

Introduction

During my internship experience I conducted independent research on the Domain as well as in the lab. The goal of my research was to test the hypotheses that dams on Sewanee's Domain have negative impacts on both salamander abundance and diversity in streams and that dissolved iron manganese also has negative impacts on both salamander abundance and diversity. I took an interdisciplinary approach by testing these hypotheses through the lenses of salamander ecology, water chemistry, and geospatial analysis. This multipronged approach was formed in attempt to analyze the complexity of environmental variables, such as forest type, watershed size, precipitation, temperature, and topography, that are present in these habitats.

The research that I conducted in the summer will be part of a year-long study that began during the spring of 2013. This research is being conducted as part of the ecology and biodiversity major and the certificate of watershed sciences.

Statement of objectives

The goal of this research was to perform a study and publish a scientific paper on the impacts of dams on the diversity and abundance of salamander populations in Sewanee, Tennessee. This will be accomplished by testing the hypotheses stated above using a well thought out study design. This will ultimately result in a greater understanding of the interactions between salamanders and human made constructs, dams. For this study, I performed a combination of various types of fieldwork that included timed searches for salamanders and a water sampling for analysis, lab work where water chemistry will be analyzed, and GIS work focused on spatial analyses and hydrologic modeling. The year-long duration of this study was

chosen in an attempt to capture behavioral differences of salamanders in relation to season. The results of the study will be presented at Scholarship Sewanee in the spring of 2014.

What I Did

I worked for a total of 11 weeks. I worked on all tasks throughout the summer. The work that I performed was split into multiple sections: timed sampling for salamanders and water sampling in the field, water chemistry analysis the lab, GIS computation, hydrologic modeling, and mapmaking in the Landscape Analysis Lab, and statistical testing and data analysis. The study design includes ten replicates of a dammed stream and on dammed stream. There are two sample sites at each stream resulting in four samples per replicate and 40 in total. All replicates were sampled on a weekly basis. Water samples were taken before each timed search, rendering an equal amount of water samples and sample sites.

I conducted four weeks of field sampling which included collecting water samples and timed searches for salamanders. Seven weeks were spent analyzing the water samples for iron content, and refining this process. The iron analysis took much longer than expected due to errors in the methodology of iron analysis. The problems in the methods were identified and corrected for.

Statement of impact

The overall goal of this research is to test the hypotheses previously stated in a scientific and replicable manner. The results of this research will provide a baseline of data of the diversity and abundance of the salamander population and water chemistry at the study sites.

This will provide an opportunity for additional research to be conducted as to greater understand these aquatic systems. The conclusions of this research could also be used to influence habitat management on the Domain. The lakes on the Domain, and the streams draining from the lakes, are novel habitats and adoptive management could be greatly influenced by this and other research that would provide greater understanding of the ecological interaction that these habitats create.

My work on this project has helped me gain valuable experience in field work, database management, statistical analysis, comprehensive and informative map making, organizational skills, development of positive work habits, and improvement upon my abilities to conduct independent research. In future projects, I will allow for a lot more time for the structuring of methods and laboratory work. These are the areas in which I underestimated the time needed for these activities and unwisely expected to have no errors. This experience has greatly prepared me for future field work and potentially a job that involves large amounts of field work. I will be able to use all of these abilities for the advancement of my scientific career.