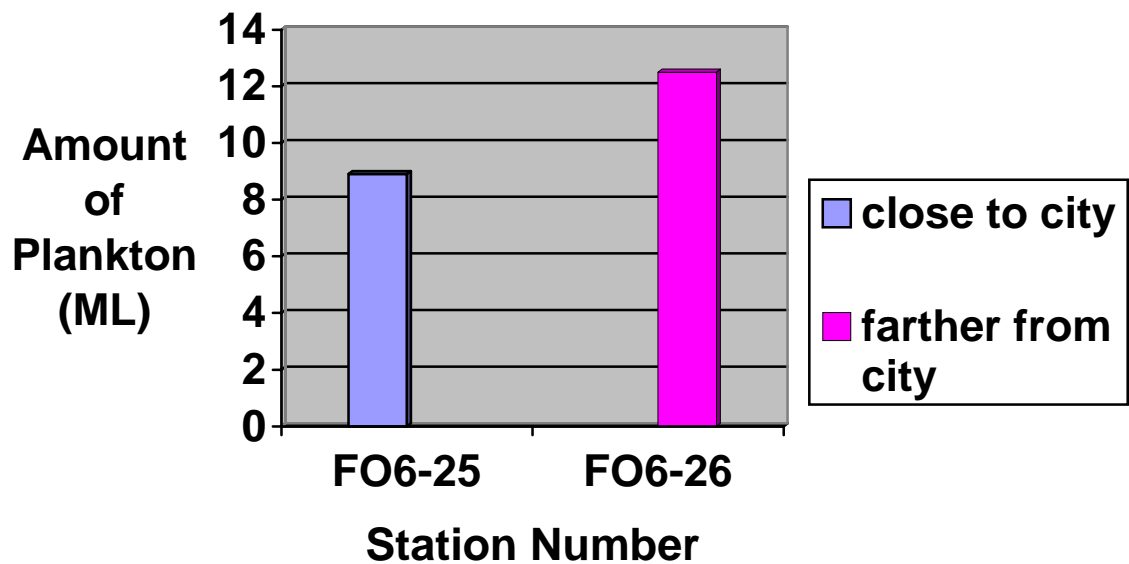
For our hypothesis to be correct, we would have had to find more plankton where there were less nitrates and less pollution, and less plankton where there were more nitrates or more pollution.

V. Results

Location	Close to city (Duwamish River Mouth)	Farther from city (shipping Lanes)
Nitrates (PPM)	0.3	N/A
Plankton (ML)	8.9	12.5

We found 8.9ml of plankton at a water depth of 5 meters close to Seattle (Duwamish River Mouth), and 12.5ml of plankton at the same depth farther from the city (shipping lanes). The results show that there is more plankton farther from the city, possibly because there's less pollution there. However, we were unable to read the nitrate level. We thought we found 0.3 ppm of nitrates close to the city, but we are not sure about that, because the color in the test kit was pink, and our example was orange.

Plankton Comparison



VI. Discussion

Our prediction is if there are more nitrates in the water, then there will be less plankton because plankton do not like pollution. We do not have any information of nitrates. We are unable to support or reject our prediction. Otherwise some factors that affected our research are the location and equipment. We went further out from the city and found more plankton. Even though we couldn't test for the nitrates, we still found out that maybe plankton prefer being away from the city. We found out from the aquarium that the nitrate levels were low in Puget Sound, so our test kit could not read or detect the low nitrate levels. Another reason is the test kit itself might be defective.

If we were to try this experiment again, we would check to see if the nitrate test kits are working and make the containers go deeper in the water and we will try several times to get the average for our work and the include repetition in the investigation..

To explain a possible reason why fewer plankton live near the city is because pollution from industries. People affect the water in the sea.

If we were to improve our research and run another Expedition in the future, we would collect different/more data. Because the results that we have at the first time will have changed.

VII. Cruise Summary

We met at WILD, at 8:00 A.M., making sure everybody had enough clothing to stay warm during the sailing. We took bus number 99 to the Waterfront to meet the members of Salish Sea. We divided into two groups (Wind Watchers, and Water Watchers), and played a game to get to know each other better. After the game, we went to the sail boat, met the other members of Salish Sea, and learned the rules of being on the sail boat.

The boat started to move, and we were all very excited. Jeff starts us with some snacks (apples, pears, ABC cookies). After that we got into our groups. The Wind Watchers got to work with Captain Kevin for the first half of the trip, and learned the skills of being a sailor, and learned how to sail the boat.

The Water Watchers got to work with Dana and Nick to learn the science, which included the taking of temperature, water depth, latitude and longitude, percent cloud cover, beaufort scale, low tide and high tide, and learning the use of equipment (surface Phytoplankton Net, Zooplankton Net, Niskin Bottle). We pulled the plankton out of the water and we put the samples in the container. We captured a jelly fish and then we brought them down to the bottom of the boat and we took a look in the microscope. We also saw a sea lion come to the surface and bark!

After that we started lunch. We had noodles and fresh sandwiches for lunch that were great and super tasty. When we were done with our lunch, the Water Watchers and the Wind Watchers switched spots on the boat. Water Watchers got to learn how to drive the boat, how to control the sheets and how to change the direction of the sails. The Wind Watchers got to do the experiment.

When it was almost the end of the day, it was the job of the Captain to take us home and to the sweet land. We miss floating on the water and we would like to do this one more time, even longer!