

Greenbelt Willowbrook Lake Fisheries Assessment



NYC Parks Greenbelt Natural Resources Team (GNRT)

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July 2, 2012



**GREENBELT
CONSERVANCY**

Introduction

Willowbrook Park is a 226-acre park within the Greenbelt's 2,800 acre flagship park system, located in Staten Island. Willowbrook Lake is a 5-acre freshwater body surrounded by ash and sweetgum dominant forest, and landscaped areas near Victory Boulevard. The lake is maintained and managed by NYC Parks and NYS DEC.

The Greenbelt Natural Resources Team (GNRT) oversees and stewards the natural areas of the Greenbelt through an ecosystem-based management approach. In light of recent flooding events and deterioration of the lake's shoreline, GNRT set out to conduct a fisheries assessment to establish a baseline for fish data, water quality, and recommendations for a restoration plan to improve the lake's ecology.

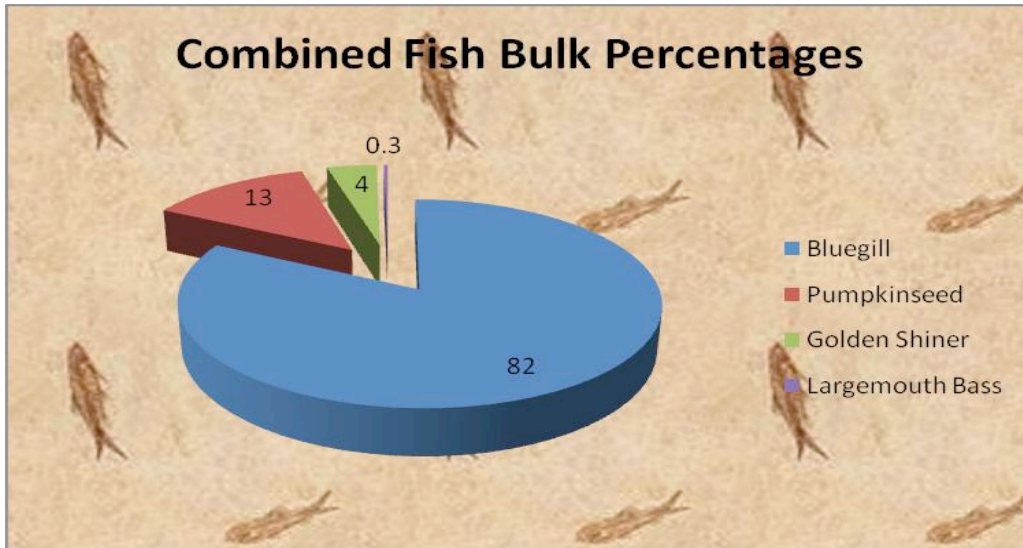
Methods

On September 26, 2011, GNRT staff surveyed six transects during the morning and afternoon hours along the northern and western borders of the lake. Transects ran approximately 15 meters in length. Staff wore waders and used seine nets to collect the fish in these transects. Also, staff surveyed these transects and discovered that the best method was to 'round-up' the fish within the transects towards the seine nets instead of seining in random formation. The survey was completed within four to five hours. .

Fish were caught and transferred to live wells close to shore for data analysis. Staff assessed for species, length (mm) and weight (grams). For the most part, weight was discounted because the fish were small in size. The catch per unit effort was determined for Bluegill (*Lepomis macrochirus*), Pumpkinseed (*Lepomis gibbosus*), Golden shiner (*Notemigonus crysoleucas*) and Largemouth bass (*Micropterus salmoides*). The length frequency distribution and the average length for each of these species were determined, along with the Proportional Stock Density (PSD) to describe the size of Largemouth bass and Bluegill population of the lake. Fish stock size is the size fish reach maturity, and quality size refers to the size of fish anglers prefer to catch. Largemouth bass PSDs are 40-70 or 200mm to 300mm (8"-12") and Bluegill are 20-40 or 80mm to 150 mm (3"-6"). It was determined that stock size for Bluegill is 80mm and 250mm for Largemouth bass to reach maturity. All fish were successfully returned to the lake.

Results

323 fish were collected during the assessment. The following pie chart illustrates the fish assemblage:



The average catch per unit effort (CPUE) for Largemouth bass throughout the 6 transects was 0.01. The average CPUE for Bluegills was 2.96. Average Pumpkinseed CPUE was 0.48. The average CPUE for Golden shiners was 0.14. The length frequency distribution for Bluegill, Largemouth Bass, Pumpkinseed and Golden Shiner is displayed in Figures 1,2,3 and 4; respectively. The average length of Largemouth bass was 175 mm. The average length for Bluegills was 41 mm, 70.37 mm for Pumpkinseeds and 94.77 mm for Golden shiners (Fig. 5).

The range of proportional stock density (PSD) values indicative of balance when the population supports a substantial fishery are 40-70 for Largemouth bass and 20-40 for Bluegill (Anderson, 1980). The formula for PSD (%) = number \geq quality *100/number \geq stock size (Anderson, 1976). The PSD for Largemouth bass was 0% and 10.6% for Bluegills.

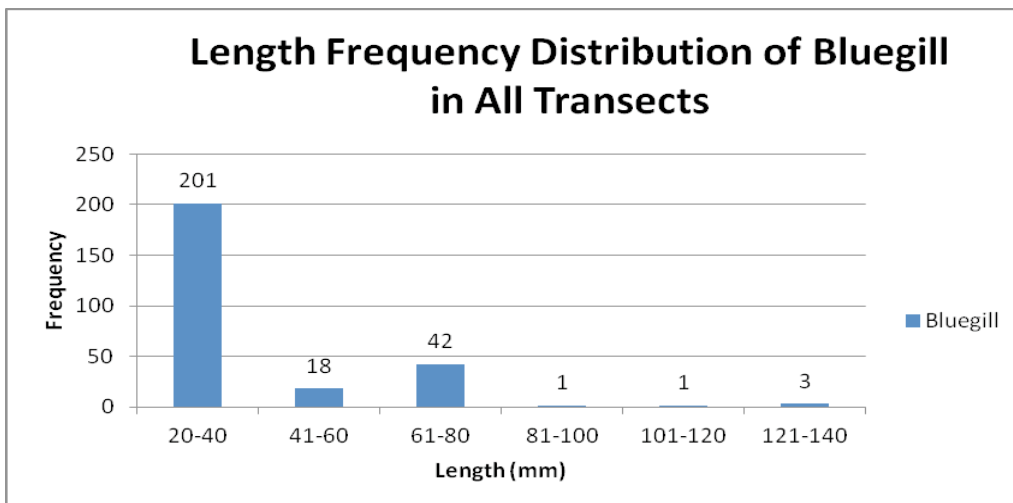


Fig.1: Length frequency distribution of Bluegill in all transects.

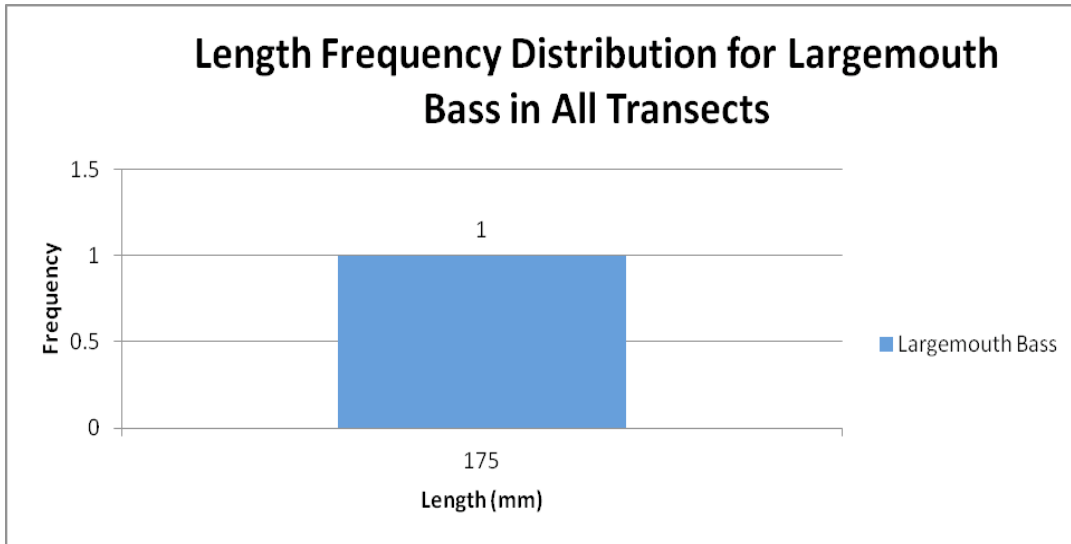


Fig.2: Length frequency distribution for Largemouth Bass in all transects.

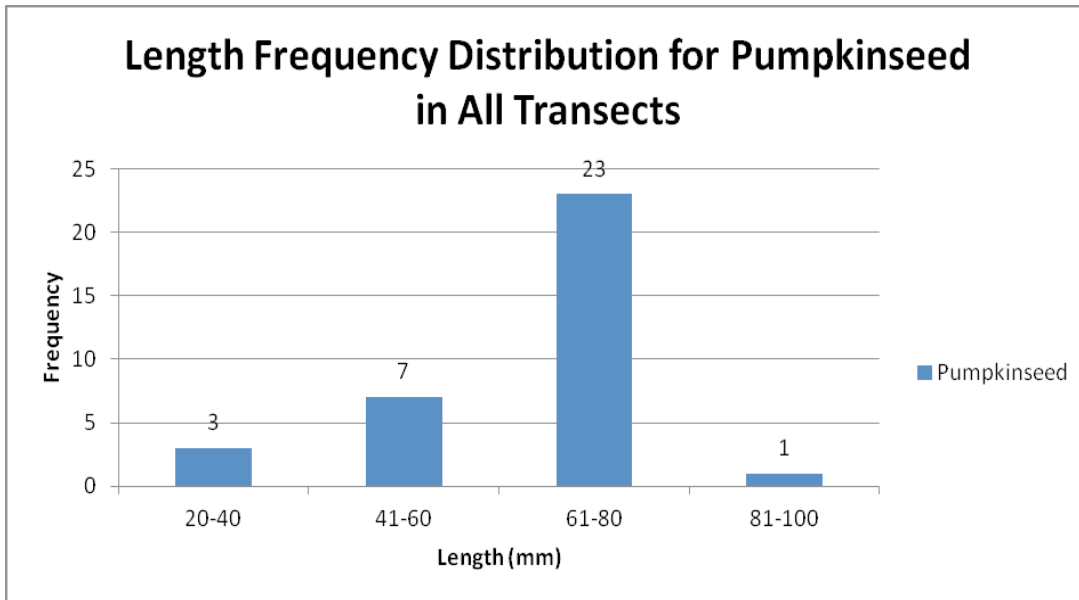


Fig.3: Length frequency distribution for Pumpkinseed in all transects.

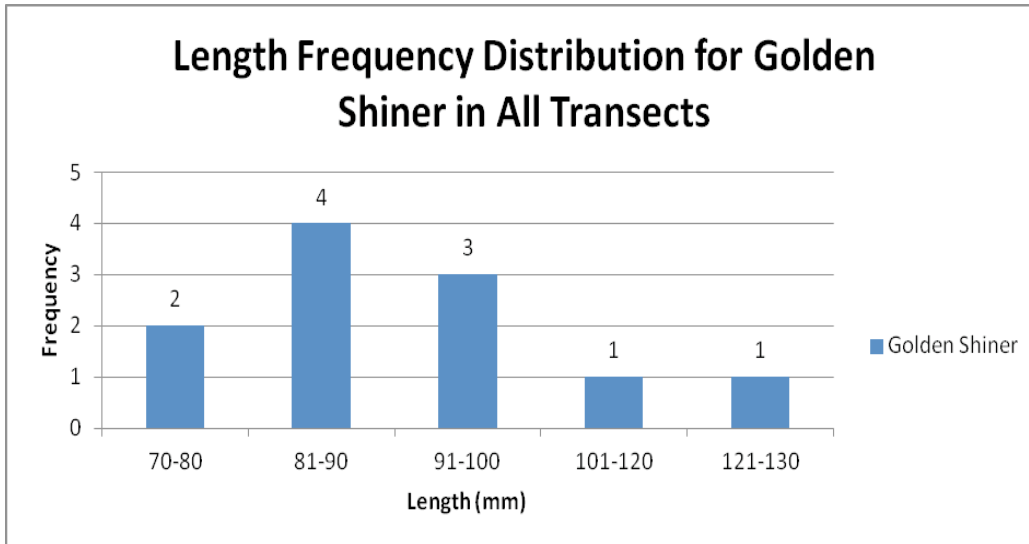


Fig.4: Length Frequency Distribution for Golden Shiner in all transects.

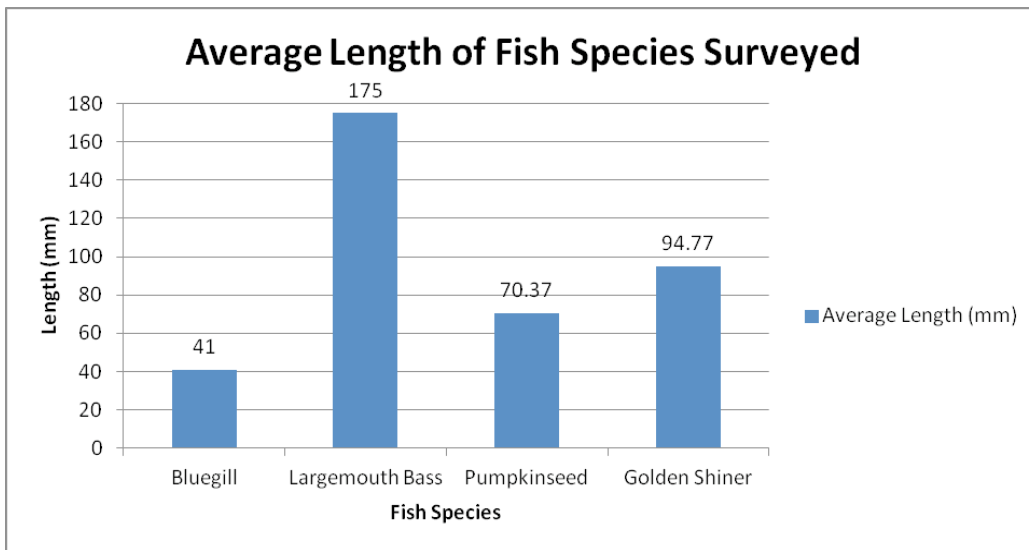


Fig.5: Average length of species surveyed; Bluegill, Largemouth Bass, Pumpkinseed, and Golden Shiner.

Discussion

According to the PSD values for Largemouth bass and Bluegill populations, Willowbrook Lake is likely unbalanced in the predator-prey ratios. Due to the low sampling numbers for Largemouth bass, it is not a viable representation of the PSD %. This is mainly due to the limitations of using seine nets for this species. However, the PSD % value for Bluegill is relatively accurate using the same method and is below its range of 20-60, which implies an unbalanced fish population. One can assume that the

lake's Largemouth bass PSD % is lower than a balanced PSD % value in relation to the observed Bluegill PSD %.

Management Recommendations

Conduct another fish survey starting September 2012 and possibly team up with NYS DEC to expand the fish survey. The results may vary and be more effective if the assessment methodology used by NYS DEC involves electro-shocking. As an ongoing fisheries surveillance effort by GNRT, we will seek to initiate another fish survey in High Rock Park in addition to Willowbrook to assess other water bodies in the Greenbelt.

In the spring of 2012, NYC Parks planted 500 native shrubs along the western shoreline to address the erosion. Volunteers from Goldman Sachs, NY Cares and Parks staff from NRG and the Greenbelt coordinated this effort. In July 2012, these plants will be mulched with woodchips to reduce weeds from overgrowing the area. The planting site will be monitored periodically for the next two years.

If funding allows, NYC Parks will seek to continue stabilizing the eroding shoreline using bio-logs incrementally, in addition to the existing shrub line. We also will seek to partner with NYS DEC and the Greenbelt Conservancy to advance this front.

Acknowledgement

I would like to thank the Greenbelt Administration, and the Greenbelt Conservancy for supporting GNRT in this study. I also would like to thank NYS DEC, particularly the Region 2 Fisheries Manager M. K. Cohen for sharing her knowledge and expertise, and the Licensing Division for assisting with specimen collection. Also, the Greenbelt Environmental Education staff including, Beth Nicholls, Nancy Clair, and Karen Roos for their assistance with the survey. Finally, Anna Puchkoff, one of my GNRT 2012 summer interns, for her assistance in drafting parts of this report and calculating the biostatics.

References

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