

Project Title: Intertidal Meiofaunal Density and Diversity on Sapelo Island, Georgia

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Previously funded by CURCA? YES

End date for proposed activities: May 2013

Project Rationale and Objectives: This past summer, I taught a new field research course that exposed 13 upper class biology majors to an intensive field research experience at the University of Georgia Marine Institute (UGAMI) on Sapelo Island. Five student - created projects resulted from the course, all of which culminated in successful presentations at a course - concluding research poster symposium. Students working on two of the projects have opted to continue their studies during this academic year. This narrative describes one of these projects, a study designed largely by the participating students, of the meiofaunal density and diversity, as related to depth and tidal exposure, across the sandy beach intertidal zone. The term meiofauna describes heterotrophic (consumer) organisms that range in size from 50 – 1,000 micrometers (for comparison, a human hair is about 75 micrometers across). Meiofauna are a critical part of the beach, ocean and salt marsh food webs; their diversity and abundance appear to be very high and new species are found frequently. Already the students have produced a valuable catalog of meiofaunal diversity on one Sapelo beach; their additional studies will compare this diversity to the diversity of another Sapelo beach with different physical conditions. Furthermore, the ongoing study will consider the richness of both beaches' photosynthetic phytoplankton, which is the essential base of these food webs.

Research Question #1: *Is there a difference in diversity and abundance of intertidal meiofauna phyla between tidal zones or sediment depths on a Sapelo beach?*

traffic. Understanding meiofaunal composition of pristine southeast Atlantic beaches will provide practical information for research and monitoring beyond Sapelo Island.

Three students began this project during the summer field research course (BIOL 4226) addressing research question #1 above. Their studies showed clear differences in meiofaunal diversity across intertidal zones and at different depths. Meiofaunal richness was greatest in the lowest zone, nearest the waterline, while abundance was greatest in the mid intertidal zone, which

Currently, three students are involved in the study and are planning on submitting abstracts to present their work at a regional conference in April. This project has also spurred two related side projects, examining the effect of the recycled tire leachate on the feeding process of the ubiquitous freshwater protist, *Tetrahymena pyriformis*. In addition to a set of biological studies on the toxicity of the tire leachate on *Tetrahymena*, two students developed a science education study using the *Tetrahymena* protocol in a freshman biology class and examining whether this guided inquiry exercise resulted in improved student understanding of the scientific method. Both *Tetrahymena* projects (biology and education) have been presented at regional and state conferences; twice the educational study has won a Best Student Presentation Award. In all, this CURCA funded project has supported the work of 13 students.

2010 – “Gender differences in antioxidant response and free radical damage in the brains of methamphetamine exposed mice” This project was designed to be a part of a larger ongoing study conducted by Drs. Ryan Shanks and Steven Lloyd. Unfortunately, a series of ill - fated events caused the project not to go as planned. The two students with whom the study began got some promising preliminary results but then failed to follow through on subsequent work. There was an initial period of trial and error while we optimized our methods; this is a common occurrence when conducting new laboratory techniques. The reagents purchased with CURCA funding were used during the optimization and early experiments (so none went to waste); remaining CURCA monies went towards shared supplies (with Drs. Shanks and Lloyd) for mouse colony maintenance. At that time, my work responsibilities changed and increased, forcing me to refocus my scholarly efforts on established research in areas with which I was already familiar. Therefore, I have not recruited other students to continue the study. I hope to one day revive this line of work and use the baseline data as a starting point.

Budget: Minimal supplies and equipment are needed to conduct this study and most are already in – house. The main cost is for travel to the research site where samples are collected. Three students are currently involved in this study; more will continue the study during next summer’s field research course. We are requesting funding to support transportation to and from Sapelo Island, plus lodging in the UGAMI dorms. We anticipate two additional trips, of 3 nights each, will be necessary to get all of the samples needed at the correct times of the tidal cycle. A breakdown of costs is below:

Lodging (4 people x 6 nights x \$35/person/night) = \$840

*The UGAMI dorms have a stocked kitchen and students provide their own food so there is no cost for meals.

Gas (2 cars x 2 round trips) = \$400 (obviously a semi – educated guess, since who know what gas will cost?)

TOTAL = \$1240

Timeline: The project was started in June, 2012 and is ongoing. Given the students’ experience and enthusiasm, the additionally proposed studies will easily be completed by early spring semester of 2013.