HEP Mini Grant: Southern Brooklyn Ecological Education Partnership

Summer 2006 Final Report

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Introduction

The Natural Resources Group (NRG), as part of City of New York Parks and Recreation, completed its third year of partnership with the New York Aquarium to improve and expand upon 2004's Teen Conservation and Stewardship Program. This program was designed to provide basic ecological data for this designated restoration site, as well as providing field experiences for local high school students. For many of the participants this was a first time exposure to field study techniques. The program promoted environmental stewardship of existing parkland that is being monitored by NRG pre-restoration at Dreier Offerman and Six Diamonds Parks in Brooklyn.

Methodology

This educational program took place during the month of August. A total of six field days were selected and organized by Kimberlyn Acevedo, the hired Ecological Education Coordinator and with the help of Michelle Vermonty, the Volunteer Coordinator at the New York Aquarium. In total there were thirty- six participants from the Aquarium's summer docent program this year.

The docents began their field day with a discussion of salt marsh ecology with an emphasis on marsh formation, the characteristics of healthy and disturbed marsh habitats, and instruction on using field guides. Once in the field at the study site, the volunteers recorded weather observations and water quality data and took note of wildlife activity on the marsh.

Of the six days that were set aside as field days, docents spent exactly half of those days in chest waders seining for fish at two of the three different locations along Coney Island Creek at high tide. Captured fish were then transferred to a holding bucket and species were identified using the *Peterson's Field Guide to Fish of the Atlantic Region.* The volunteers, careful not to harm the fish, measured the length of each one. All information was recorded on data sheets that had been drafted by former NRG Project Manager, Robbin Bergfors. The formal protocols established for use in the fish and true crab monitoring was provided in the report for this project from last summer.

The other half of the field days were spent observing true crab populations at low tide along the marsh. Docents measured out two-meter transects along the shore within each station and upturned rocks and debris. Using the *Peterson's Field Guide to the Atlantic Seashore* the volunteers were able to identify and record the species of crab being observed and their sex, while also taking particular note of egg- bearing females. In an attempt to maintain crab burrows, as well as to continue to foster a sense of stewardship amongst the docents, all rocks and debris that were overturned in the transects were replaced.

In addition to the data collection conducted on the true crab populations at the Coney Island Creek sites, docents also participated in the serial tagging, measurement, and release of horseshoe crabs as part of a research study for Dr. Jennifer Mattei of Sacred Heart University in Fairfield, Connecticut.

Results

Upon the completion of the fieldwork conducted, the summer docents were asked to complete a minimum of a one- page summary of their work at the Coney Island Creek sites. A total of eight docents completed the assignment. They were asked to include in their summary the location where their fieldwork took place, the type of work that was conducted, what their experience was like, what they learned, and what they liked best or least about the work they did. Overall, the feedback was very positive. All the docents enjoyed themselves and said they would continue to come out for similar projects.

Excerpts from the summer docents' summaries are listed below:

"...I found this project to a great experience." ~Jessica W.

"...Not only were there plants and marine animals, but we found birds, too. The salt marsh is also a perfect place to find food. That's why there were so many birds around the area where fish could be found." ~Cheryl P.

"...I had fun while I was learning and that rarely ever happens so I'm happy. It was also great because it gave me a taste of what I might do if I decide to become a marine biologist, which is a strong possibility." ~Beverly H.

"...I didn't know there was such a thing as Fiddler Crabs anyway. I liked seeing wild horseshoe crabs and even though we looked stupid in the waders, we looked professional." ~Caroline K.

"...living so close to the Coney Island Creek I never knew it was so polluted. Even though it's illegal to dump garbage into the creek people still do it. Imagine how more pleasant the creek would be with out all the garbage." ~Alisa P.

"...This was a very fun experience going to this salt marsh. I touched animals that I was scared of, like the crabs. I helped tag horseshoe crabs and examined the different fish species we caught. I even met more friends and got to know more about the people I work with at the Aquarium." ~Cheryl P.

Water temperature, dissolved oxygen, pH and salinity was recorded at the site on each of the field days. The salinity information numbers seem extremely low for the site, and there may have been error in the testing conducted by the students. (See Appendix A: Figure 1).

Although there were established protocols in place for this program, we did find it necessary to make adjustments to them for this year. Many of the docents that participated in the program, while very eager to work, found it difficult to maneuver over

the mud flats, debris, and rubble in the monitoring stations. For this reason, it was often hard to walk along the shore of Coney Island Creek to monitoring stations B and C. As a result, most of the data that has been collected was recorded for the most part in monitoring station A, followed by monitoring station B and no data collected in monitoring station C.

Fish seining was most successful at station A where conditions were relatively flat and muddy, mimicking the historically sandy shores of Gravesend Bay. Station B was heavily strewn with large construction rubble, which prevented proper seining technique, but did yield the largest sized fish. The docents hypothesized that the larger fish where able to find better shelter amongst the large construction debris and deteriorating barges, thus being better protected from predators.

A majority of fish identified at monitoring stations A and B were juvenile Atlantic silversides, striped killifish, and marsh killifish. Results of the seining also yielded some mummichogs, Gulf killifish, and American shad. Definitive conclusions should not be extrapolated regarding fish species diversity at individual stations due to the educational aspect under which the data was collected and the bias represented by lack of data collected at Stations B and C (Appendix A: Figure 2).

Based on the variable fish seining success at monitoring stations A and B, it was hoped that these same stations would provide a significant number of native crabs due to the flatter muddier substrate, even despite the amount of gravel and other rubble covering the shore. While monitoring station B was the most rubble-strewn of the two sites and predicted to be a more favorable substrate for the invasive Japanese shore crab, docents were thrilled to observe that a majority of the crab species that were found were green crabs, fiddler crabs, and blue- claw crabs. This is not to imply that non- native invasive species of true crab were not found. On the contrary, the docents did find members belonging to both the Japanese shore crab and Chinese mitten crab species as well. A summary chart of our true crab observations can be found in Appendix A: Figure 3.

We indeed found Station A to be the most populated with native fiddler crab colonies, as might be expected from the sandy and muddy environment. A few green crabs were also observed and a few black-fingered mud crabs, but very few invasive Japanese shore crabs.

The horseshoe crab tagging study for Dr. Jennifer Mattei for the most part was successful in spite of the increasing temperatures and the lateness of the mating season. We had predicted that tagging would be difficult due to for these reasons, but the docents were able to play a small role in professional research by tagging 7 horseshoe crabs over the course of the field days.

Pictures of field visits with the docents are included in Appendix B at the end of this report.

Appendix A:

Figure 1. Water Quality Data at Coney Island Creek Salt Marsh, Summer 2006

Date	Station	DO (mg/L)	pH	Salinity (ppt)	Water Temp. (°C)
8/07/06	A	6-8	7.7	-	-
8/08/06	A	8-10	7.7	-	30
8/14/06	B	4-6	7.6	1.010	30
8/15/06	B	8-10	7.7	1.020	20
8/21/06	A	8-10	7.8	1.015	28
8/22/06	A	8-10	7.9	1.020	30

Figure 2. Fish Observation Summary.

Station A:

Species	Number of Individuals caught
Gulf killifish	8
Marsh killifish	82
Mummichogs	1
Striped killifish	5
Atlantic silversides	0
American shad	0
Unknown	0

Station B:

Species	Number of Individuals caught
Gulf killifish	7
Marsh killifish	180
Mummichogs	17
Striped killifish	71
Atlantic silversides	21
American shad	4
Unknown	4

Figure 3. True Crab Observation Summary.

Station A:

Species	Number of Females	Number of Males	Gender Unknown	Total Number Caught
Blue claw crab	~	~	~	24
Fiddler crab	34	18	1	53
Asian shore crab	3	5	58	66
Chinese mitten crab	~	~	~	2
Green crab	4	~	~	4
Mud crab	~	~	~	23
Unknown	~	~	~	31

Station B:

Species	Number of Females	Number of Males	Gender Unknown	Total Number Caught
Blue claw crab	~	~	~	5
Fiddler crab	~	~	~	3
Asian shore crab	~	~	~	7
Chinese mitten crab	~	~	~	0
Green crab	~	~	~	4
Mud crab	~	~	~	0
Unknown	~	~	~	1

Appendix B: Photographs of docents conducting fieldwork.

1. Docents Cara K. and Beverly H. conducting pH test of a water sample in Station A.

2. Docents Cara K. and Beverly H. checking on the results of a pH test conducted on a water sample in Station A.

3. Docent seining in Station A at Coney Island Creek.

4. Docents retrieving the net from the water.