GRO Summer Internship Final Report

Responses of Marine Crustacean Populations to Human Stressors in Laboratory and Field Environments

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I spent my summer in Narragansett, RI, interning at the EPA's Atlantic Ecology Division (AED), with Jason Grear, an ecologist in the Population Ecology Branch. The AED campus is located on the Narragansett Bay. The research focus of the AED is to improve the understanding of environmental impacts in the Atlantic region. My project for the summer was titled "Responses of Marine Crustacean Populations to Human Stressors in Laboratory and Field Environments." I worked with a species of mysid, *Americamysis bahia*, a small marine crustacean, whose initial population was collected in the Gulf of Mexico. We looked at the effect of increased carbon dioxide levels on growth and survival of *A. bahia*. As atmospheric CO_2 levels rise, CO_2 levels in the ocean also rise. As CO_2levels increase, pH levels decrease, which has led to a concern among researchers about ocean acidification.

There has been a lot of research that studies the effects of decreasing pH on organisms to evaluate how much impact we are having on marine environments. The setup on which I worked measured weekly growth and survival of mysids exposed to a relatively minor change in pH. Through this project I learned different imaging techniques, from the initial video capture done each week on the mysids, to learning the computer software that measured and analyzed the collected data for us. Experiencing these various techniques and ways to collect data provide new skills and information and will be easily applied to many projects in my future.

When I was not in the lab, I read a lot of literature on ocean acidification. It was interesting to compare the approaches of researchers, as well as reading articles that were just released, giving me exciting insights into emerging science. While most of the research was lab-focused, I did get the opportunity to help out in the field with setting up a new trap. The trap was designed to collect a species of mysid, *Neomysis americana*, found in the Narragansett Bay. Since it was a new trap used at the AED to collect mysids, there were a lot of trial and error runs in setting it up, from figuring out trap mechanics to finding the best location to catch the mysids. In both the lab and field work portions, I learned how much work goes into setting up an experiment. I now know when I read a study that no matter how simple and straightforward it seems, every study takes a lot of time and effort into designing the study, trying different tactics, and just figuring things out before getting to the final setup.

The biggest challenge I overcame throughout the summer was the late start on my internship. I studied abroad in New Zealand this past semester and therefore was unable to start my internship until July. At this point, all the other GRO fellows, as well as other students working at the AED, had settled into their work and the summer was in full swing. I was the new person at work who was learning my way around. However, after the first week or two and with the help of all the friendly people that worked at the EPA, I quickly began to feel comfortable around the building. Because my internship was shorter, it went by very fast. Before I knew it, my experience in Narragansett was halfway over!

Looking back, I realize how much I have learned since arriving here. Since the majority of my time has been spent in the wet lab, I've gained a lot of lab work experience. This includes learning how to calibrate pH meters and setting up tanks and caring for organisms. I learned that this work meant I was often on my feet and moving around. While at times it was exhausting, I realized that I really enjoyed being hands-on with my work. It was particularly

rewarding to apply previously learned skills and knowledge to the internship, from laboratory procedures to math skills. As a math minor and science major, I often heard about the connections and importance of mathematics in research. My Project Advisor, Jason Grear, uses a lot of mathematical modeling with population ecology. Because of my course work, I was able to understand and follow explanations and demonstrations. Removing the mathematics from the textbook and placing it into the context of my work was encouraging, and reinforced that my decision to minor in math is worth the challenge it has been at times. I am very interested in continuing to find and build on those connections.

Even though I was only there for the summer, I was impressed with the EPA and the Atlantic Ecology Division's work environment. I didn't feel lost in a big agency. Everyone with whom I interacted was very friendly and accommodating, not just to me, but to each other as well. I noticed that while people were busy with their own work, they were also interested in what their coworkers were doing, and available for help and insight. It provided a good environment for me to learn how an office/lab works. It was interesting how easy it was to become comfortable interacting and getting to know the people I worked with, whether during a lunch break or while working on a project together. I also enjoyed getting to hear about the wide variety of projects being done among the different branches. It was a very rewarding place to learn, not to mention a great place to live for the summer.

My advice to future GRO fellows is to keep in mind how fast the summer goes by. While it may seem like a long time at the beginning, the internship flies by. Make sure you get to experience everything you want to experience! Don't be afraid to ask questions – it really is the best way to learn. Your advisors and other people you work with are really good resources, not just for your specific project, but also about life after college and graduate school.

Finally, if you are living in a new town, explore that area and get to know it. While I don't go to college too far from where I worked, I wasn't familiar with Rhode Island. I really enjoyed spending my free time getting to know the country's smallest state. I did both the typical tourist activities and saw what life as a resident there is like.

This internship is a great opportunity. It has done what I hoped an internship would do. I learned new skills and about exciting work in my field. I also experienced how my classroom work can be put to use in the real world. This summer sets me up for both my senior year of college and the rest of my career.