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Lab Memo

Introduction:

The effects a school campus can have on a body of water can vary. The purpose of this lab is to evaluate the impacts that Humboldt State University has on its local creeks and lakes. Of the bodies of water on campus, we visited College Creek, Fern Lake, the outlet of Fern lake, and the Jolly Giant Creek. Since our analysis was taken in winter, the temperatures of the waters are colder than usual. The potential concerns HSU poses on these tributaries are the agriculture which could affect the DO in the waters, the school/student waste, and the small hatchery on campus. Our objectives were to measure the dissolved oxygen, pH, turbidity and the temperature at each tributary. Once collected, we used these measurements to evaluate and analyze the effects that HSU has had on these surrounding bodies of water.

Materials and Methods:

To determine any impacts Humboldt State University has on its tributaries, we walked to sample sites including a tributary flowing into Fern Lake, an outlet of Fern Lake, Jolly Giant creek flowing out of the lake, and College Creek. It is important to remember that HSU's fish hatchery may have purification effects on the water quality of College Creek due to fish habitat. Also, it is important to note the effects from the stagnant Fern Lake and Dorm Rooms have on the Jolly Giant Creek. To measure the varying aspects of the water quality flowing in and out of Humboldt State University we used a pH meter, a Turbidity(NTU) meter, and a Dissolved Oxygen(mg/L) meter.

Results:

The table below displays the data our group collected during the lab. Using the measurements taken, we can determine the possible impacts on the bodies of water from Humboldt State University.

Location	DO(mg/L)	pH	Temperature Degrees Celsius	Turbidity w/ 10 NTU sample	Turbidity Averages
Upstream of Fern Lake	9.32 mg/L	6.30	11.2 C	11.21 NTU	62.67 NTU
Fern Lake Near Outlet	5.18 mg/l	6.88	11.2 C	11.14 NTU	70.34 NTU
Jolly Giant Creek	5.80 mg/L	6.69	11.0 C	11.14 NTU	59.00 NTU
College Creek	9.30 mg/L	7.08	13.2 C	9.93 NTU	19.03 NTU

Discussion

Our hypothesis seemed to match our collected data for the most part, although we were not able to fully predict all aspects of water quality. We could determine the turbidity levels of most of the bodies of water based off their position by the lake. We successfully predicted that the turbidity levels would be high near the outlet of Fern Lake because of the stagnant waters it holds, thus flowing into the Jolly Giant Creek with a high turbidity. We also successfully predicted that the DO levels of College Creek would be high since College Creek receives treated water from the Fish Hatchery, and high DO levels for the stream feeding the lake because of oxygen mixing from water flow and photosynthesis from plants in creek. We were unable to hypothesize the turbidity levels of the tributary upstream of Fern Lake, mistakenly assuming low turbidity due to constant flow, although we hadn't considered where the stream came from.

When comparing results with other teams water quality lab data, the results were very similar. This confirms that these results are reasonable to believe. Since it is winter the temperature in Fern lake is going to be lower than it would be in the summer. Low temperatures and cloudy skies prevent plants and aquatic plants to photosynthesize so they end up respiring and using the dissolved oxygen. The low DO results could also be from the agricultural run off from school grounds that are rich in fertilizers and neighboring forests that have promoted plant growth. These growing plants are also consuming the amount of DO in these waters. Another trial should be tested in the summer time with warmer water temperatures to compare these results.

The errors that possibly occurred could depend on many factors. It is possible that when we measured the water quality, we were not sufficient enough considering that it is the first time for many of us. For example, it is possible that we did not submerge tools deep enough for a more accurate analysis. To clarify, the water on the surface has a higher temperature than deeper levels of water; hence, that could affect our temperature results. Another possibility that could affect our results is that we were not taking our turbidity measurements in the exact same point that we took it from because it is almost impossible to set our tool in the exact depth and point that we measured from each time with the movement of water and maybe that is why we average the three results. The sufficiency of the tools that we are using could also be a possible reason for errors. For instance, if our measurement tools are low quality or old that could be less accurate than higher quality tools with recent tech. Since we measured the water quality in three different locations, another possible reason is contamination of the measuring tools and bottles.

Conclusion

All in all, depending on the weather and the agriculture of the area, the pH, turbidity, temperature and the DO can fluctuate throughout the seasons. Our hypothesis on these measurements almost matched the results because we took those factors into consideration. There is also a possibility for the occurrence of different types errors when taking those measurements. For the example, the pH level of Fern Lake near the outlet may actually be higher or lower than the value that we recorded which was 6.88. One reason why there is a possibility of error is contamination of the previous measurement that we took from the Upstream of Fern Lake which was 6.30.

Appendices

Water Quality Lab Data

Group Members' Names: Mai, Ish, William

Location	DO (mg/L)	Temperature (°C)	pH	Turbidity Reading with 10 NTU Sample	Turbidity Reading from site (NTU)	Notes:
In College Creek	9.30	13.2	7.08	9.93	19.6 18.08 19.41	$\frac{19.6 + 18.08 + 19.41}{3}$
Upstream of Fern Lake	9.32	11.2	6.30	11.21	62 60 66	$\frac{62 + 60 + 66}{3}$
In Fern Lake near the outlet	5.18	11.2°C	6.88	11.14	80 76 55	$\frac{80 + 76 + 55}{3}$
In Jolly Giant Creek upstream of the dorms	5.80	11.0°C	6.69	11.14	66 56 55	$\frac{66 + 56 + 55}{3}$

Our data collected from each water source.

Water Quality Lab Data

Group Members' Names: Sana D. Silva, NADA E. FERNANDES, Ahmed Alhank, Mercedes Weekly

Location	DO (mg/L)	Temperature (°C)	pH	Turbidity Reading with 10 NTU Sample	Turbidity Reading from site (NTU)	Notes:
In College Creek	6.30	13.1°C	6.83	11.17	21.83 26.48 23.31	
Upstream of Fern Lake	10.53	10.8 (°C)	6.64	11.31	45.93 51.00 53.00	
In Fern Lake near the outlet	9.60	11.5 (°C)	6.8	11.07	57.00 56 56	
In Jolly Giant Creek upstream of the dorms	11.10	10.6 (°C)	7.0	11.47	60 59 58	

$\frac{10 \times \text{NTU}}{11.7} = 21.83 = 11.7$

A second set of data from the same water sources but a different team, to show that our results were reasonable.