

# **Increasing Harbor Stewardship through Oyster Restoration in New York City**

A Harbor Estuary Stewardship Project  
In partnership with NY/NJ Baykeeper,  
The River Project, and NY Harbor School

Final Report November 16, 2007

Submitted by NY/NJ Baykeeper, The River Project, and NY Harbor School

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## **Project Summary**

NY/NJ Baykeeper, The River Project, and the New York Harbor School were given a grant to increase stewardship among residents of the New York–New Jersey Harbor Estuary through training oyster gardeners from schools and community organizations in New York City and conducting outreach about their work. The primary audience – oyster gardeners – gained new knowledge and skills to function as harbor stewards and promote restoration and favorable attitudes among New York City residents about improving the ecological health of the harbor. The secondary audience – the general public, government agencies, and elected officials – learned about oyster gardening directly from the main project partners, and indirectly from media attention attracted by new oyster gardening groups.

In addition, we feel that we have successfully established a strong, sustainable partnership. Moving forward, all partners are committed to continuing with oyster restoration and education activities in New York Harbor.

## **Activities, Results, and Future Plans**

### New York Harbor School: Oyster Ambassadors

We began with ten students but dwindled to eight as reality set in: Saturdays on boats and in the mud, monitoring and delivering and talking about oysters. Without pay and regardless of the weather. But our eight students, from freshman to juniors, were strong and enjoyed themselves and we got a lot done. Thanks largely due to their work as Oyster Ambassadors, many of these students have gone on to leadership positions in school and other areas of their life:

- Tanasia Swift was accepted for a full scholarship to The Island School, an exclusive semester program in the Bahamas where students focus on local history, geography and Marine Science
- Mayra Julian described being an Oyster Ambassador as the crucial part of her development in her College Personal Statement (see Student Spotlight)
- Kayla Dockery went from being quietly marginalized to becoming a more confident leader in her class
- Jennifer Soto was accepted for a full scholarship to Maine Coast Semester, an exclusive semester program in Maine that focuses on environmental sustainability
- Jerriel Stafford participated in an historic “Watershed Trek” with eleven other students, following New York City’s water supply from its source high in the Catskill Mountains to its final destination in New York City.

One of the major challenges associated with bringing the oyster gardening program to New York City was the different shoreline habitats that would require different gardening techniques and equipment. We began using large lantern nets, but they were too heavy and got fouled up with mud too quickly to be managed by students or just one volunteer. The second, smaller lantern nets had holes in them that were too big for our small-sized oysters. So we ended up handing out a lot of oyster floats that we had made. These floats were made of polyethelene bags with floats on either side. They floated on top of the water and were good in most scenarios. But we lost lots of oysters from the oyster floats. They proved too hard to close, and in some places, all oysters were lost from the floats.

Katie Mosher-Smith and the Gowanus Oyster Gardeners experimented with new kinds of equipment and found a model called an "Australian tube net" that was smaller, more manageable, and easier to close. This model was handed out to gardeners at our most recent event, where we distributed 5,000 oysters to ten different groups.



The NY Harbor School took a very active role in formalizing an oyster gardening program specific to New York. In particular, Roy Arezzo, marine science teacher at the NY Harbor School, and Katie Mosher-Smith, part-time teacher and founder of the Gowanus Community Oyster Garden Program, have made considerable progress to assure consistent participation by developing an application process for interested gardeners. For potential gardeners, the application process itself is a reminder that with stewardship comes responsibility. With the information gardeners provide, we ensure that all gardens have an

acceptable site and two contacts. This allows us to follow up on the status of oyster gardens if data collection lapses, and to arrange for the ordering of spat and nets for each season's event. This is a significant improvement from our first year, when we had little screening of interested gardeners. Initially, we were so glad people were willing to take on the job, that we delivered the oysters and hoped they would follow up.

Local opportunities for learning about oysters and stewardship are increasing; going forward, we will be sending out regular newsletters that will alert the oyster gardening community to related events, lectures and published materials. These learning opportunities and social networking help to foster a sense of community, especially among the educators. New partnerships are developing at many of the gardens as groups share net maintenance and discuss successful teaching experiences they've had.

Our ultimate goal was to create a reef where we could place the gardened oysters, and although this hasn't happened yet, it is still in the works. And this is the most important part to the students. They really want to build a reef that has oysters and all the diversity of life that they have witnessed on the oyster floats. We will have all of our Oyster Ambassadors returning next year, and we'll add two more so that we'll be at ten. These eight students will have learned so much more, we believe they will be able to activate more sites and include more people in this project to restore oysters to the Hudson-Raritan Estuary and to teach people about the New York Harbor at the same time.

#### NY/NJ Baykeeper: Training and Gardening

Many positive insights arose from collaborations among partners, most importantly, a renewed interest in the oyster gardening program from Baykeeper's existing New York gardeners. Having a program based in New York and an end point for oysters has been a great motivator. The establishment of the NY Harbor School Oyster Ambassadors also helped promote the program and stewardship of NY Harbor. This wonderful group of students participated in workshops,



gave presentations, and traveled to gardening locations around NY Harbor, offering assistance and educating the public. Seeing an engaged and dedicated urban youth helped inspire NY residents.

Each gardener is required to fill out an accounting sheet when picking up and returning oysters and receives a numbered tag to be placed in their float for identification purposes. Information included on this sheet is start and end date, number of oysters received and returned, and average starting and ending size of oysters. Gardeners are asked to collect

monthly mortality and growth data, which serves as an indicator of their continued involvement in the program. Baykeeper keeps all data sheets on file, but in no way uses the data for any decision making.

The HEP Stewardship Project led to a streamlined gardening program with protocols in place for sites in New York. The required knowledge for running a gardening program was successfully transferred to partners through various training sessions, workshops, meetings, and other interactions. The River Project and NY Harbor School ordered all supplies, including oyster seed, put together all events, and recruited gardeners. They also adapted equipment to suit the needs for NY gardeners. Not only was essential knowledge transferred to partners, the Harbor School Oyster Ambassadors were educated about the Estuary, oyster biology and ecology, and the importance of oyster restoration.

Looking forward, NY/NJ Baykeeper is eager to build upon what was learned through this partnership. Baykeeper will continue to stay involved in overseeing the NY gardening program, attend training sessions and workshops, and seek funding for a part time oyster gardening coordinator.

#### The River Project: Wet lab and reef

The River Project's new wet lab at Pier 40 is a place for oyster gardeners to return their oysters, ensuring continuity from year to year of the program while we continue to develop plans for a small-scale reef on the Tribeca waterfront. In the lab, gardened oysters contribute to restoration efforts as a demonstration of oyster growth and ecology for passers-by, school groups, and other visitors. Of the first group of oysters returned by gardeners this June, 50% of the oysters were distributed to MacNeil Park (see Events section below) while the rest remained in the lab.

Considerable progress has been made toward developing a pilot reef in the lower Hudson River. As described in our previous quarterly report, The River Project organized a meeting with all partner organizations and the New York DEC to discuss the permitting process. Reef design and planning is underway with help from researchers at the Marine Labs at SUNY Stony Brook and The Hudson River Park Trust. To ensure that the oysters will be able to survive at this site, which differs significantly from the NY/NJ Baykeeper sites in factors such as depth, wave action and

turbidity, one decision we have made is to place oysters along the transect of the reef in cages for one year before attempting to build a more permanent structure.

The Hudson River Park Trust (HRPT), The River Project's landlord, is a partnership between New York State and City charged with the design, construction and operation of the five-mile Hudson River Park. HRPT has agreed to partner and assist with oyster restoration in the Park, and is currently working with the Region 2 office of DEC to determine what permits are needed to transfer the oysters to the new Hudson River Park locations. So far, it has been established that a permit from the Army Corps of Engineers will not be needed at this stage of the project.



On July 25, divers from the Stevens Institute of Technology and River Project staff conducted an oyster survey of the Vestry St. inter-pier and Pier 42 pile field sites that have been proposed as locations for the pilot reef. The divers found live oysters on broken concrete slabs approximately 120 meters east of the northwest end of the pile field in approximately 3 meters of water shortly after low tide. Tying a white nylon cord to a pile near the concrete slabs marked these locations. The divers recorded over 60 minutes of video footage, adding to the knowledge base for conditions at the proposed sites. The footage is currently being converted into digital format for analysis, storage and posting of highlights with site descriptions on The River Project website, [www.riverproject.org](http://www.riverproject.org) (complete footage will be available upon request). It will be an invaluable resource when final plans are made for the pilot reef size and structure.

The River Project will continue to demonstrate the potential for oyster restoration to the public by working with New York Harbor School, NY/NJ Baykeeper and other partners on oyster gardening events and demonstrations at the Pier 40 site. We will also continue our outreach activities, and work with HRPT towards permitting of oyster restoration studies and the construction of a pilot reef in Hudson River Park.

### Events

Over the course of the grant, several oyster gardening workshops were held at Pier 40. During the last two events (June and October 2007), oysters were distributed to over 15 groups (see map for group details and oyster garden locations).

A major milestone for the project was the First Annual Oyster Gardening Event held on June 28, 2007. It was a celebratory event for volunteer oyster gardeners as they came to return their oysters and pick up new supplies and oyster seed. The evening included training for new gardeners by the Oyster Ambassadors. Each group received 1000 oysters about the size of a thumb nail to tend over the year. Over fifty people gathered in The River Project's new wet lab to receive training and mingle with other gardeners. Over 10,000 juvenile oysters were

distributed at the event to groups throughout New York City (see list of oyster gardening groups).

About 500 gardened oysters are being used in a research project led by Pace University professor and Marine Pathologist Dr. James M. Cervino. He has teamed with Brooklyn-based sculptor Mara Haseltine, Global Coral Reef Alliance President Dr. Thomas J. Goreau, and Columbia University graduate student Kaitlin Baird on a project that involves attaching oysters to metal sculptures mounted to old pilings in the waters off the shoreline of MacNeil Park. This exciting and ambitious project marks the first time any NY gardened oysters have been placed in NY Harbor waters.

### **Outreach**

We have reached out to community and school groups throughout the five boroughs. The program now includes hundreds of oyster gardeners working together through gardens in Jamaica Bay, the Gowanus Canal, Upper NY Harbor, the East River, the Hudson River, the Bronx River and the Harlem River.

Many New York City gardens are tended by groups that reach their own large audiences:

- Thousands of visitors to the **Statue of Liberty** are given an introduction to the very successful Liberty Island oysters by National Parks Service employees
- Solar1 introduces visitors to their nets and has held two lectures by local oyster experts Paul Mankiewicz and Mara Haseltine
- The Science Barge promotes their oyster garden in their newsletters and introduced the nets to visiting school groups this summer
- Rocking the Boat, the NY Restoration Project and East River CREW all introduce visitors and school groups to their oyster gardens

Oyster Ambassadors gave oyster gardening presentations for approximately 200 people at seven New York City waterfront locations on the East River (Long Island City, Stuyvesant Cove, South Street Seaport Museum), Hudson River (New York Sun Works Science Barge, the historic vessel Lilac), Harlem River, and Gowanus Canal. In addition, they gave talks about oyster gardening and stewardship of New York Harbor at public meetings attended by approximately 400 people at the New York Boat Show at Jacob Javits Center, the Frost Valley YMCA Environmental Education Conference Center, and Hudson River Museum's Riverama in Glendale, New York. Andrew Hernandez, Kyle Williams, Jorge Anderson, Jennifer Soto and Kyle Dockery were participants at the Annual New York State Marine Education Association, leading an hour-long presentation and discussion about oyster gardening for an audience of 50 people.

The River Project sent information about the project via fax and e-mail to City Council Members, the New York State Assembly and Community Board 1. The River Project's Outreach Director made a presentation about the project to the Manhattan Delegation of the City Council. Information about the project was also presented to the Manhattan Borough President's Office along with a funding request.

The activities of Gowanus Community Oyster Garden volunteers attracted unprecedented media attention to oyster restoration activities in New York City, including television coverage on News12 and a NY Press article (see attached Volunteer Spotlight). NPR's Science Friday is currently working on a video piece about New York City Oyster Gardening and will feature footage from the October Oyster Event. Oyster Gardening classes taught by Susan Hua, Katie Mosher-Smith and other Gowanus volunteers at the Gowanus canal reached hundreds of students and community members. Additionally, scheduled visits have been made by groups from the New York Open Center, Outward Bound and Open House NY (through the Gowanus Dredgers Canoe Club).

The success of the Gowanus outreach program has led to a pilot program that is being developed and will be delivered by the Prospect Park Zoo. Zoo educators will deliver classes as one session held at the Gowanus Canal with a follow-up session at the Prospect Park Zoo. This program will stress local conservation and stewardship techniques through oyster gardening. This collaboration with the Wildlife Conservation Society is a direct result of outreach from the New York City Oyster Gardening Program. Though programming has not yet started, it is very exciting to see the WCS pursue conservation and stewardship outreach at this local level in a place like the Gowanus Canal.

## **Evaluation**

Major outcomes of the project have been:

- An annual oyster event, and two to three oyster distribution events per year at Pier 40 in Manhattan
- Established a group of Oyster Ambassadors for the year 2006–2007. This program will continue to be part of the extracurricular work of the New York Harbor School
- An oyster garden application process developed by The New York Harbor School to help ensure serious and active participants
- An oyster cage that seems to address issue specific to New York waters, such as vandalism and excess flotsam not commonly associated with gardens in less urban areas
- The continued participation of 18 community groups and schools as oyster gardeners and a rekindled interest of oyster restoration in NY waters
- New collaboration with partners representing secondary audiences, such as the Hudson River Park Trust and Patagonia Soho
- Substantial progress and encouragement from the DEC regarding reef permits.
- Permits for a reef study at the Vestry St. and pier 42 sites within Hudson River Park are underway
- Early characterization of several sites for potential oyster restoration using underwater video footage
- Development of a wet lab at Pier 40 to act as a place for oyster's growth to be exhibited in natural waters, and aid in project continuity for participants
- New media coverage helping extend stewardship message to new secondary audiences.

The project was evaluated for its effect on each of the different audiences: student oyster ambassadors, volunteer gardeners, and secondary audiences. Oyster ambassadors demonstrated their new knowledge of oysters and the New York Harbor ecosystem at numerous public outreach events as described above. Among volunteer gardeners, increased stewardship was

evident as the continued active participation of volunteers in all 18 gardening groups trained, as indicated by their continuing to care for their oysters and send in monthly data. A summative evaluation survey was also given out to gardeners at the October workshop, and although not all gardeners returned their evaluations, there were positive responses from those who did.

Impact on secondary audiences was indicated by the growing interest from media outlets whose audience is the general public. The press that the Gowanus Oyster Garden received was hopeful and enlightening. Some teachers and community members who saw the pieces were surprised to find that animals were living in and near the canal. Some groups responded by participating in scheduled shoreline clean-ups, and many teachers have added estuary studies to their curriculum. Dozens of teachers from area schools have requested field trips to the garden, many of which will hopefully be served by Prospect Park Zoo this spring.

NOTE: Data gathered through the project described in this report were not collected under an approved Quality Assurance Project Plan (QAPP) as described in the New England Interstate Water Pollution Control Commission's Quality Management Plan. Data collected were for educational purposes only. While the information contained is technically sound, any future use of this report should include an evaluation of data limitations resulting from the lack of documented quality assurance procedures associated with the project.

## **Program Contacts**

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## **Attachments**

Current project partners and gardening groups

Map and list of oyster gardening locations

Description of oyster event at Pier 40

Volunteer Spotlight

Student Spotlight



## **Current Oyster Restoration Project Partners**

NY/NJ Harbor Estuary Stewardship Program

The River Project

NY/NJ Baykeeper

New York Harbor School

Hudson River Park Trust

Patagonia Soho

Stevens Institute of Technology

## **Oyster Gardening Groups**

Gowanus Community Oyster Garden

Rocking the Boat

Trevor Day School

MS 448 BCS

Winston Preparatory

NY Soil and Water Conservation District/PS3

NY Restoration project

South Street Seaport Museum

Public School 58, The Carroll School

Public School 78

The Gowanus Dredgers Canoe Club

Solar One

Science Barge

Hunter College, Institute for Sustainable Cities

NPS Statue of Liberty

SUNY Maritime College

Electra Information Systems

American Littoral Society

National Parks Service

## Volunteer Spotlight

New York City Oyster Gardening  
Katie Mosher-Smith, Personal Statement  
10/22/07

In fall of 2007, I joined the New York City Oyster Gardening program (NYCOG) as a gardener. I am enrolled in Columbia University's certificate program in Conservation Biology, and oyster gardening tied in well with my interest in environmental stewardship in NYC. At the time, I was looking for a way to volunteer in my neighborhood, more specifically for ways to promote restoration in the Gowanus Canal. The rich history of the Gowanus and the oyster in NYC, combined with the enthusiasm of the New York Harbor School's (NYHS) Harbor Corps' students, inspired me to create an outreach program specific to the history of oysters in the Gowanus.

I created a website that posts dates when the Gowanus Community Oyster Garden (GCOG) volunteers are available to demonstrate net handling and data collection. NYCOG manuals, data sheets and applications are available as well as news related to oyster gardening, research and restoration on the east coast. The site has received 2,500 hits so far.

In February '07, I was joined by Susan Hua, a Columbia University graduate student in Conservation Biology. Susan received credit for interning with GCOG for a course in Teaching Conservation Biology. Together we created an educational program that we offered to area schools, delivering free one-hour field trips. We delivered twelve classes covering the topics of ecology, biology, community studies and history. Our students ranged from kindergarten through college level. Our volunteers have also delivered over 20 well-attended open sessions to the public, speaking to community members and organized groups. GCOG has been featured in a newscast on NEWS12, in an article in NY Press, and is mentioned in the documentary City of Water.

As an active oyster gardener, I often connected with Roy Arezzo from NYHS and am now working at the school as a part-time assistant science teacher. I am also enjoying my new role coordinating the NYCOG applications and events and look forward to contributing to this fantastic stewardship program as it continues to grow!

Gowanus Community Oyster Garden: <http://www.gowanusoysters.com>

City of Water. Dir. Jasper Goldman and Loren Talbot, Metropolitan Waterfront Alliance and Municipal Arts Society, 2007

Cowan, Matt. "Brooklyn's Life Aquatic - How oysters may save the Gowanus." NY Press, July 2007. By <http://www.nypress.com/20/31/news&columns/feature3.cfm>

News12 clip on the Gowanus Community Oyster Garden  
<http://www.youtube.com/watch?v=u8hCaBPGd6A>

## Student Spotlight

Mayra L. Julian

New York Harbor School

As I stepped outside my house, a snowflake touched my face and the wind started howling in my ear. The trees rocked back and forth, but the chilly conditions only encouraged me to keep on with my journey. From my home in Bushwick, Brooklyn, it took me 45 minutes to get to Pier 40, located along the Hudson in Midtown Manhattan. I was going to meet classmates on a boat, the *Lilac*, where our oyster floats live on the port side. As I got off the train and walked towards the pier, I felt the harbor breeze upon my face. We were going to deliver equipment and baby oysters to colleagues who work with us around New York protecting the water bodies.

I am a member of a group called Harbor Corps, a school club dedicated to raising awareness about pollution in our waterways. In addition to oyster gardening we attend conferences and give workshops about cleaning up the New York Harbor. It was still early morning when I caught up with my friends and we boarded the quiet, rusty boat. There was no one around, only us, a small group of teenagers waiting to count 2,000 baby oysters and then take them to the Bronx. Most people are not aware that New York Harbor was once filled with oysters and other wildlife. Unfortunately, due to pollution the oyster population has declined and very few are left. Oysters are important organisms that help filter water and in doing so naturally clean it of pollutants. We have reintroduced oysters to the Hudson as a means to clean it up. We monitor the growth of each oyster to ensure they're surviving the harsh environment. Like an oyster, I have succeeded to overcome the harsh obstacles in my school and my community.

I come from a community where failure is common. I come from a minority group where many girls get pregnant by sixteen and few go on to college or even graduate from High School. I don't want to continue with that chain. I want to stand out and break free. I feel lucky to have supporting parents and teachers that always help me out when I have difficulties. For example, after spending hours after school doing extra work and studying really hard, I was placed in advanced classes. In addition to Harbor Corps, I am involved in a number of interesting and engaging activities, like the senior committee which plans fundraising events for seniors and also organize events for our school, and other clubs like the yearbook club, science club, youth craft, and ocean conservation club. I feel elated to see my hard work pay off, and the happiness in my parents' faces have kept me motivated to continue my education.

The wind blew stronger and the snow became heavier. Even though my hands had gone numb with cold, I was warmed by the wonderful foggy colors of the horizon. The sounds of the waves hitting upon the boat started fading away. I started thinking how lucky I was to be in this place, putting a part of myself into this issue of water pollution. Most teenagers probably wouldn't volunteer to spend their Saturdays sorting a stinky pallet of living sea creatures and traveling all over the New York Subway on a very cold day, but I am different.

I will be the first in my family to attend college. I want to make them proud of me. My parents didn't get to go to college because they didn't have economic freedom in their country, Mexico. But that fact didn't stop them from dreaming, and coming to America to work and succeed. My father has inspired me to continue my education, because even though he had a difficulty speaking English at first, that didn't stop him and he continue to work towards his goals. Like my father who broke from that chain of poverty, I want to do the same. However, I am different even from my family, they would spend a cold snowy day drinking hot chocolate or sleeping in their cozy bed instead of spending it in the Hudson River cleaning the muddy and slimy things found in a oyster net.

After wondering off for a moment I felt someone touch me on my shoulder, saying, "Mayra, we are getting ready to leave and deliver these oysters". I finished cleaning the oysters and taking away the mud and the garbage that accumulated on them. I was upset when I found some oyster shells open and killed by other crabs, oyster drills, and worms. We as a group try to keep these oysters alive and help them grow and survived through the harsh winter. I know that oysters are helpless, but I am not. I am strong. I have succeeded in high school and will continue to excel in college. Even if the winds and tides are against me I will find a way to overcome and defeat them. Even though I cannot see what my future holds for me, I will approach each day strong, positive and eager to succeed.