How Healthy are our Streams? Work in the BGC Lab

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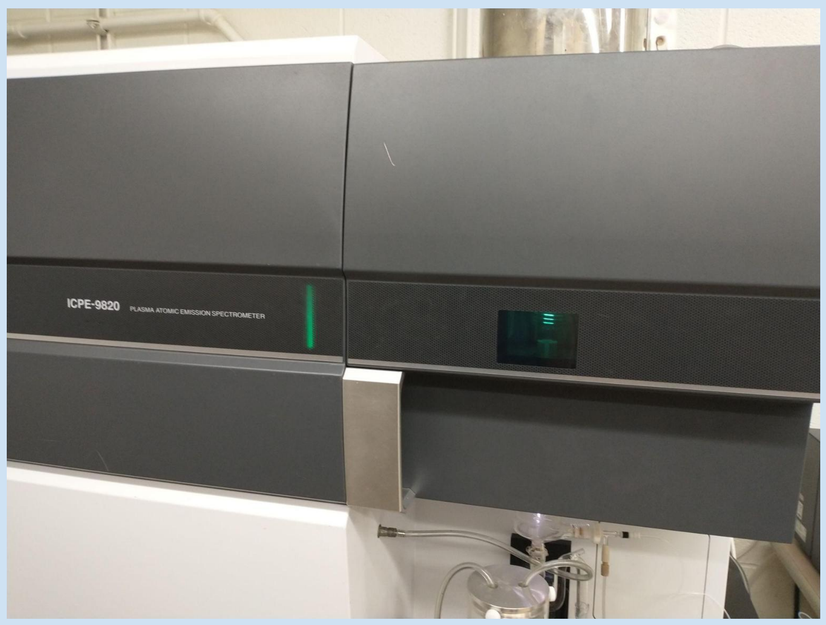
Introduction

For my practicum, I worked in the biogeochemistry (BGC) laboratory at the University of Maryland during the summer of 2025. This is a lab which analyzes water samples to investigate anthropogenic impacts on freshwater ecosystems.

A Day in the lab:

Work in the lab was composed of many different activities. Some of those activities are:

- Obtaining, filtering, and acidifying water samples
- Running samples on instruments
- Post-processing data from instruments
- General Laboratory upkeep



Photograph of the ICP-OES, an instrument in the lab used to determine trace element concentrations of water samples. Photographed by Alan Elliott.

Impact and Future Work:

Working in a scientific lab helped me learn valuable lab and paper writing skills, and develop my interest in freshwater ecosystems and chemical analysis, and confirmed my desire to explore scientific questions, including in a lab setting.

In the lab, I contributed to gathering and analyzing data through sampling, post-processing data, running samples, and writing a scientific report.

Looking to the future, monitoring stream health is a perpetual task. Our lab has gathered many years of data, but more data would help us solidify existing trends, identify new trends, and let us analyze stream health developments. I helped contribute to this over a period of time, but there are always more samples to get and more ICP runs to do.

Acknowledgments:

Thanks to everyone who helped make this practicum project possible. This includes:
Dr. Sujay Kaushal, Principal investigator,
Ashley Mon, Site Supervisor,
Dr. Holtz and Dr. Merck, SGC program directors,
University of Maryland, host of the BGC Lab.

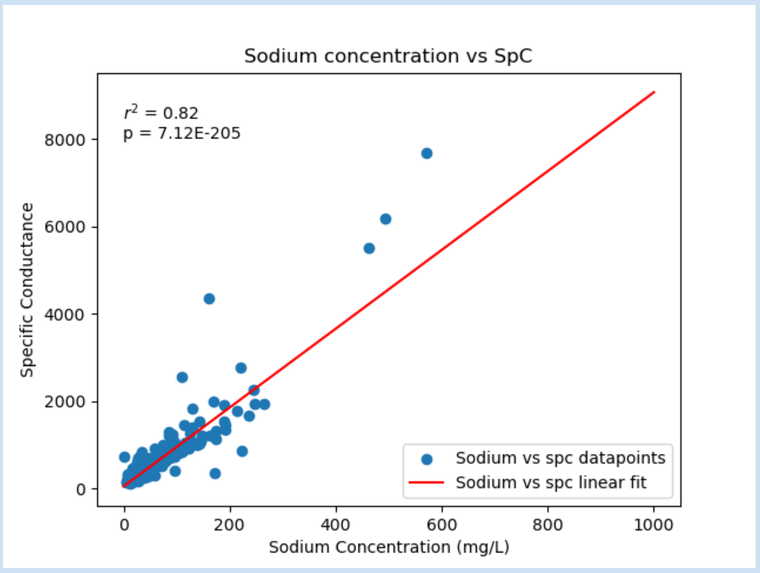
Independent research:

Along with the everyday lab work, my project also involved looking into a research question independently and writing a scientific report on my findings.

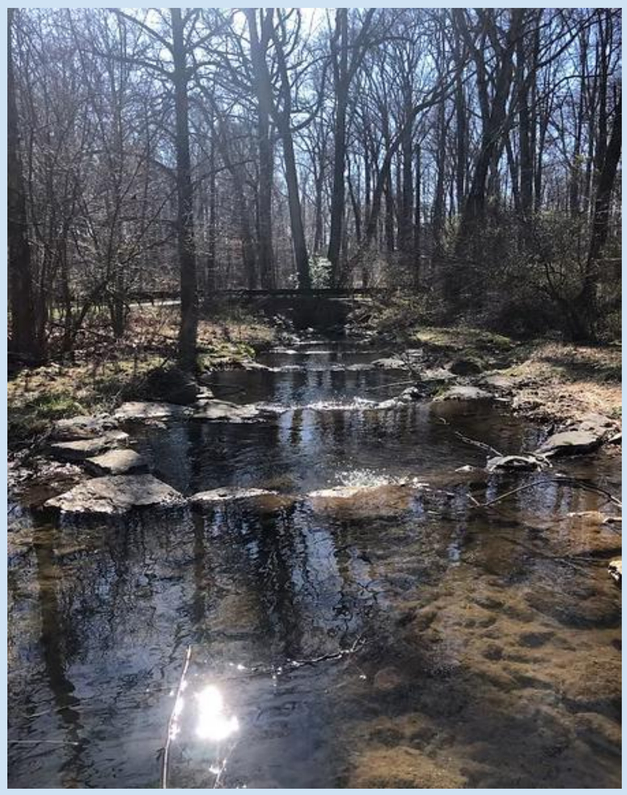
My research question: How is salinity related to the concentrations of various trace elements, and how do those trace element concentrations vary throughout the year?

Findings:

- salinity was highly correlated with sodium concentrations, but not other analyzed elements.
- sodium concentrations spike dramatically during winter
- Other elements did not have significant variations.
- The above are primarily caused by road salting events



Graph of Specific Conductance versus Sodium concentrations across all analyzed sites. Graph generated by Alan Elliott using Python's matplotlib library.



Photograph of Paint Branch Stream restoration. Photograph by Dr. Sujay Kaushal. (https://kaushallab.wixsite.com/kaushallab/lab-photos)

Site Information:

Our lab's name is the Biogeochemistry Laboratory, and it is located on the University of Mayland Campus, in the biochemistry wing of the chemistry building, at 8051 Regents Dr, College Park, MD, 20742.

The principal investigator is Dr. Sujay Kaushal, and the lab's goals are to understand the Ecology of watershed and aquatic ecosystems, through the lens of human interactions and watershed restoration strategies.

Contact info: Dr. Sujay Kaushal: skaushal@umd.edu

Website: https://kaushallab.wixsite.com/kaushallab