Lab Memo

To: Margaret Lang
From: Rebecca Burke, Jacqueline Gomez, Rick Thomas, Shane Hayes
CC: Eileen Cashman
Date: 09.16.2016
Re: Water Quality Assessment Measurements

Introduction

The purpose of this lab was to identify the impact the environment and activities that take place in the different bodies of water within campus have on the water quality. In order to determine whether the impacts on these water bodies were negative or positive our team measured four water quality parameters for each, which include DO, temperature, pH, and turbidity, and compared them with the same parameters measured for the Birch Creek Fish Hatchery and the Cuyahoga River in Ohio.

Materials and Methods

- YSI model 55 dissolved oxygen (DO) meter
  Used to measure the amount of Oxygen gas dissolved in a water sample
- HI93703, for measure of turbidity in NTU's (Nephelometric Turbidity Units)
- pH Meter, used to measure pH and temperature in C°

For our measurements we attempted to use pools aside of direct flow of water. We used 3 samples and averaged them for our turbidity reading.

Results

Overall the data we collected was within the average healthy range for a typical stream or lake. The Redwood surroundings would account for the slight increased acidity to several of these water sources. Though acidic, these values still gave readings from 5-7 pH. Our turbidity readings were low for most of these sources with a range of 1-26 NTU's. The turbidity reading at the outlet of Fern Lake was lower than average, though we hypothesized that it would be higher.

Table 1 - HSU Campus Water Quality (9.16.2016)

Location	DO (mg/L)	Temperature (°C)	pH	Turbidity Reading
In College Creek	9.7 mg/L	13.7 °C	6.9	26 NTUs (with 10 NTU Sample)
Upstream of Fern Lake	10.7 mg/L	11.7 °C	6.16	5.20 NTUs (with 3 samples)
In Fern Lake near the outlet	6.4 mg/L	16.4 °C	5.4	3.48 NTUs (with 3 Samples)
In Jolly Giant Creek upstream of the dorms	10.31 mg/L	11.0 °C	5.75	1.65 NTUs (with 3 Samples)

Discussion

        Our group hypothesis for data from College Creek was that the Dissolved Oxygen would be high because of the increased oxygen that would create ideal conditions for the fish to thrive and the input of this creek is fed from the fish hatchery. From the data collected in November 2015, this stream was on the higher end reading 9.7mg/L, confirming our hypothesis.

        With the low flow rate of Jolly Giant Creek, we predicted a higher than usual pH level. We theorized that the acidic decomposition of organic matter from the Redwood Trees surround the location would increase the acidity in this stream. When collecting our data we found our hypothesis to be true and found the pH to be extremely low.

        The data we collected from our sample upstream of Fern Lake read just above five NTU's. Our hypothesis was wrong due to us predicting the result as normal in the 10 - 15 NTU's. We predicted this because this river was likely to have rain runoff flowing into it which could carry lots of debris and organic matter downstream. The turbidity may have been low due to the time of year, as in October we're nearing the end of Humboldt County's dry season.

        In comparison to the data in Table 2 in the Appendix, our findings were reasonable. In measure of DO, temperature, pH, and turbidity, we found that our data from College Creek very closely reflected the data from Birch Creek fish hatchery in Idaho. As College Creek is directly fed from the fish hatchery on campus we were not surprised to see similar temperature (within 1°C), similar DO levels (within 1.5 mg/L), and similar pH (approximately neutral). The only major difference between our data from College Creek and the Birch Creek Fish hatchery was the turbidity reading, which measure significantly lower for the Idaho hatchery.

        There were several points where data collection could have been skewed. With regard to DO, there was a possibility that the results could have been altered by whether or not there was water on the permeable membrane of the meter if not sufficiently submerged.With regard to turbidity, this could have been skewed at the output of Fern Lake. Due to the water not flowing out the overflow, we had to get deep enough into the water to fill our cuvette. By going deep enough, we could have easily stirred up the sediment and organic matter resting on the bottom of the lake by accidently hitting a protruding branch or stepping into the water. In terms of temperature, our data could have been altered based on water flow rate. During sampling, we experienced on Jolly Giant Creek that the temperature was collected and recorded in one pool, and the next measurement was taken only inches away and the temperature rose by three degrees Celsius. pH could have been affected similarly.

Conclusion

This report discusses the water quality within College Creek, upstream of Fern Lake, in Fern Lake near the outlet, and in Jolly Giant Creek upstream of the dorms. With the collection of pH, temperature, turbidity and level of dissolved oxygen data from these waters as well as from Birch Creek Fish Hatchery and the Cuyahoga River, our team deduced that our data demonstrates measurements within healthy range of water quality parameters.

Appendix

Table 2 - Information gathered from online resources 9.16.2016

Location	DO (mg/L)	Temperature (°C)	pH	Turbidity Reading (with 10 NTU Sample)
Birch Creek Fish Hatchery Water Quality Data **IDAHO** http://www.kimberly.uidaho.edu/midsnake/wqdata/hatchery.htm	8.3	14.7	7.9	2.88
Cuyahoga **Ohio** River Sept. 1991 http://www.grc.nasa.gov/WWW/k-12/fenlewis/Waterquality.html	ranged from 1.5 to 90 percent saturation, with an average of 13.2 percent	did not exceed 20 C or 68 F and thus did not create a climate for many fish diseases. It often exceeded 13 C or 55 F, creating a climate right for many fish, plants, insect nymphs and some fish diseases	ranging from 6.0 to 8.0 in fourteen tests of a range of locations	from a study of twelve sites was 24.9 Nephelometer Turbidity Units (NTU)

Water Quality Lab Data

Group Members' Names: Rebecca Burke, Jacqueline Gomez, Shane Hayes, Rick Thomas

Location	DO (mg/L)	Temperature (°C)	pH	Turbidity Reading with 10 NTU Sample	Turbidity Reading from site (NTU)	Notes:
In College Creek	9.7 mg/L high	13.7°C	6.9 normal	16 NTU		Predicted: - High DO, - Normal Temp, - Low pH, - High turbidity
Upstream of Fern Lake	10.7 mg/L high	11.7°C normal	6.16 normal	5.52 NTU, 5.16 NTU, 4.93 NTU 5.2 Low		Predicted: - Normal DO, Normal Temp, Normal pH, Normal turbidity
In Fern Lake near the outlet	6.4 mg/L high	16.4°C normal	5.4 normal	2.69 NTU, 2.88 NTU, 3.88 NTU 3.48 Low		Predicted: Normal DO, - slightly higher..., - Normal pH, - High turbidity
In Jolly Giant Creek upstream of the dorms	10.51 mg/L high	11.0°C normal	5.75 Low	1.65 NTU, 1.71 NTU, 1.60 NTU 1.65 Low		Predicted: - Normal DO, - Normal temp, - Normal pH, - Low Turbidity

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