

# University of Georgia Costa Rica Summer Research



Students: Malcolm Scobell, Casey Urban

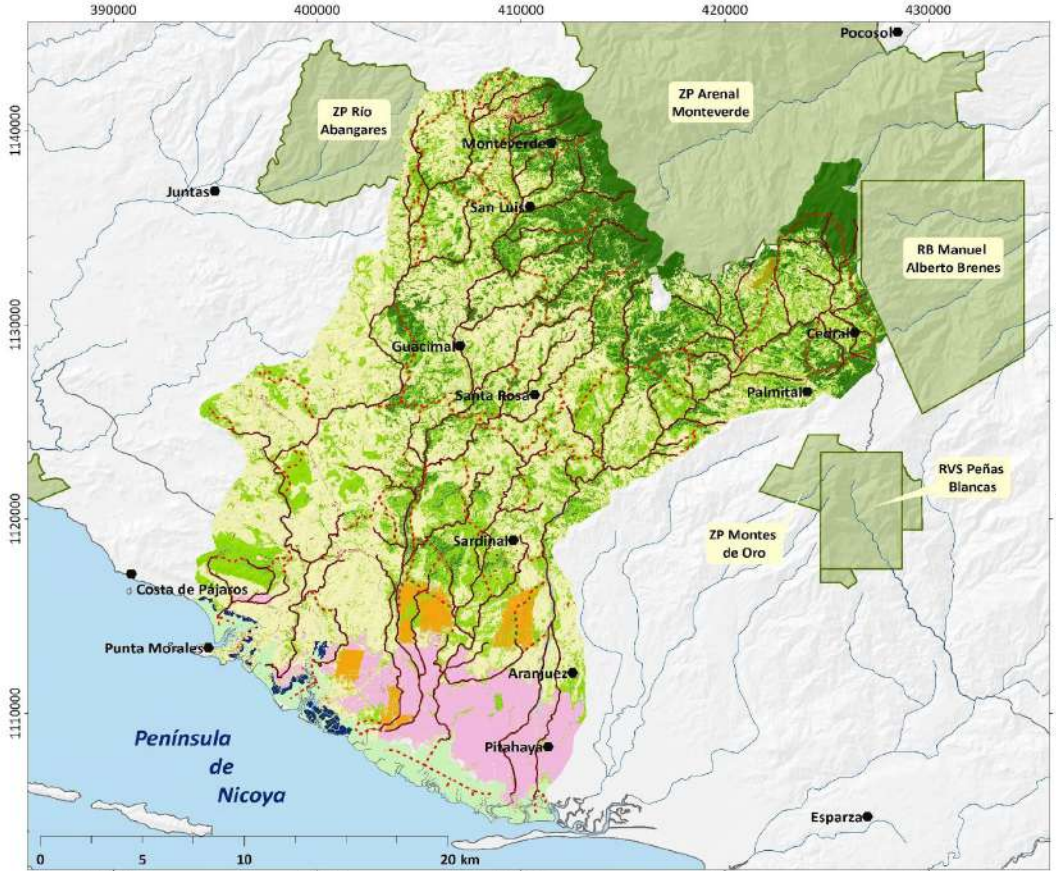
Advisor: Don Morris

Lehigh University, Bethlehem, PA



## Abstract

Working as research interns at the University of Georgia Costa Rica (UGA) campus for 7 weeks, we had the opportunity to work on a variety of research projects. These included: bird strike research, herbarium mounting, and water quality assessment of local watersheds. The water quality project was examining the differences in quality along the Bellbird Biological Corridor, and is the project of Professor Thomas Shahady of Lynchburg University. The Herbarium Collection was donated by William Haber, a botanist who worked extensively collecting and preserving specimens of plant species of Costa Rica. The Bird Strike research project was led by Martha, who is doing a data collection and analysis to find ways to reduce bird strike occurrences. The internship included some field days, but the majority of the work was done in a lab. The trip culminated in a community service project that consisted of more holistic water quality lab work with both chemical and physical testing.



Bellbird Biological Corridor: where sampling was done along three predominant watersheds.



Macroinvertebrate images through the microscope.

## Goals

The goal of this internship was to continue research being done in various areas by UGA staff and guest faculty. UGA supports research done in areas of ecology, forestry, agriculture, biology, and much more.



Laboratory setup for the work on river sample cleaning and macroinvertebrate counting.

## Methods

### Water Quality Project

A majority of the work for the water quality project was done in the lab. River samples collected in May had to be cleaned of leaves, sediment, and other materials in order to collect, preserve, and analyze the macroinvertebrate composition of the sample. Once this cleaning was finished, the macroinvertebrates could be sorted by Order and counted. Then the water quality could be assessed using the Bosque Eternal Index (BEI) formulated by Dr. Thomas Shahady. Chemical and biological analysis was also done for each sample at the time of collection. This included a five-day Biological Oxygen Demand test ( $BOD_5$ ), E coli and total coliforms cultivation and count, and measurements of temperature, pressure, dissolved oxygen, conductivity, pH, and ammonia. The river velocity and width was also calculated at the time of sampling. This collection and analysis is completed for 18 different sites along three predominant watersheds in the Bellbird Biological Corridor, every three months.

### Bird Strike Research

This research is being conducted by Martha Garro Cruz and we aided her in daily data collection. In the morning, we conducted an observational study of ten buildings around the UGA campus. We noted any bird behaviour that interacted with the windows, and entered the data into the database. In the afternoon, we did a systematic search of the ten buildings, looking for any signs of a bird strike (feathers, silhouettes, or dead birds).

### Herbarium Mounting

An intern at UGA campus took on the project of mounting the herbarium specimens onto paper in order for the samples to be preserved. We aided him in mounting the samples and creating a database of the specimens in the herbarium.



Deceased bird due to a window strike, collected during observations.

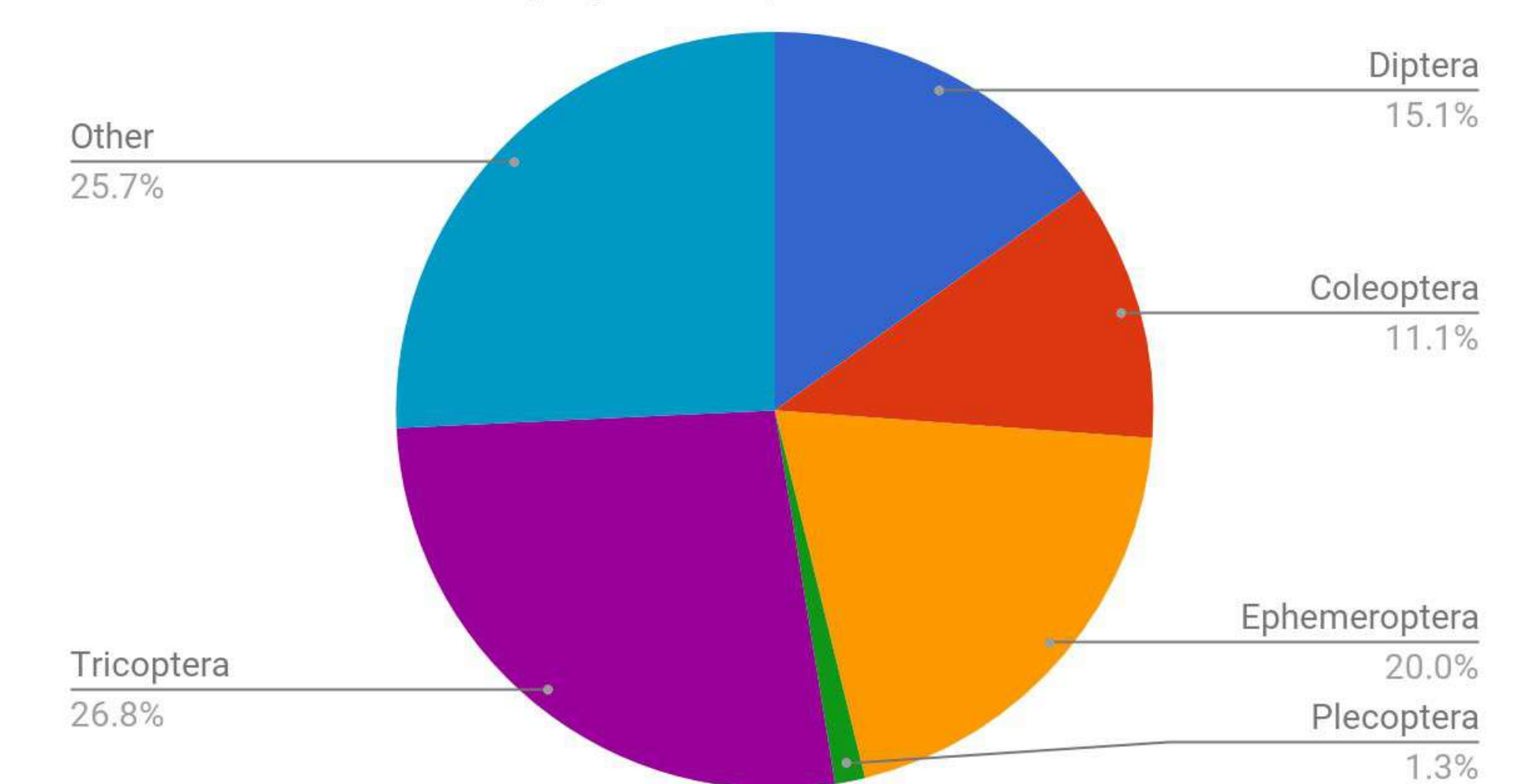


Herbarium specimen being mounted. Source: <https://ugacostaricablog.com/2017/06/28/hands-on-the-herbarium/>

## Community Service Project: Water Quality Workshop

The final portion of the internship was completed with the entire Lehigh intern group. For three days, sampling was conducted in the field at the 18 different sites. Measurements were taken of the river width, depth and velocity, and multiprobe chemical measurements, and samples of river material were also collected. This was brought back to the laboratory to be cleaned and analyzed. The groups then compared their data to each other's, as well as to data from May.

Macroinvertebrate Count (August 2017)



Distribution of Macroinvertebrates from a sample

## Future Work

We found that the BEI index was not an accurate measurement of water quality for all regions in the Bellbird Biological Corridor. The index needs to be continuously utilized to be properly collaborated for the corridor. It gave a 'good' assessment of the Reserva Monteverde site, which, being at the highest elevation of all the sites, should have been 'excellent' water quality. The vision is to be able to distribute the BEI system to local communities and schools, as a learning service project about local water quality. The bird strike data collection will be continued through 2017, until a system is implemented to prevent bird strikes. This will be studied and compared to the past data.

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Iacocca International Internship Program