

Uncovering Presence of *E. coli* and Coliform Bacteria in an Island Community



Siyah Yongue & Anastasia Petrovskaya

Abstract

Belize, while small, is diverse ecologically and culturally. However, this places at risk from improper waste management (i.e. septic tank discharge) and non-point pollution. We examined different water locations around Caye Caulker and found a high presence of *E. coli* in certain areas. With this data helps use better understand the root causes of pollution. Additionally it will allow us to suggest improvements to the water quality in Caye Caulker.

Introduction

This experiment was organized in order to see if there was any, irregular concentrations of *E. coli* and coliforms in many water locations around Belize (Caye Caulker). The importance of this project is to inform the public on any harmful concentrations found, let the public know how to lower the harmful concentrations, and to encourage change on better liquid-solid waste management practices.

Hypothesis: *E. coli* and coliform concentrations are higher in areas that more densely populated.

Method

We went to 5 different locations around Caye Caulker and used 'Aquavial' *E. coli* and Coliforms Water Testing Kits. We used a sterile pipet to collect water at specific locations. The water was transfer to the tube to combine with lactose sugar and pH indicator. Tubes incubated at for 48 hours at room temperature. After 48 hours if the solution went to a dark pink then the water is considered unsafe due to the high concentrations of *E. coli* within, and if the solution stayed yellow then it means there is none to low concentrations of bacteria.

Discussion

We found that the local's well water had the strongest concentration of *E. coli* and coliforms. It is possible that the well is being contaminated by discharge from a nearby septic tank. If the well is old and the not sealed properly then septic material can seep through. These results are important because they were taken at a private home, and they were using this water for daily tasks With the help of this data, we were able to share the results, and let the residents know of solutions to reduce the concentration of bacteria, such as boiling the water before drinking or connecting to the island's main septic tank. Water collected at Sport Bar and the Water Plant showed fairly high levels of *E. coli*, however, they were not as high as in the well water. Possibly these results are due to non- point pollution, meaning that there is waste run-off occurring near these locations. It is our hope that Caye Caulker residents will use this data to find the main focal point of run-off pollution. Further studies should be conducted with a larger number of data collection kits, and/or kits that will identify specific types of bacteria. Our results were shared with different stake holders in Caye Caulker's community, and their reactions to the data might promote change.



Side House Well Protected Area 1 Protected Area 2



Sports Bar Treatment Plant Sink at the Split



Figure 1 – Aquavial's Reference on contaminated water versus clean water

References

Belize's Ecosystems: Threats and Challenges to Conservation in Belize, Colin A. Young.
 “*E. Coli* in Drinking Water - Aquatell.” *Aquatell U.S*

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