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WATER QUALITY IN NARRAGANSETT BAY

Abstract

   My GLOBE project was inspired by and based around Narragansett Bay. It is local for me, and I learned at summer camp about it. Narragansett Bay connects the Seekonk river and the Atlantic Ocean. The water in the middle is brackish, a mix of Seekonk river's freshwater and the salty ocean water. I wondered if the pH, or acidity, changes in the Bay, while I was thinking about doing my project on the salinity. My research question became: How does the salinity change, and does the pH change in Narragansett Bay? I wanted to know if the salinity had a sort of drop-off point where it got much higher, or if it rose at a steady rate. I found that the salinity increases, as expected, and that the pH lowers.

Introduction

   This research project addresses the global climate change at a local level. Acidification of rivers, bays, and oceans is a side effect of global warming, and harms plants and animals. This affects people who fish, eat fish, or swim in the water. I wondered if I could demonstrate this locally by studying the salinity and pH of the Seekonk River and Narragansett Bay.

Research question and Hypothesis

   My research question is whether, how quickly and at what points do the salinity and pH change as the water from Seekonk River flows into Narragansett Bay. I already knew that the salinity would go up as the water got closer to the ocean, but I wondered if it would do so steadily or abruptly. I wanted to know if the pH did the same thing, and got more or less acidic. I hypothesised that the salinity would increase, and that the pH would change, though I was not sure whether it would increase or decrease.

Methods and Data

   Following GLOBE protocols, I collected water samples from January through March 2019 at seven sites ranging from just before Seekonk Falls in Pawtucket, to Rocky Point in Warwick much farther down the Narragansett Bay. To test for salinity, I used a ppm meter (a device that measures the parts per million), except for at site #6, where I needed to use a portable refractometer due to the malfunction of the ppm meter. To test for pH, I used a pH meter to test for the pH. I

graphed the data.

Results: Table 1

Slater Mill Note: The water had ice in it.	1/20/19 5:00 PM	pH: 6.8	Salinity: 57.2 ppm
Swan Point	2/3/19 5:00 PM	pH: 7.2	Salinity: 433 ppm
India Point	2/15/19 5:00 PM	pH: 7.6	Salinity: 4443ppm
Washington Park	2/14/19 3:40 PM	pH: 5.3	Salinity: 9153 ppm
Gaspee Point	2/14/19 5:10 PM	pH: 5.3	Salinity: 9108 ppm
Conimicut Point	3/25/19 4:13 PM	pH: 5.3	Salinity: 20%*
Rocky Point	3/25/19 5:35 PM	pH: 5.2	Salinity: 8267 ppm**

*I used a different device due to equipment malfunction.

** The ppm meter was starting to break when this was tested.

Results: Figures 1 and 2
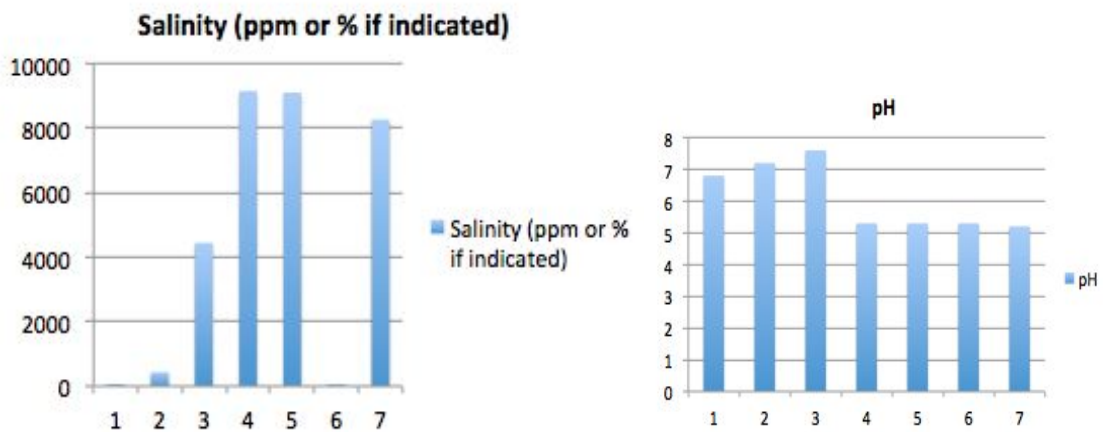
Sample #6 was tested using a portable refractometer, with the result 20%, which is barely visible on the graph. The ppm meter may have already malfunctioning when

I tested sample #7.

Conclusions

   My conclusions are that the pH and salinity get saltier and more acidic as the water gets closer to the ocean. I noticed that between sites #3 and #4, there is a big change. My data backs this up, with the exception of the salinity measurement at site #6 because of the equipment malfunction. This information affects many people in Rhode Island, since the Bay can be a source of food, recreation, and and just a point of interest. Organizations like Save the Bay and others are working to clean up and restore the bay, which was polluted and garbage-filled. Working with the Globe mentors helped me improve my next-to-nonexistent research project experience. They helped me adapt, refine, and execute my project question.

Implications for Future Research

   Ideas for future explorations that I have are: seeing if the pH and salinity change in different seasons and seeing if in comparison to other similar bodies of water, the salinity changes in a similar way. With my project in mind, if I do another project like this, I would take temperature, and plan specific days to collect water, so that the samples are closer in time.

References

https://ocean.si.edu/ocean-life/invertebrates/ocean-acidification

To convert salinity from a percentage to PPM:

www.rapidtables.com

<u>Badges</u>
I feel that I qualify for the following badges:

The Data Scientist badge, because I collected large amounts of data and analysed it.

The Make an Impact badge, because I chose to research an issue that affects my community.

The Be a STEM Professional badge, because my report clearly states and describes how I worked with STEM professionals.