GRO Summer Internship Final Report

Fish-Habitat Relationships in a Great Lakes Coastal System

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Traveling has always been one of my favorite things to do, and when I saw that I had the chance to go somewhere new for my internship, I was very excited. I did not know very much about Minnesota or the Great Lakes before I got here, but as my internship comes to an end, I have a new appreciation for the diversity of landscapes and environments throughout the United States. I have really enjoyed my time here at ORD/NHEERL/MED in Duluth, MN, and have learned even more than I was expecting. While my project focused on larval fish populations, I learned much more, including freshwater ecosystem ecology and the historical background of the area. I know that I will really benefit in a future career from all the new skills and knowledge that I gained through my internship.

During my time here, my advisors, Anett Trebitz and Joel Hoffman, and I planned a research project for me to complete that was based on previous research that Joel has done on larval fish populations. We would use a similar strategy for sampling that had been used in the past, but we would also have the opportunity to use a new type of sampling gear, called a light trap. One of our goals was to learn the effectiveness of the new gear and to learn some of the basic strategies for efficient deployment and use. The larval fish samples we took ended up not only being useful as data for my research but will also be used in the future as teaching samples for larval fish identification and as stable isotope samples for one of Joel's research projects involving food web dynamics.

Larval fish are studied for many reasons, including their importance as a water quality indicator. The species composition within an area and presence of certain fishes can often be used to determine the health of a system. One of the major goals of MED is to evaluate ecosystem health in the river/harbor area in order to recommend restoration strategies and to make sure that all Clean Water Act criteria are being met. Additionally, sampling larval fish gives important background data on the state of the fisheries, which are important both ecologically and economically to the area. We set out to study the effects of water quality and habitat type on the composition of larval and juvenile fish populations by taking samples in vegetated and bare habitats both nearshore using a larval seine and in deeper water using the new trap. Once all of the samples were collected, we looked at the relationships between the different fish species and the water quality, habitat type, and location in the river.

After reviewing all of the data, we determined that there was greater species richness and overall abundance in the vegetated areas than in the bare areas. The fish have more protection from predators and strong weather patterns in the vegetated habitats. Also, the seine collected more fish and had greater species richness than the light traps. However, the light traps were more efficient because it was easy to sort the sample. The larval fish tend to get damaged in the seine and it collects a lot of debris, but the trap keeps the fish in good condition and is very easy to sort through. We all learned a lot about using the light traps, and Joel and Anett have a good idea of what they liked and did not like about the trap and some of the things they would change when using it in the future.

Overall, we were lucky during our fieldwork because the weather was nice almost every day; and we did not have any huge problems with any of the equipment or the samples. The fieldwork was my favorite part of the internship, and I learned a lot while we worked on the river. I learned how important it is to be flexible, especially when working in an ecological field. No

one can control the weather or where the perfect sampling place is going to be located so it is important to work with what is available and "go with the flow." I also realized how important it is to be observant. There are many situations that do not allow much time for something to be taught, so I found the best way to learn was by just doing it. It was really important to me that I learned how to do the different tasks in the field; and even though it was hard, I tried to just jump in and do my best. Being willing to do all tasks at hand is important in any career, and I learned so much from doing my best to participate.

I came into this project with a lot more background in English than in science so it was really nice to learn some new skills. However, my writing and communication experience definitely helped make the scientific reading and report writing a lot easier. While I had a basic understanding of computers and math, I had no idea of the full potential of Excel and the use of statistical programs. The work I have done here will help me in my statistics and biology courses when I return to school and in any further research or scientific reading I may do.

However, throughout this process I have also come to see that I will probably not end up in a research science career. While I really enjoyed the fieldwork, I do not think I could commit myself to the amount of time spent at a desk. My biggest struggle during my internship was keeping myself occupied when there was not something specifically related to my project to do. I tried to do as much reading as I could so I would have a good idea of the research and issues within the Great Lakes, but there was still a lot of down time. The readings had a big impact on me, though, because they definitely reinforced my belief in the importance of the environment and its protection and also the importance of communication across disciplines. Scientific research is crucial in order to make progress in remediation and legislation, but citizen involvement is also very important; there needs to be an open line of communication between the two groups. I would love to be able to work in a field where everyone could be involved in restoring and protecting the environment, from scientists to children. I have seen now that there is a lot of potential for even more communication across groups who ultimately all have the same goal.

I enjoyed the atmosphere of the lab because everyone seemed committed to doing their part to help the environment, in both work and their personal life. The employees take a real interest in focusing their research in order to restore different ecosystems. Additionally, many of the people take that desire into their personal life and do little things like recycling and taking alternate transportation to work. I am sure that this same attitude is prevalent across the EPA, which really helps the Agency with its huge task of regulating and protecting habitats that are not always well understood but are essential in order to keep the balance of nature. The extent of cooperation it takes to make things happen is incredible, and I enjoy seeing how everyone from scientists to business owners work together to accomplish their goals.

My whole internship was a really positive experience, and I truly appreciate everything that my advisors did for me so that I could have this opportunity and learn so much about the environment. The best advice for anyone coming into his or her own internship would be to make sure that he or she is prepared. A lot of background knowledge really helps, especially if you are in a new place. Also, go outside of your comfort zone and do things you have not ever done before. It is amazing how empowered you feel when you do something you never knew you could do. Also, ask your advisors and other people you work with about the area and events. There are always places to go and things to do, and it is so useful to have someone that is familiar with the area give you pointers. I learned so much from my internship, not only about the environment but also about myself. While I may not go on to a career in research science, I know that this experience has shaped my goals for the future, and I will always appreciate having this opportunity.