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March 1st, 2023

On March 1st my class and I journeyed down to the lower San Luis valley in order to study stream and river ecology in the Guacimal and San Luis rivers, at approximately 10.218045 N, -84.849253 W. On our stream and river ecology field day, we did a physical survey, chemical survey, and biological survey (analyzed macroinvertebrates. In terms of the biological survey, 10 minutes were allotted to each student to collect macroinvertebrates in colanders that were under rocks in the river, and stored in a jar to be analyzed in the lab later to classify their order. At the end of the allotted time, we consolidated our species. This was done once for the San Luis river and the Guacimal river.

The reason why we were testing macroinvertebrates was that they are indicators of water quality. Different species relate to a scale from 1-10, quantifying the health of the water. 1 meant the worst water quality, while 10 meant the best water quality. The river ecosystem is especially important because communities and animals rely on the river water. For that reason it is important to know the quality of water, if the quality is bad it could affect the health of downstream animals and communities. A major benefit associated with conserving freshwater is that people are able to consume safe clean water for drinking and use. Everyone has the right to safe clean drinking water, although due to mismanagement and weak regulations, rivers are becoming polluted. We could take for example the Tempisque river that feeds into the Nicoya Gulf, it was very polluted from agricultural runoff and would therefore likely have macroinvertebrate species whose water quality indication is low. The main challenge of freshwater conservation is that there are many sources of contamination that are nonpoint sources, meaning that it's hard to identify where the contamination is originating from. This happens from agricultural runoff like

in the Tempisque river and might be happening in the Guacimal or San Luis rivers as well.

Another challenge in freshwater conservation is monitoring for contamination. How often are people/ scientists/ governmental officials going into river ecosystems to test for pollutants? This is where macroinvertebrate species identification is actually helpful because instead of running tests, the quality is indicated by the species present. A drawback of water quality indication from macroinvertebrates is that sometimes the data can be biased based on where you are pulling your sample, the day, season, etc. Although some indication is better than none, from our field day we did notice a difference in the two rivers which could indicate the difference in the water quality of the two rivers and lead to further policy reforms.