

Macroinvertebrates vs. Drought Effects

Shanick A. Pagán Fred
Jean P. Ortiz Calo
Prof. Rosaliz Rodriguez
José Aponte de la Torre School



ABSTRACT

Macroinvertebrates are great indicators of water quality. The abundance or absence of some species can help determine the state of the stream because of their sensitivity to pollution. The purpose of our research is to determine how the post drought effects affected macroinvertebrate population in the Puerto Rican streams; specifically, we will observe the changes in Phosphorus and Nitrogen levels to determine how these effects affected the macroinvertebrates. Nutrients, such as these, are essential for plant and animal growth and nourishment, but the overabundance of these in water can cause a number of adverse health and ecological effects. Excess nitrogen, for example can cause overstimulation of growth of aquatic plants and algae; Excessive growth of these organisms, in turn, can clog water intakes, use up dissolved oxygen as they decompose, and block light to deeper waters. Phosphorus, on the other hand, can speed up eutrophication (a reduction in dissolved oxygen in water bodies caused by an increase of mineral and organic nutrients) of rivers and lakes.

INTRODUCTION

- ❖ Macroinvertebrates are spineless organisms that can be seen with the naked eye.
- ❖ Macro organisms mostly inhabit aquatic ecosystems and are considered bio indicators of water quality.
- ❖ Droughts can cause environmental, economic or social impacts in a community.
- ❖ Excess nitrogen, as nitrate, in drinking water can result in restriction of oxygen transport in the bloodstream of young infants or young livestock because they lack the enzyme necessary to correct this condition.
- ❖ Both Phosphorus and Nitrogen are common constituents of agricultural fertilizers, manure, and organic wastes in sewage and industrial effluent.

ACKNOWLEDGEMENT

- ❖ The students of Academia Maria Reina and José E. Aponte de la Torre School
- ❖ Yiria Muniz Costas, José E. Aponte de la Torre School (Escuela Pa' Los Duros), Research Methods
- ❖ RAAC, St. Michael's College
- ❖ Rosaliz Rodriguez, José E. Aponte de la Torre School (Escuela Pa' Los Duros), Biology
- ❖ José E. Aponte de la Torre School

Funding provided by
NSF Grant EPS
#1101317



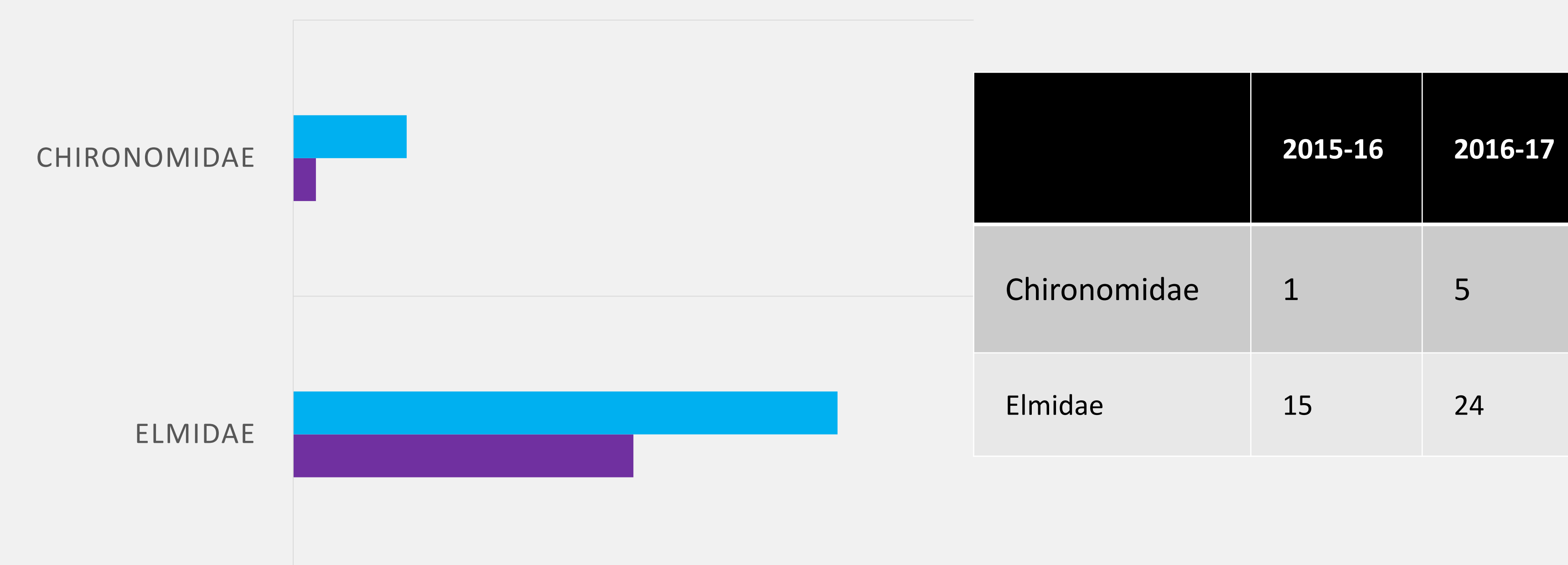
METHODOLOGY



RESULTS

MARACUTO

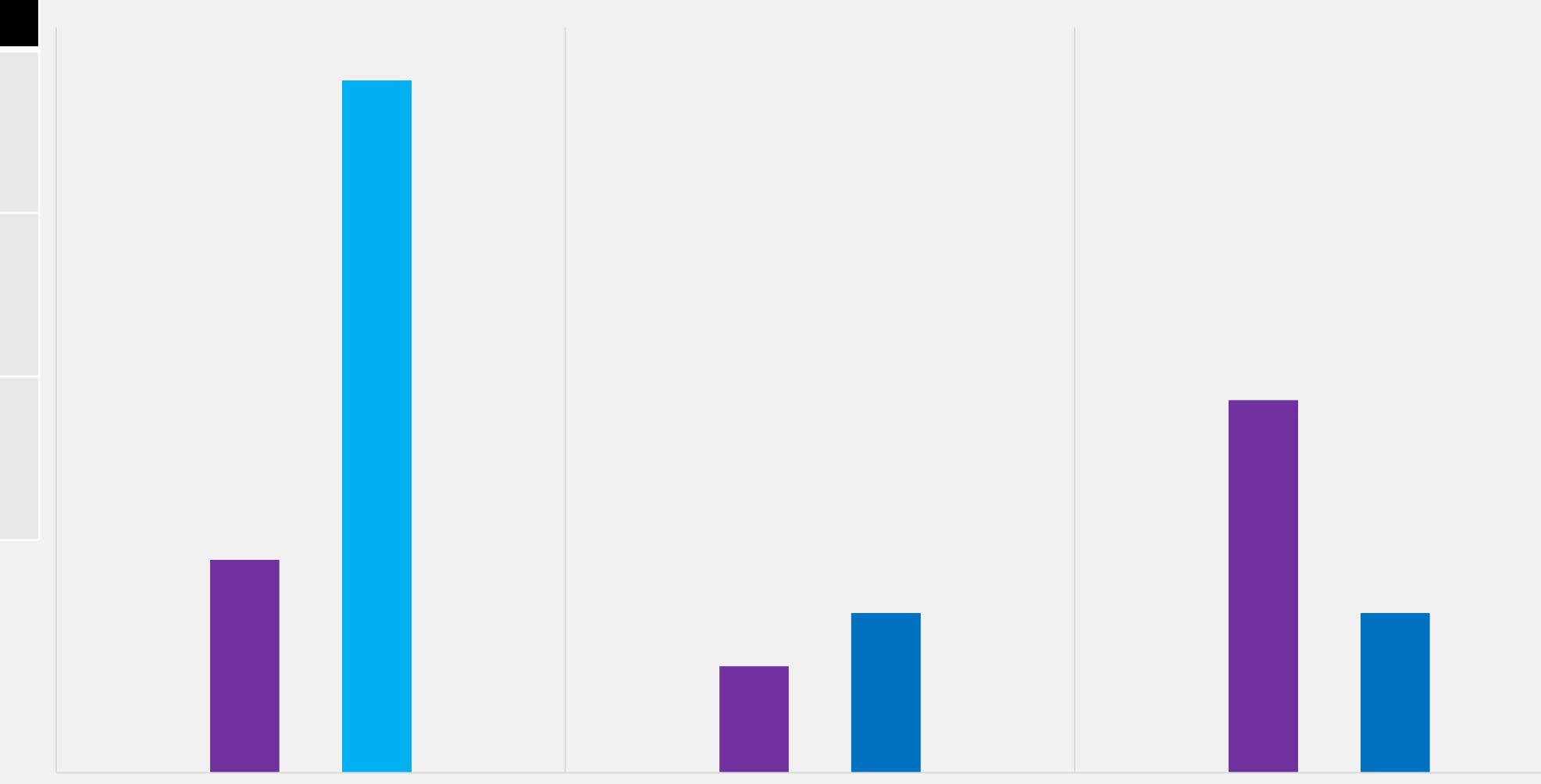
■ 2016-17 ■ 2015-16



	2015-16	2016-17
Hydropsychidae	4	13
Chironomidae	2	3
Elmidae	7	3

SABANA

■ 2015-16 ■ 2016-17



CONCLUSION

Comparing the years 2015-2016 and 2016-2017, the drought in Puerto Rico greatly affected the macroinvertebrate populations in the stream ecosystems that were studied. When comparing the macroinvertebrate populations over the two timespans, the populations greatly decreased after the drought that occurred during the year 2015-2016. This event caused an extreme deficit of essential nutrients for the macroinvertebrate populations that live in these natural river ecosystems. With the absence of these essential nutrients in the river, the macroinvertebrate populations suffered a massive population decrease. After studying and comparing macroinvertebrate population trends in the Maracuto and Sabana rivers before and after the drought a year later. We observed how the populations have increased slightly over time. Droughts, like the one that occurred in Puerto Rico, have catastrophic effects on the ecosystems that depend on natural water sources such as rain. Now, we observed how the macroinvertebrate populations are intensified but the drought has still not come to an end. Without this natural source of water, the river systems lose key nutrients that are essential for the survival of the macroinvertebrate populations that reside in them.

REFERENCES

- ❖ About education(2016), Water quality monitoring using aquatic macroinvertebrates. Consultant date; February-20-2017, URL:<http://insects.about.com/od/water-quality-monitoring/qt/Water-Quality-Monitoring-Usin>
- ❖ Food and agriculture Organization of The United Nations (2015). Biodiversity of the nature of soil. Consultant day February-16-2017, url:<http://www.fao.org/agriculture/crops/thematic-sitemap/theme/spi/soil-biodiversity/the-nature-of-soil/what-is-a-healthy-soil/en>
- ❖ The USGS Water Science School, Nitrogen and Water. Consultant date: February-26-2017.
- ❖ URL: <https://water.usgs.gov/edu/nitrogen.html>
- ❖ The USGS Water Science School, Phosphorus and Water. Consultant date: February-28-2017.
- ❖ URL: <https://water.usgs.gov/edu/phosphorus.html>
- ❖ Water quality(2013), Macroinvertebrates as indicators of water quality. Consultant date: Ferary-5-2017. URL:<http://extension.psu.edu/natural-resources/water/news/2013/macroinvertebrates-as-indicators-of-water-quality>
- ❖ Zhang, L., Li, C., Zhou, D., Zhang, S., & Chen, J. (2013). Hydrothermal Liquefaction of Water Hyacinth: Product Distribution and Identification. Energy Sources, Part A: Recovery, Utilization, and Environmental Effects, 1349-1357.