

Survey of Banded Sunfish Population in Zeke's Pond

Katie Heiser(Lafayette College Easton, PA 18042) Dr. Timothy Green (Brookhaven National Laboratory Upton, NY 11973)

Introduction

In New York State the range of the Banded Sunfish (*Enneacanthus obesus*) is constrained to small areas of Long Island. Because of this, it has been listed as a threatened species by the State. The headwaters of the Peconic River provided suitable habitat with thick vegetation lining the shores. However, during the Peconic River restoration project at Brookhaven National Laboratory, much of this habitat was destroyed. In 2003 and 2004, an attempt to save the population was made and 195 banded sunfish were rescued ahead of the Peconic River cleanup. Many of the Banded Sunfish living in the Peconic River were relocated to Zeke's pond.

Zeke's pond is a large coastal plain pond located in the east central portion of BNL. In 2002 drought conditions resulted in the pond nearly drying up. A small population of banded sunfish were rescued and reintroduced to the pond in 2003. Those fish plus the 195 rescued from the Peconic River in 2003 made up the breeding stock for the present population study.

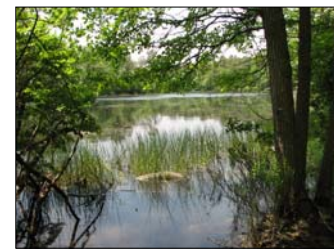


Adult Banded Sunfish(*Enneacanthus obesus*)



Results

The number of fish per square foot was determined for each seine run. Then a density was determined for the area seined. The average for all seine runs was 0.35 Banded Sunfish per square foot. Assuming a 98% confidence rate there was a range of 0.33-0.37 fish per square foot. The total area covered by the pond is approximately 290,800 square feet (6.68 acres). Based on the average number of fish per square foot the population was estimated at approximately 101,800 fish in the pond. However, based on the range of 0.33 - .037 per square foot, there could be anywhere from 95,900 fish to 107,600 fish in the Zeke's pond. The efficiency of the seining was not evaluated, so there could be a significantly larger population than predicted.



Zeke's Pond

Materials and Methods

Seine nets proved to be the most effective way to capture the Banded Sunfish. Originally it was thought that the fish would prefer the more vegetated portions of the pond. This would mean differences in the density of fish in the pond. Therefore, both open water and vegetated areas were seined in an attempt to find the densities of the different habitats. All of the runs were logged individually and described. After the fish were captured, they were counted, measured and then immediately released back into the pond. The standard length was measured from the snout to the end of the body or just prior to the start of the tail fin.

A seine net is a large net with two poles at either end that is pulled through the water by two people. Ideally the net will end up covering everything from the bottom to the surface of the pond.

The effectiveness of the seining based on visual observations was as low as 50%. The exact efficiency is uncertain, however that would place the estimate significantly higher at approximately 202,000 banded sunfish. Since this study did not evaluate the efficiency of the sampling technique, the total estimate for this study will remain at approximately 101,000 fish.

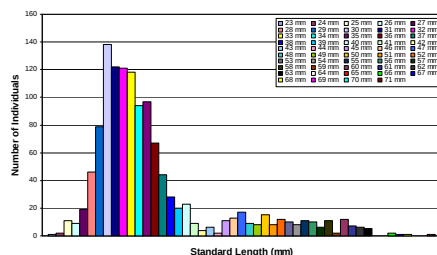


Figure 1 shows all of the individuals surveyed by length. The population is comprised of mostly juvenile fish.



Juvenile Banded Sunfish

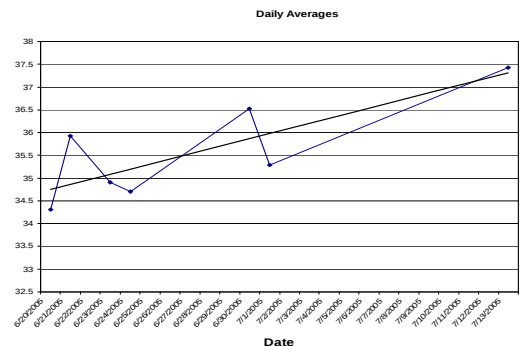


Figure 2 shows the average growth rate from the first day of seining to the last. The fish grew so rapidly that there were few fish under 30mm by the final week of seining.

This study clearly includes this year's hatchlings, for which the mortality rate is unknown. At a different point in the year the number of fish surviving in the pond could be very different. However, the life cycle of the Banded Sunfish has not been closely studied and their population patterns are unknown. The abundance of hatchlings and rapid growth rate could be indicative of a future overpopulation problem and the population could plummet in a few years. It is hoped that the number of breeding individuals will be increased next year and the population will begin to stabilize.

Although the Banded Sunfish appear to be doing well, there are a number of other species living in Zeke's Pond. The effect of these species on the Banded Sunfish is unknown. While seining, Green Frog and Bullfrog tadpoles were commonly captured. Tadpoles were not counted or measured, and were immediately released. The next most common animal found in the net was the Pumpkinseed Sunfish. While they were not part of the study, they were still measured. By the end of the study there had been approximately 20 Pumpkinseeds ranging in length from 18mm to 65mm. Larger adult Pumpkinseeds were also observed, but none were captured. Although this information may not serve to estimate the size of the population it does show an established population of Pumpkinseed Sunfish in Zeke's pond.



Banded Sunfish being released into Zeke's Pond

While fish were being collected for this study, many Banded Sunfish were observed in the wild. Individuals were seen guarding small six to eight inch depressions in the mud. It is assumed that the fish were guarding nests, much like other sunfish. Behavior like this is also indicative of a healthy and growing population.

Despite the variable range of possible population estimates presented in this study, the rescue project appears to have been successful. Based on the study, the initial population has grown approximately 500 times its original size. It is hopeful that this phenomenal growth rate has allowed the sunfish to become permanently established in Zeke's Pond and will allow their reintroduction to the Peconic River and possibly re-establish populations in other suitable ponds in the Peconic River system.

Acknowledgments

I thank the U.S. Department of Energy, Office of Science and the National Science Foundation (NSF) for this unique opportunity to conduct research at Brookhaven National Laboratory through the SULI program. I especially thank my mentor, Tim Green for his wealth of knowledge, excellent mentoring and help collecting fish. I also thank Jennifer Higbie for her help with the GIS. I would also like to offer my gratitude to all the people who came out to see the project and help seine for fish.