TO: DR MILLER ROBBIE

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SUBJECT: WATER QUALITY LAB

DATE: 2/19/16

Introduction

In this water quality lab, the goal was to test four locations for their values in: DO, temperature, pH, and Turbidity. DO is the dissolved oxygen, pH is the measure of acidity in a liquid, while turbidity is a measure of clarity. From assumptions of local ecology, we formulated a range of hypothetical values for each of the four locations. Then came the data collection for each of the four locations: at the Fish Hatchery, upstream of Fern lake, outlet of Fern Lake, and the upstream of Jolly Giant creek. This would give an ideal measurement of ranges possible. Then we would acquire the correct measurements of each parameter with digital instruments.

Materials and Methods

Our lab required the calculations of pH, DO, turbidity, and temperature. For pH, the use of a pH meter was relatively simple. It's measure by sticking the end of it into the water and giving it a little swirl in order to get a good reading. Dissolved Oxygen would be measured(with the YSI Model 55 Dissolved Oxygen (DO) Meter) by placing the reader into desired areas and reading the DO value given. The DO meter also measured temperature, when placed into the water, it read back both DO and temperature in degrees celsius. Lastly, turbidity was measured with the "HI93703 meter", which required us to read the turbidity of a sample at base 10 ntu and calculate the error range. Once that was calculated, three samples were collected from the water, finding the average and measuring the turbidity whilst taking the error range into consideration for the final percentage.

Results

After careful measurements and recording the DO, turbidity, pH, and temperature of 4 water sources around campus, we arrived at various concentrations. Some measurements were different than our predictions and some matched, according to the lab handout that gave average levels of typical, poor and good water quality levels. **The averages that are included in our table indicated high levels of DO, as all were above the average of 5-7 mg/L. Except in upstream of Fern Lake, which yielded a high average of 20.37 mg/L.** Our temperature measurements were all within the average values, but were colder than the temperatures determined as good values. In our pH readings, the levels near the outlet of the Fern Lake, Fish Hatchery, and upstream of the Jolly Giant Creek indicated good water quality with their pH's around 7, although the upstream of Fern Lake levels measured higher than the typical values

with readings higher than 8. Lastly, the measurements in turbidity were slightly miscalculated due to the reliability of our "Hi93703" instrument, as it was missing the standard 10 NTU jars. Our results in turbidity averages came from another group who was willing to share data. These NTU levels were less than typical values of 10-20 NTU, all measuring around 8 or 9 NTU.

Discussion

Our Results indicate good Water Quality levels with the parameters outlined. DO was higher than the minimum of 6 mg/L in all of testing sites. Temperature was a 2-4 degrees colder than ideal WQ and pH levels were within the values to indicate good Water Quality with the exception of the Upstream of Fern Lake, this higher pH indicates a more basic pH level. The Turbidity for all of the sites tested were too high to be considered good indicators for water quality with the exception of the fish hatchery. Turbidity of the Upstream of Fern Lake was much higher and is almost too high for healthy ranges for Salmonids.

The Upstream was thought have high DO, because it is in a less affected area, low to typical Temperature due to small amount of water and the cold season, and typical pH and Turbidity because it is in a low impact area. The pH within the upstream ended up being much higher than we anticipated. A more basic pH can be caused by the plant life around creek. The turbidity in the Upstream was much higher than any other site. This was a very interesting discovery to our group because we thought that its low human impact would make it the least likely to have the highest turbidity. This high turbidity could come from the recent rainfall and the amount sediment within the creek. In the Jolly Giant Creek we thought that there would be low DO due to its proximity to the dorms and its nearness to the popular trail, typical Temperature and pH with High Turbidity because the creeks is all flowing and picking up a lot of sediment. The DO in the Jolly Giant Creek was actually higher than that in Fern Lake. This could be explained through the fact that the creek is moving and mixing and DO is coming in through the churning.

As stated above, an issue arose with our instrument that came up when collecting data, which resulted in our use of a different group's data.

Conclusion

Overall there was a slightly higher DO concentration in all the testing sites. There were relatively high turbidity at all testing sites as well, with the upstream output of fern lake having a high concentration of turbidity. The pH levels and temperature levels were both within good values of good water quality. Overall, these findings show fairly good water quality and suitable conditions as expected.

Further edited by Jackson K.

Appendix

Location	DO (mg/L)	Temperature ($\circ C$)	pH	Turbidity Reading with 10 NTU Sample	Turbidity Reading From site (NTU)
Fish Hatchery	10.4	13.2	7.6	8.63	4.17 3.46 3.54 avg 5.09
Upstream of Fern Lake	10.16	11.4	8.6	9.93	20.52 19.72 20.65 avg 20.37
In Fern Lake near Outlet	8.3	11.3	7.84	8.63	8.83 7.54 7.71 avg 9.40
In Jolly Giant Creek upstream of the dorms	9.15	11.2	7.9	9.5	9.69 9.78 8.92 avg 9.96