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Institute for Watershed Studies Internship

Jessica Espy

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HUXLEY
COLLEGE OF THE ENVIRONMENT

Internship Title: Research Technician II

Student Name: Jessica Espy

Internship Dates: June 2021- Sept 2021

Printed Advisor Name

Rebecca Bunn

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STUDENT SIGNATURE

Jessica Espy

DATE: 05/24/2022

Institute for Watershed Studies Internship Report

Jessica Espy

Western Washington University, Summer 2021

Introduction

The Institute for Watershed Studies (IWS) is a program through WWU founded by Dr. Robin Mathews. The program is intended to support research on freshwater lakes, streams, and wetlands throughout Whatcom, Skagit, and Snohomish counties. Additionally, the program supports student research. All freshwater lake data collected by students is entered into a web database that is accessible to anyone in the community interested in learning about various water quality measurements of a specific watershed. Measurements include turbidity, pH, alkalinity, dissolved oxygen, and nitrogen & phosphorous content. Algal communities were also observed with each sample. Students working in the lab are encouraged to learn the difference between toxic algae and non-toxic algae. As a student employee for IWS during Summer 2021, I learned much about field sampling and lab analysis. Prior to this position, I did not have experience in water quality measurement or freshwater sampling fieldwork. Additionally, I was unfamiliar with many of the microorganisms I encountered in the freshwater samples. This position gave me substantial experience in areas that will be valuable to future jobs in the environmental field.

Role and Skills Gained

This position had two components: Field sampling and Lab analysis.

Field Sampling

Field sampling was the most enjoyable part of the position. On Monday and Wednesday each week, my coworker and I would drive to sites to collect for lab analysis. Sampling would require organization and thorough preparation. During the first few weeks, there were many

challenges and a learning curve. To overcome obstacles, my coworker and I maintained clear and frequent communication. Tasks were delegated each morning and double-checked by the other person to ensure no mistakes were made or instruments were forgotten. To test pH, conductivity, and salinity, a ysi instrument was used at each sample site. Nalgene bottles were carried to the site for water collection. These samples would be used to analyze for dissolved oxygen, turbidity, and nitrogen & phosphorous. A few sample sites included Cain lake, the alpine lakes at Mount Baker, Geneva lake, Hoag pond, Lake Padden, Shannon lake, and Summer lake. To collect algae, a closed net was used. One person wearing waders would stand in the water, throwing the net as many times as necessary before a sufficient sample was collected. This was my favorite part about field days, it was fun standing in the water while throwing the net. I found that many community members were curious about the sampling and would ask many questions about the work we were doing and where to find the results. This gave me hope that the citizens in these areas are concerned for the quality of our watershed.

Lab Analysis

On Tuesdays and Thursdays, the day would be spent in the lab. This too came with its own challenges and learning curve. In the first few weeks, I found the amount of information in the procedures to be overwhelming. It made the possibility of making an error more likely. To overcome this challenge, thorough and frequent communication with my coworker and lab manager was necessary. I found that asking lots of questions was the most helpful, even if it felt uncomfortable at times.

Total nitrogen/total Phosphorous (TN/TP), Dissolved oxygen (DO), chlorophyll, Alkalinity, and turbidity were the factors analyzed during lab days. TN/TP was done by filtering 50 mL of sample using a suction filter. The sample would then be analyzed by the lab manager and entered in the excel document. DO was tested using a small sieve filter and syringe. These samples as well would be analyzed by the lab manager and entered in the excel document. To test for alkalinity, samples would need to be at room temperature. Once samples reached room temperature, 100 mL of sample would be titrated with HCl. To test for turbidity, a turbidity reader machine was used. Small glass vials of sample would be filled and wiped, careful not to touch the vial with fingertips, then inserted into the machine. After a few seconds, a reading would be given and entered into the logbook. At the end of field days, one person would take a set of samples designated for chlorophyll testing and add 6 drops of magnesium chloride. The samples would sit in the fridge overnight, ready to be tested the next day. Testing used suction filtration devices. 100 mL of sample would be poured into the suction devices over a white filter. After the water had completely filtered, the filter would be removed from the device and placed in a folded aluminum foil envelope. The sample would then be stored in the fridge for later testing. To test for chlorophyll, the filter would be ground up with an acetone solution and then put in test tubes to be read on the fluorometer. HCl would be added after the second reading.

Once lab analysis was complete for the day, we were able to look at samples under the microscope. This was one of the most interesting aspects of the position, and I learned a lot about aquatic microbial communities. Notably, I began to be able to recognize the difference between toxic and non-toxic algae.

Lab days were also designated field prep days. Labelling, dish washing, and route preparation were all part of these days. Without a high level of organization and preparation, this position would be very difficult to do successfully. This role gave me a better sense of organization and I now feel that I can comfortably enter a job with confidence in my ability to pay attention to detail and communicate effectively.

Relevance to coursework and future career interests

Water quality is directly related to agriculture. It impacts communities in multiple ways and is a critical issue in environmental regulations. The position with IWS gave me a deeper knowledge base of water quality testing and related environmental issues. In the future, I can use my understanding of water quality sampling methods and techniques to work with farmers and landowners. Having a familiarity with this area of research will help me develop a deeper sense of trust with farmers, and I will be able to problem-solve more readily. One example of this would be if a farmer is being fined for releasing manure into watersheds. I can help the farmer understand the dangers of this issue (by explaining toxic algae and eutrophication) and assist in finding a solution.

Summary

IWS was an excellent organization to work for over the summer. I learned how to communicate in both a field and a lab setting. I feel that I learned a great deal of professionalism that will be useful in future jobs. After the first month, all the duties became repetitive, which made my progress and comfortability more pronounced. Very quickly, it became obvious to me that I had learned a great deal of information and could use it to my advantage in the position. I appreciated that the work I was doing will be shared with the community, and it will have an

impact on the years to come. Prior to this position, water quality was not a subject I found particularly interesting. After the position, I realize how important it is and how it influences every single facet of a career in environmental science.

Time Long

Date	Hours	Activities
6/21	33	Training & Sampling: Padden, Hoag, Fazon. Lab training.
6/28	40	Lab
7/5	37	Sampling & Lab- Beaver Pond, Cain, Geneva, Reed, Squires, Hoag, Mirror. Data entry
7/12	38	Sampling & Lab: Bear, Evan, Gold Mill Pond, Myrtle, Ice Ponds, Boardman, Baker, Everett, Grandy, Shannon, Vogler.
7/19	29	Sampling & Lab: Mount Baker HW loop. Beaver, Big, Cavanaugh, Clear, Sixteen, Summer.
7/26	18	Sampling & Lab: Armstrong, Ketchum, Sunday. Data Entry
8/2	20	Sampling & Lab: Canyon, Twin lower & upper.

		Mountain Loop resample.
8/9	25	Sampling & Lab: Snohomish New Lakes. Skagit Resample.
8/16	16	Sampling & Lab: Mt Baker Resample.
8/23	12	Final Week Sampling at Canyon Lake



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Dear Jessica,

This letter is to confirm the completion of your internship with the Institute for Watershed Studies during the summer of 2021. Your work sampling lakes in northwestern Washington and performing related analytical tests completed your summer internship.

We appreciate your contribution. Your work was done to my expectations.

Best Regards,

Joan Pickens
Laboratory Manager