

Water Chemistry Research

The University of the South

Summer 2012

### **Quality Testing on Bodies of Water in Sewanee, TN**

This summer I worked under the supervision of environmental chemistry professor Dr. White at The University of the South. My research was focused on testing the water quality of manmade lakes on the Sewanee domain, as well as popular swimming areas. These tests included measuring nitrate and phosphate levels, alkalinity, chloride content, hardness, calcium hardness, total suspended solids, pH, conductivity, total dissolved solids, salinity, turbidity, dissolved oxygen, temperature, total coli forms, and a presence/absence test for E-coli. The lakes tested were Lake Cheston, The Reservoir, Harrison Spring, Lake O'Donnell, Lake Dimmick, and Cheston Farm Lake.

The first half of summer was dedicated to literature research and familiarizing myself with the process of searching for and reading scientific journals. Being an environmental chemistry major I have taken classes that required literature citing, thus this process was not completely foreign but still helpful in improving my skills as a scientist. Topics I read about varied from the effects of personal care pharmaceutical products (PCPP's, such as prescription drugs, shampoos, and toothpaste) on water sources, to the impact artificial sweeteners have on ecosystems after exposure through drinking water treatment processes. I greatly enjoyed educating myself about how the human population has an influence on the environment by simply flushing a toilet.

Literature was also helpful in developing a method which would be used to measure most of the quality tests of the water sources. Once a method had been created and I had learned how to properly use the equipment, Dr. White and I began to take water samples of the lakes on Sewanee campus. Lakes that are popular swimming sites were of particular interest to me mainly because I was curious about the

quality of water students were swimming in. The most interesting water source we tested on the domain was Harrison Spring. Results indicated that there was potential contamination in this water source that many community members and students used as drinking water.

This summer gave me the opportunity to experience all aspects of research done both inside and outside of the lab. There were moments when I was overly eager to jump right into field work, which made me resent having to stay in the lab and read journals. However, I came to realize that by making myself knowledgeable about the parameters I was testing for I also was able to understand and perform a better analysis of each lake. The greatest lesson I learned was to appreciate healthy water and how the entire environment is affected by it. What does it mean for water to be healthy? Much like any other body, clarity and purity are most important in bodies of water. Some of the water sources I sampled had appeared to be pristine, but had higher levels of nitrate and total dissolved solids than samples that I expected to be less pure.

I learned to be patient this summer and not to become discouraged when results did not have a favorable outcome. Part of developing a testing method involved creating and testing standards. Some standards were more easily made than others, which was frustrating. As a senior environmental chemistry major this was something that I had done in lab countless times, and made me question myself when I could not duplicate my results. Similar to literature research, I came to realize that during the process of repeating an experiment I gained precision in my lab work. I made sure to always wear gloves so not to contaminate my sample, each time I used a pipette I double checked that there were no bubbles in the tip that would cause variation in results, I even began to weigh out all of my sample components as another source of certainty. Even with all these extra precautions there were times when I still be off in my results. I began to understand that failures in the lab were just a part of research and that they just made victory even sweeter.

I gained valuable experience from this summer and benefited as both a scientist and student. Being outside in the field is something that I really enjoyed and hope to continue doing in the future, whether it is through graduate school or doing research in another lab.