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Belize Independent research

November 6, 2013

Introduction

My independent research project is intended to determine the water quality at different points of the Sibun River, a major river flowing from the Maya Mountains in Belize. I plan to test the capacity and diversity of indicator macro-invertebrates in the river and determine whether the faster regions or slower regions can support more life. Indicator species are plants and/or animals that, with their presence, demonstrate a certain quality. For the Sibun I will be looking for indicators such as mayfly, stonefly, and caddis-fly larvae, who require high levels of oxygen to survive and indicate good quality water. The greater the number and the greater the diversity of the indicator species in the river, the better the quality of the water will be.

Because of the moderate temperatures and the relatively neutral pH levels of the Sibun it is able to sufficiently support many organisms and the overall quality is good. I hypothesize that the slower moving regions of the river will have a greater number of indicators with greater quality water than the faster moving regions with more turbulent water. There will be less indicator species in the faster water because many will not have adaptations that allow them to live in turbulent waters.

Materials List

* Kick Net- To collect organisms from the stream
* Specimen Jars- To store the organisms to study the collected species
* Measuring Tape, Stopwatch, and an Orange- To determine the velocity of the stream
* Pencil and Waterproof Notebook- To record the data

Method

This experiment required a four man team. We began by assembling the kick net by cutting down two approximately 5 foot limbs. Once the limbs were attached to the net we wadded out to a fast moving part of the river. We measured the velocity of several areas of the water using an orange, a measuring tape, and a stopwatch. We measuring out 15 meters and recorded how long the orange took to float down the 15 meters. After doing several tests we found the fastest and slowest moving waters in the area. Next two of the group members planted the kick net firmly in the river bed while the other two members walked upstream flipping rocks and kicking up sediment. After two minutes we pulled up the kick net and transferred the captured organisms into the specimen jars. We repeated this process two more times. Then we moved to the slowest water and did the same procedure three times, keeping these organisms in a separate jar. Finally, we brought the specimens back to the lodge and tallied up the organisms present in both the slow water and the fast water.

Results

|  |  |  |  |
| --- | --- | --- | --- |
| Number of Species (Faster) | Organisms in Faster Water | Number of Species (Slower) | Organisms in Slower Water |
| 1  4  4  2  3  1  1  1  2  1 | Hellgrammite  Damselfly (*Argia*)  Belostoma(*flumineum*)  Hydropsyche  Mayfly (*Pentamanthus*)  Mayfly (*Campsurus*)  Mayfly (*Katyroperia*)  Ecphyplocia  Caddisfly (*Trichoptera*)  Mayfly (*Leuetra*) | 1  2  1  1  1  2 | Hellgrammite  Damselfly (*Argia*)  Elmidae (*Dryopidae*)  Dragonfly (*Hagenius*)  Caddisfly (*Leptocella*)  Mayfly (*Pentamanthus*) |

Conclusion

I concluded that based on the presence of indicator species the Sibun River consists of quality water and can support many organisms. However, I did find that the faster moving contained a slightly higher percentage of the indicator species than the slower moving water, indicating that the fast water is higher quality. Of the species collected the slower water contained about 38 percent indicator species while the faster water was up to 40 percent indicator species. This is because the indicator species that demand high oxygen supplies have a more ample supply of new oxygen as more water is arriving quickly. The next step of my research would be to determine if besides the oxygen levels, would other factors (pH, temperature, etc.) also support the quality of the water or also if pollution is effecting the water quality.

Sources

* <a href="http://science.jrank.org/pages/3553/Indicator-Species.html">Indicator Species</a>
* http://www.wqpmag.com/victory-belize-sibun-river-saved-hazardous-waste-landfill
* http://www.epa.gov/nhrlsup1/arm/indicators/indicators.htm#rminv
* http://oregonexplorer.info/umpqua/WaterQuality/WaterQualityFactors
* http://wetlandinfo.ehp.qld.gov.au/wetlands/ecology/components/fauna/fauna-indicator-species-list.html#insect-and-arachnid