GRO Summer Internship Final Report

Satellite Products Applied to Development of Water Quality Standards

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This summer I spent my internship in Gulf Breeze, FL, at the EPA's Gulf Ecology Division (GED), a research facility on its own island. I worked for Blake Schaeffer, a research ecologist, on a project called, "Satellite products applied to development of water quality standards." I also worked closely with Robyn Conmy, another research ecologist. The project I worked on was looking at developing water quality standards in estuaries in Florida. I worked at an ecology lab, so things like habitat and water quality were of high interest. Estuaries are very important ecosystems and standards need to be in place so these systems don't become nutrient loaded and, in turn, hypoxic.

The project I worked on is an ongoing three-year study, so there have not been any conclusions yet. However, I did learn a lot during my internship. I learned how to operate and clean many field instruments including a Hyperpro, a Hypersas, a CTD, and an AC-s. I also learned how to download and process all of the data from these instruments. I was trained on how to operate a bench-top spectrofluorometer and a spectrophotometer. I ended up running all of the FDOM (fluoresced dissolved organic matter) samples collected throughout the summer.

The field instruments were used in each of the four bays being studied (Pensacola, Choctawhatchee, St. Joe's, and St. Andrew's) once a month. After I learned how to operate the equipment and process the data, I was responsible for doing this after every cruise. We went out on a 25-foot boat and stopped at different pre-set stations in each bay. At each station the AC-s and CTD were cranked down to the bottom of the bay and then back up, and the Hyperpro was dropped down 3 times. A Secchi disk was also used and water samples were collected at most stations. Both a surface mapper, collecting depth, salinity, dissolved oxygen, turbidity, and chlorophyll data, and the Hypersas ran during the length of the cruise. The AC-s collected data on absorption and total attenuation in the water column. It also had a CDOM (colored dissolved organic matter). The CTD collected conductivity, temperature, and depth data, along with having CDOM, chlorophyll, and turbidity fluorometers. The water samples had to be filtered after each cruise, which is something I learned how to do. The different filtered samples were used for different bench-top instruments to measure CDOM, FDOM (fluoresced dissolved organic matter), TSS (total suspended solids), chlorophyll, and part abs. These skills will help me when applying for graduate school and jobs because they significantly broaden my background and show I can learn a lot in a short amount of time.

I was also assigned to learn how to operate a new instrument, a Water Quality Monitor (WQM), which the team had recently purchased. Not much had been done with it before I got there, so I was basically starting from scratch. So, of course on the second day of my internship, the WQM stopped working. I was afraid I'd broken an instrument that cost thousands of dollars, but as it turns out, something was wrong with it. We sent it back to the manufacturer and after a month we got it back in good working order. Once we got it back, I spent much of my time calibrating the instrument, figuring out the software, and preparing it for deployment. I had to cover the WQM in electrical tape, plastic wrap, and then another layer of electrical tape before covering it in anti-fouling paint. I had to do this to the battery too. This was to protect the instrument from getting bio-fouled while it was deployed. I spent the last few weeks of my internship deploying it off of a dock on the island for a week or so at a time to see if it worked properly. It seemed to be working great and the team is planning on purchasing 10 to 15 more of these to deploy in the

bays and next year in the Florida Keys. It's exciting to know that my initial work will develop into a huge project.

It was a crazy summer on the Gulf Coast of Florida. Pensacola Beach was hit with oil from the BP oil spill offshore, which definitely affected the dynamic of the area. Booms were put up around the island to protect it from oil. During out field work on Pensacola Bay, we had to take extra care with the instruments to make sure no oil contaminated our data. There was a wetlab on the island with fish and corals that uses water from the bay in its tanks. I had to run samples of the bay water to see if it had been contaminated with oil, so oil wouldn't get into the intake and kill the lab's animals.

Besides the water quality project, I also worked on a coastal nutrient criteria project. I was able to use my GIS (geographic information system) skills to help get points to be used in satellite processing of data within a 3 mile boundary of the coast. I also worked with water discharge data from the United States Geological Survey, which is something I have done before in school. Because I helped with this, I got to go to a meeting at EPA headquarters in Washington, DC, to talk about the project. It was very interesting to see how our research was being used to develop nutrient standards for the coastal waters of Florida.

I really enjoyed working for the EPA this summer. Everyone was very friendly and was quick to help if I needed something. It was especially exciting that we had our own island to work on. I think it helped people stay focused, because there weren't busy streets and other facilities around causing distractions. All of the people at GED seemed very committed to their work and to helping to do their part to protect the environment, which is something I definitely respect. The projects I worked on this summer are not exactly along the lines of what I want to do with my career, but have certainly opened my eyes to working for a federal agency. My interests lie strongly in marine geology and I would be very open to working for USGS or NOAA later in my life.

Overall, the internship was great! I learned so much about oceanographic optics and had a great experience working in a government research lab. It was great to not spend the entire summer behind a computer; I got to go into the field a lot and also spent a lot of time in the lab. I really enjoyed being part of a team where I was depended on. I was trusted to be in charge of instrumentation and data and not treated like an intern who doesn't know anything. It has helped my sense of responsibility and shown me what it is like to work in the real world. I appreciated my time at GED and would suggest it to anyone who is interested in any of the work they do on the island.

I think my advice to next year's GRO Fellows would be to try everything. I got involved in a large range of work this summer, not just the project I came to work on. Most of the work was nothing like I had ever done before, and I learned a lot from the experiences. I think being willing to do such a range of work showed my eagerness to learn and to take on responsibility, which are traits I think graduate schools and employers will look for in any young scientist.