

Will Coleman
Biology Research Internship with Dr. Kirk Zigler
Sewanee Biology Department
Summer 2014

Cave Biodiversity of Hamilton County, TN

This summer I served as a research assistant for Dr. Kirk Ziwith The University of the South's Biology Department. My internship funded the research of cave biodiversity in the ridge and valley of Tennessee. This summer 2014 research is the final chapter in my research project that I began in January 2013. I have worked on this project for three semesters and two summers, and I am truly grateful for all the funding and faculty support I have received.

Tennessee is home to a vast number of caves known to possess the richest cave biodiversity in the United States. The heart of Tennessee's caves are found in the South Cumberland area, including Franklin County, Grundy County, Marion County, and Hamilton County, as well as expanding into northeast Alabama and northwest Georgia. Until my research was conducted over the past year and a half, a great number of caves in Hamilton County had not been biologically surveyed, and their species composition was largely based on speculation, and often unknown.

Dr. Kirk Zigler specializes in cave biology research and has advised my project since its inception in January 2013. During the Spring 2013 semester, I began my project to survey cave obligate fauna of Hamilton County. I visited several caves and collected invertebrates to be sorted in the lab. During the summer of 2013, Dr. Zigler and I caved multiple times per week; ultimately extensively surveying twelve caves in the South Cumberland area. I collected over 200 samples of invertebrate biodiversity and learned to meticulously sort them in the lab. After completing the sorting process near the end of my internship period, I began the next step of identification. This involves carefully analyzing invertebrate morphology under the microscope to find subtle differences that are used to differentiate closely related species. During this step, Dr. Zigler and I were ecstatic to find that an aquatic cave dwelling invertebrate that we collected was presumed to be extinct, had not been recorded in over fifty years, and was not known from the cave we collected it from. In addition to that find, we collected a handful of millipedes that are undescribed members of the *Pseudotremia* genus.

While last summer was primarily spent doing field research and collecting data, this summer was a bit different. At this point, my internship focused on presenting research, writing scientific papers, and molecular analysis of cave millipedes. First, I finished my paper on the rediscovery of *Caecidotea*

nickajackensis, a cave-obligate isopod that was thought to be extinct since the construction of Nickajack Dam in 1967. This paper is currently under review at the journal Speleobiology Notes. My second paper, which focuses on the broad scale of my research- the cave biodiversity of Hamilton County, is still being prepped for journal submission as Dr. Zigler and I are waiting to hear back final confirmation on some of our species identifications from experts around the south east. I cannot wait to (hopefully) have these papers published.

I was able to present my research this summer at the National Speleological Society Convention in Huntsville, AL. The weeklong convention had one day devoted to cave biology, where there were a number of presentations by students, professors, and researchers from all over the country. It was incredibly rewarding to present my research among other scholars of the same field and take questions from the audience. Additionally, attending the convention allowed me to observe cave life in a variety of caves in the Huntsville area with experienced cavers. During the convention, another one of Dr. Zigler's research students and I camped on site with the Sewanee Mountain Grotto, which was full of incredibly nice cavers from Sewanee who were very welcoming.

Working with Dr. Zigler this summer allowed me to complete my research projects that I devoted so much of my time and energy to as an undergraduate. Now as an alum, I am very motivated to attend graduate school for an advanced

degree in the field of ecology and biodiversity. I have taken a job in Atlanta with the Southeastern Trust for Parks and Land for the time being, and I will be starting my graduate school applications this winter. I cannot be grateful enough for all the opportunities Sewanee has given me through undergraduate research in the biology department. Working with Dr. Zigler was always a learning process, and I have recommended him as both an academic and a research advisor to underclassmen who ask me for advice in that area. Studying cave biology and learning to independently conduct and write exceptional research allowed me to find my academic niche at Sewanee, and has given me a stepping stone to pursuing a career in the sciences.