Environmental Impact Assessment of Aquatic Weed Removal at SBRC, Pond B

By: Paula Figueroa Delgado & Anna Tokunaga

Introduction:

SBRC (Sustainable Barbados Recycling Center) built Pond B in 2011. Shortly after they noticed that weeds began to overtake the pond. Throughout the years they have cleaned the pond multiple times and every time the same weeds or new weeds have returned. Due to the proximity of the pond to the recycling center there is nutrient runoff which subsequently causes eutrophication. Eutrophication occurs when there is an excess nutrient runoff that stimulates the growth of microorganisms and weeds (Okafor, 2011). Excessive water weed growth is not beneficial because as the weeds die, microorganisms break them down. This process takes up huge amounts of oxygen, therefore decreasing the amount of oxygen available for other organisms. The weeds have changed throughout the years but currently there is duckweed, paspalum and hydrilla in Pond B. However, during the sixth week of our project SBRC unexpectedly cleaned the pond therefore reducing but not eliminating the weeds.

Although SBRC is a recycling center they are interested in developing a tourism program to educate people about their operations. Our project is focused on developing a long term solution to ensure that the weeds in Pond B are properly managed in a cost and time effective manner, while protecting the biodiversity of the area and encouraging tourism to the site.

Our team:

Paula Figueroa Delgado (on left) and Anna Tokunaga (on right)

Goals and Objectives:

Our overall goal for this project is to determine the health of Pond B through a comparison with three other ponds (Bayfield, Halton and Royal Westmoreland) and to recommend the necessary changes to improve the ecological balance of the site. Supplementary to our analysis on weed control methods, we will recommend methods to beautify the site as part of a plan by SBRC to upgrade this area for tourists.

Methods:

In order to determine the ecological effects that removing the aquatic weeds could have on the area we analyzed the bird population of Pond B and the other 3 ponds with the help of Dr. John Webster. We did a comparative analysis of the bird population at Pond B before and after the pond was cleaned up to determine the loss of biodiversity caused by the removal.

We also took water samples from the four ponds to test for biological and chemical

oxygen demand, nitrogen, phosphorus and potassium content and brought them to the government analytical services lab. This allowed us to develop a better understanding of why the weeds were in certain ponds.

Results & Discussion:

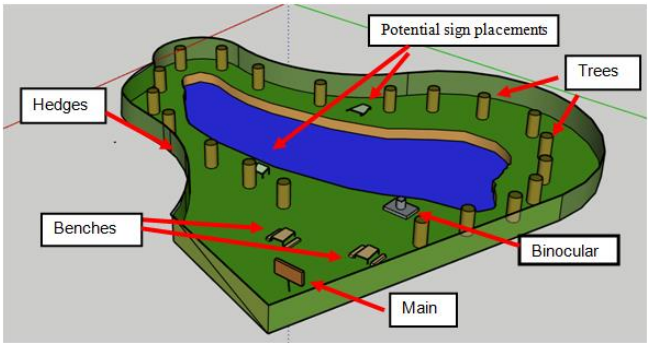
The water sampling results are limited due to the small sample size, however there were high levels of nutrients in Pond B at least in one of the sample which supports our hypothesis that the weeds were present because of eutrophication. We also observed that Royal Westmoreland was the healthiest pond in terms of oxygen levels, as well as standard nutrient contents, and it contained the least amount of weeds.

We identified duckweed, hydrilla and paspalum in Pond B. Hydrilla was our main focus due to its extremely invasive nature and ability to out compete other plants and overtake the ecosystem. Both duckweed and paspalum although they have the potential to become problematic actually appear to be beneficial for the bird species in the area.

Due to the unexpected clean up of the water weeds during our study we were able to analyze the effect that the removal of aquatic weeds had on the bird species abundance. There were four species out of the eleven total that were absent from the pond both when we surveyed a week and three weeks after the weed removal. Although they may return to the pond eventually this dramatic decrease in bird species clearly demonstrates the importance that these weeds can have.

Recommendations:

As previously mentioned, we focused most of our efforts on the removal of hydrilla. There are many possible removal methods including chemical and mechanical however, we suggest using a biological control. Triploid grass carp is often used to control water weeds because they eats high quantities of weeds and are sterile in order to prevent them from overtaking the ecosystem (Clugston & Shireman, 1987). They would control Hydrilla and duckweed while not completely eradicating the weeds from the pond. It is also beneficial because if done properly, it is a self sustaining system that makes the pond cheap and easy to manage.



In order to promote tourism and education at Pond B we suggest adding hedges, picnic tables, binoculars and signs. Below is a sample of a sign.

Conclusion:

Pond B is a diverse ecosystem that affects the flora and fauna surrounding the area. This projects goal was to enable SBRC to clean up the pond and to create an aesthetically pleasing resting area while creating the least ecological damage possible. Throughout our research we outlined the three weeds that are

present in the pond (paspalum, duckweed and hydrilla) and attempted to determine if and how to remove them. Hydrilla should be the focus when cleaning up the pond due to its invasive nature and ability to take over the entire pond. We believe that the most effective and least damaging method of control is by adding triploid grass carp to the ecosystem. However, further research should be done to conclusively determine the best method and the effect it may have on other aspects of the ecosystem.

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References:

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