

Population Assessment of the New York State Threatened *Enneacanthus obesus* (Banded Sunfish) Conducted in Zeke's Pond and the Peconic River

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ABSTRACT

Population Assessment of the New York State Threatened *Enneacanthus obesus* (Banded Sunfish) Conducted in Zeke's Pond and the Peconic River. TYRA BUNCH AND CARMEN MALDONADO (Southern University at New Orleans, New Orleans, LA 70126) TIMOTHY GREEN (Brookhaven National Laboratory, Upton, NY 11973)

Enneacanthus obesus (Banded sunfish), the smallest species of sunfish inhabiting rivers, lakes, and ponds along the Atlantic coast, has been declared a threatened species in the state of New York. Approximately 200 sunfish were relocated to Zeke's Pond in 2004 during the remediation of the Peconic River, which runs through Brookhaven's property. However, in 2005 a drought nearly eliminated the relocated sunfish population. A population assessment was conducted in the Peconic River, and Zeke's pond, which is found on the eastern most point of Brookhaven's grounds. To capture and assess a sampling of the sunfish population, a seine net, a dip net, a bucket, a measuring tape, a pen, and an all weather writing tablet were utilized. The first step was to complete a survey of the aquatic vegetation by calculating the amount of vegetation in the immediate area that was to be seined. The sunfish were collected from the seine net, stored in the bucket, counted, measured, and then returned safely back to the water. No sunfish were found in the Peconic River. An area of approximately 25785.5 ft.² was covered in Zeke's Pond during a series of thirteen visits resulting in a total of eighty seines. Final fish counts yielded 369 sunfish, sixty-six catfish, and thirteen pumpkinseeds. The estimated total population is 4,027, which is 4% of the previous study's count of 95,900. Further studies are necessary to document the life cycle and population trends of the *Enneacanthus obesus*.

1. INTRODUCTION

Enneacanthus obesus is a fresh water fish of the order Perciformes and the family Centrarchidae; their common name is banded sunfish. The word Ennea, meaning nine, and canthus, meaning rim of wheel or edge, represents the 9 “bands” circling the little fish’s body.

Averaging about 40 to 70mm in length [1], other distinguishing characteristics of the banded sunfish include an upturned mouth, rounded pectoral and tail fins, and an olive green body covered with purple, green and gold iridescent specks. *E. obesus* are carnivorous fish; they eat crustaceans, mollusks, other small aquatic or living life forms, and insect however, the most ecologically significant part of their diet is mosquito larvae, which helps in part to control the mosquito population near the bodies of water



Figure 1 Zeke's Pond

the sunfish inhabit. The banded sunfish inhabit rivers, lakes, and ponds along the Atlantic Coast; however, *E. obesus* is a threatened species in the state of New York. As a threatened genus, it has become important to reestablish the banded sunfish and prevent them from moving to the endangered species list. Therefore, Brookhaven National Laboratory in conjunction with the Department of Energy launched plans to prevent the sunfish from becoming endangered. The Peconic River, which runs through the grounds of Brookhaven National Laboratory, was home for the sunfish however, in 2004, lab personnel began remediation on the river to remove harmful chemicals that had spilled into the river over the past decades of scientific research and

discovery. During the initial steps of the remediation process, scientists and students at the lab began removing banded sunfish and relocating them into other parts of the Peconic River and Zeke's Pond, which is on the eastern most point of the laboratory's grounds. As a result of those initial steps in the remediation process, Zeke's Pond received approximately 200 banded sunfish. In 2005 a drought nearly eliminated the relocated sunfish population. Six sunfish were rescued from the practically waterless pond. Once the pond water had returned to adequate levels, the surviving sunfish were re-released into the pond to flourish.

2. METHODS AND MATERIALS

To capture and assess a sampling of the sunfish population, the materials required included a seine net, a dip net, a bucket, a measuring tape, a pencil, and an all weather writing booklet. Once in the water the preliminary procedure consisted of completing an Aquatic Vegetation Survey (AVS) by calculating the amount of Submerged Aquatic Vegetation (SAV) in the area that was to be seined. The aquatic vegetation survey was conducted by visually observing the quantities and densities of vegetation present in the area to be seined. Upon observation a rubric was utilized to calculate the amount of vegetation present in each seining site. The rubric scale is as follows:

Rubric
Found: One or two plants of a species found in an AVAS (Aquatic Vegetation Assessment Site), equivalent to less than 2% of the total AVAS surface area.
Sparse: Scattered distribution of a species in an AVAS, equivalent to between 2% and 20% of the total AVAS surface area.
Common: Common distribution of a species where the species is easily found in an AVAS equivalent to between 21% and 60% of the total AVAS surface.
Dense: Dense distribution of a species where the species is present in considerable quantities throughout and AVAS, equivalent to greater than 60% of the total AVAS surface.

Table 1 Rubric for aquatic vegetation survey [3]

Once the AVS was completed for the immediate area, seining was done in the assessed area. To seine an area, the seine net had to be swiftly dragged along the floor of the pond and pulled rapidly from the water; the sunfish were collected from the seine net by sifting through the SAV that was captured in the net. Next, the fish were counted and stored in the bucket until the seine net was completely emptied. Then the fish were measured individually, and their sizes were recorded for future reference. Finally the fish were returned safely back to the water. Once the assessment of the fish was completed, the next seining process would begin where the last process ended immediately following completion of the AVS.

3. RESULTS

While the total area of Zeke's Pond is estimated at 281,432 ft.², an area of approximately 25785.5 ft.² was covered during this summer's seining process. A total of eighty seines were completed during a series of thirteen visits to Zeke's Pond over a period of eight weeks. Seining in Zeke's Pond began on June 11, 2007 and was concluded on July 31, 2007. The total number of banded sunfish collected in Zeke's Pond was 369[Table 3]. Additionally there were a total of sixty-six catfish and thirteen pumpkinseeds caught during the seining period.

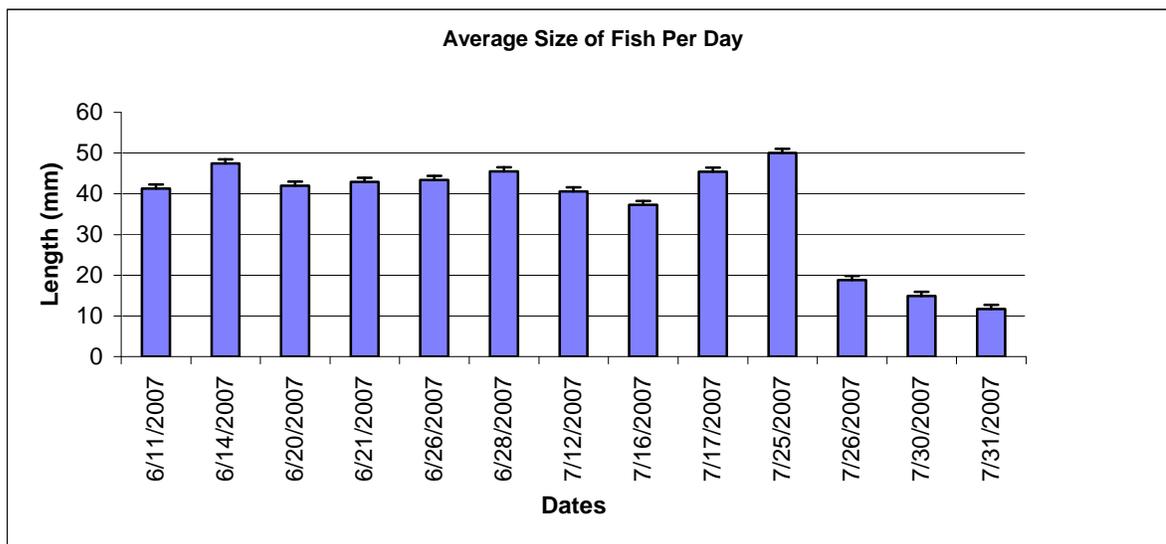


Table 2 Average Size of Fish Per Day

Although the range of sizes of banded sunfish varied, the smallest sunfish measured 12mm in length, while the largest fish measured 60mm. The average size of fish captured were 35.32mm and the average number of fish per square foot were 0.014. The estimated population of banded sunfish in Zeke's Pond is 4027, which is one-fifth of the previous years estimated total population. Standard deviation, which is a measurement of the variation within a distribution, ranged from 4.6 to 12.17.

Seining in the Peconic River began on June 25, 2007 and was concluded on July 10, 2007. Seining in several different locations along the Peconic River on Brookhaven's grounds did not yield any banded sunfish; however, one catfish, two minnows, and one pickerel were caught in different locations along the Peconic River.

4. DISCUSSION AND CONCLUSION

In comparison to the previous study conducted in 2005, there has been a substantial decrease in population of banded sunfish in Zeke's Pond. Previous studies suggested the population ranged from 95,900 to 107,600 [4]. However, the survey conducted this year estimated a total population of 4,027-banded sunfish in Zeke's Pond.



Fig. 2 Banded sunfish

From the overall data obtained, certain trends can be observed. In heavily vegetated areas more fish were caught. In areas that were open with sparse amounts of vegetation, less fish were

obtained. This can be associated to habitat, heavily vegetated areas not only provide more protection from predators, but also facilitate a food source.

The sizes of the fish also contrasted between initial and final runs. In runs one through sixty-seven the sizes of the fish caught ranged from 17mm to 60mm. However, in run 68 through 80 the sizes of the fish caught ranged from 12mm to 57mm. Most of the fish caught in the final runs were very small in length in comparison to the fish caught initially as a result of the fish spawning during the week of July 1, 2007. Schools of fry could be observed during that time. Due to this fact, seining had to be suspended for a week to allow the fry to grow. An increase in predation of the banded sunfish could possibly be attributed to the decrease of total population.

It was determined that 4% of the previous study's population has survived predation and other factors that has caused the sunfish to be listed as threatened in the state of New York. Such factors include a change in water level, which can be associated to an increase in the amount of predators. Also the effectiveness of the seining process could have affected the total fish count. Further studies are necessary to document long-term trends in the life cycle and population of the *Enneacanthus obesus*.

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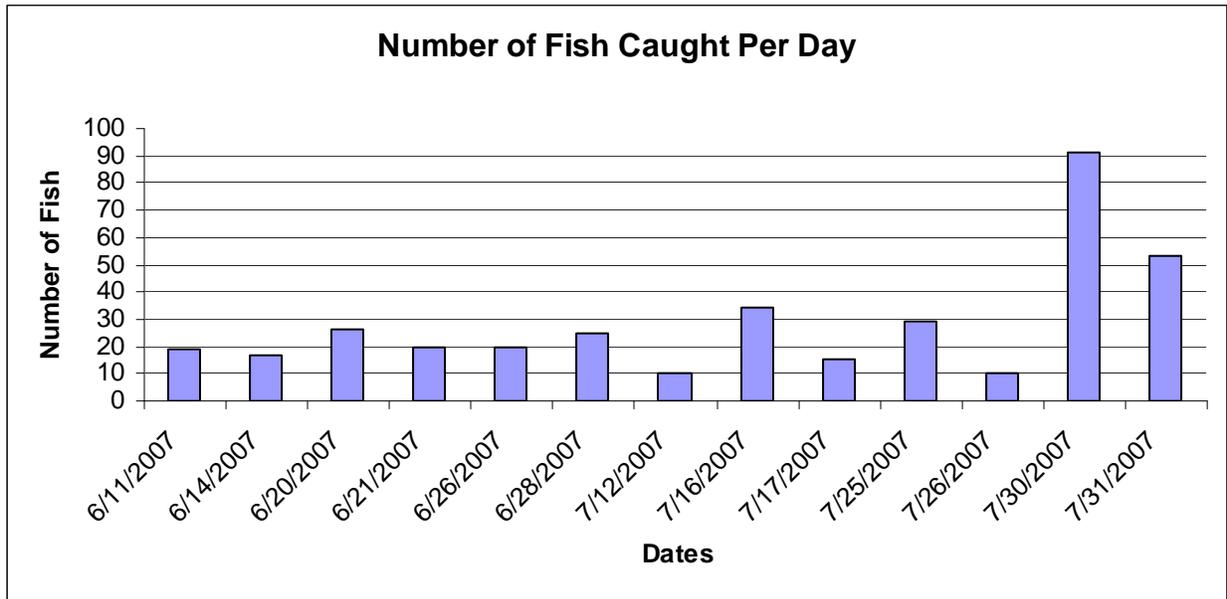


Table 3. Number of Fish Caught Per Day

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