Testimony of Emily Lloyd
Commissioner, New York City Department of Environmental Protection
before the
New York City Council Committee on Environmental Protection
concerning the
FY 2017 Preliminary Budget

Committee Room – City Hall
Friday, March 11, 2016, 1:00 pm

Good afternoon Chairman Constantinides and Members. I am Emily Lloyd, Commissioner of the New York City Department of Environmental Protection (DEP). I am joined today by First Deputy Commissioner Steve Lawitts, Acting Deputy Commissioner for Public Affairs Eric Landau, and Assistant Commissioner for Budget Joseph Murin, as well as other senior managers. Thank you for the opportunity to testify on DEP's Fiscal Year 2017 Preliminary Budget.

As you very well know, DEP has overall responsibility for the City's water supply and sewer system, including providing drinking water to all New Yorkers, maintaining pressure to fire hydrants, managing storm water, and collecting and treating wastewater. In addition, DEP also regulates air quality, hazardous waste, and critical quality of life issues, including noise. All of our water-related expenses—both operational and capital—are paid for with the money collected from the water and sewer rate charge billed to all New York City property owners and authorized annually by the New York City Water Board.

In May 2015, the NYC Water Board adopted a 2.97% increase, the lowest increase in 15 years. As part of this year's rate, a number of progressive changes to the rate schedule were introduced, all aimed at providing significant benefit and assistance, including freezing the minimum charge of $1.27 per day for the second consecutive year, which benefits more than 150,000 customers who use fewer than 100 gallons of water per day. In addition, this year's rate again included the Home Water Assistance Program, first introduced in 2014, that provides a $116 credit annually to homeowners who qualify for the federal Home Energy Assistance Program. This year, the program was expanded to also include an additional 46,500 low-income senior and disabled homeowners who receive Department of Finance property tax exemptions. Finally, this year's water rate also included a 40% return of the rental payment, with a commitment from Mayor de Blasio to return an additional 10% annually until the rental payment is fully eliminated. The Water Board will be holding public rate hearings for the FY 17 Water Rate the week of April 18th, and I look forward to working with the members of the Council to publicize those hearings.

Before I get to the substance of my testimony today, I want to briefly touch on the quality of New York City's drinking water. As Flint, Michigan struggles with its water quality crisis, I want all New Yorkers to know that DEP's staff are extremely diligent about the very issues that were sadly neglected in Flint. DEP spends substantial time and resources testing the water quality from 1,000 water quality testing locations around the five boroughs, as well as testing water quality upstate in our reservoirs, lakes, and tunnels. In total, DEP conducts over half-a-million water quality tests every year.

While New York City's water is virtually lead-free when it is delivered from our reservoir system, water can absorb lead from pipes, fixtures, and solder (material used to join pipes) found in the

plumbing of some buildings or homes. DEP believes that a moderate percentage of homes in NYC may have lead plumbing, such as lead service lines, which connect the property to the City's water main and are the responsibility of the property owner, or lead solder, which connects pipes together inside the home.

To help reduce the risk that lead can dissolve from a homeowner's plumbing/service line into their tap water, DEP carefully monitors pH levels of the water and adds phosphoric acid, which creates a protective film, reducing the release of metals from household plumbing.

Property owners interested in testing their water for lead can contact DEP for a free kit by calling 311. Upon receiving the water sample, DEP will test the water and send the property owner the results within 30 days. Should the results show an elevated level, DEP shares the results with the Department of Health and Mental Hygiene, and the City will inform the property owner of some recommended next steps.

Finally, as you know, we spend on average more than a billion dollars a year to maintain and further improve and update our water supply system, including major capital projects such as the Catskill/Delaware Ultraviolet Disinfection Facility, the Croton Water Filtration Plant, and City Water Tunnel 3.

Key Accomplishments and Updates

Let me start by providing some context. Turning to our capital and expense budgets, I believe it would be helpful to share some recent accomplishments, an update on our initiatives as part of OneNYC, a brief overview of a number of performance metrics, and an update on key programs and projects.

This past year we:

- activated the Croton Water Filtration Plant in the Bronx
- completed a $210 million rehabilitation and upgrade of the Avenue V Pump Station in Brooklyn
- completed excavation of a $250 million water tunnel connecting Brooklyn and Staten Island
- completed construction and activated a $30 million interceptor sewer line to improve the health of Flushing Bay
- began construction of Staten Island's first Mid-Island Bluebelt
- oversaw the completion of all 5,300 registered buildings converting from Number 6 heating oil

Update on OneNYC

Playing a major role in our activities is Mayor de Blasio's OneNYC plan, released on April 22, 2014 and expanding on prior long-term sustainability plans for New York City, as well as on the work of the de Blasio administration to date. OneNYC includes several initiatives that DEP is hard at work on, including:

- Protecting the city's water supply and maintaining the reliability and resiliency of the water supply system

- Installing or repairing 500 water fountains and water bottle refilling stations across the five boroughs
- Expanding green infrastructure and diversifying techniques for stormwater management in neighborhoods across the city
- Reducing pollution from stormwater runoff

To meet the City's water supply needs, New York City has a robust water supply infrastructure investment program, including projects such as a new tunnel to bring water from Kensico Reservoir to the Catskill/Delaware Ultraviolet Disinfection Facility, significant upgrades to the Hillview Reservoir in Yonkers, and the optimization of the Catskill Aqueduct.

In 2015, as the City prepares for discussions with state regulators on renewing the Filtration Avoidance Determination (FAD)—which allows the City to continue to deliver safe, unfiltered drinking water to more than eight million residents—DEP completed a comprehensive assessment of the existing program and of water quality trends. The summary confirmed that the programs and investments NYC has made over the past decade in watershed protection and infrastructure have maintained the high quality of our water supply. The City's next FAD is expected in 2017.

In February 2016, DEP substantially completed construction of the first phase of a $1.0 billion project to replace a leaking section of the Delaware Aqueduct. In the coming months, the City will begin boring the 2.5 mile long bypass tunnel more than 600 feet under the Hudson River. As a result of this project, water from the Delaware system will be unavailable for approximately six months while the new bypass tunnel is connected to the existing tunnel. DEP has developed a comprehensive program to ensure reliable water delivery during the construction period, including an expansion of water conservation retrofits at 189 schools and 330 parks across all five boroughs in 2016. We anticipate that the project will be completed in 2023.

A reliable water supply is only as valuable as it is accessible and readily available for all New Yorkers. In 2015, the City launched a new program to install or repair 500 water fountains and water bottle refilling stations citywide, encouraging residents to reach for tap water as their preferred beverage both at home and on the go. An interagency task force selected three different models of outdoor fountains that make it convenient for New Yorkers to fill their water bottles while in transit across the city. The task force identified 30 schools and 42 parks as priority sites for the first phase of installations, and has developed a GIS map to identify existing drinking fountains and potential placement options moving forward. In 2016, DEP will oversee the installation or replacement of fountains and bottle refillers in all schools identified for phase one of the program, and move forward on additional drinking fountains and bottle refillers at the first tranche of identified park sites.

While DEP continues to be vigilant about protecting our water supply, we must also seek creative ways to manage the water that falls onto our streets and enters our sewers and wastewater infrastructure. Since the 1990s, the City has pursued a dual approach to alleviating flooding and protecting our surrounding waters through an expansive build-out of gray and green infrastructure. In 2015, DEP advanced construction of green infrastructure in priority combined sewer overflow (CSO) tributary areas, which represent the 60% of the city where stormwater from the streets is carried away in the same sewers that drain sanitary waste. In 2015, DEP allocated $804.5 million in the Ten-Year Capital Budget to build green infrastructure such as right of way bioswales and stormwater greenstreets. DEP has constructed more than 1,000 right-of-way green infrastructure assets installed

citywide, and over 1,500 in construction, managing one inch of runoff from over 300 impervious acres.

Alleviating flooding in Southeast Queens is a major priority for New York City. In 2015, Mayor de Blasio and DEP announced a $1.5 billion program to substantially accelerate relief in Southeast Queens by pairing traditional sewer construction with green infrastructure throughout the region. As part of this effort, DEP launched an in-depth engineering assessment to evaluate on-the-ground conditions within 50 of the highest complaint areas within Southeast Queens. Armed with this data, DEP will identify near-term interventions that can provide relief to these property owners by the end of 2016.

In parallel, DEP works closely with the Departments of Transportation, Parks and Recreation (DPR), Design and Construction and the Economic Development Corporation to design and construct green infrastructure in the public right of way. By the end of 2016, over 2,600 right-of-way GI practices will be either in construction or fully completed. DEP also works with the Department of Education and the School Construction Authority, as well as DPR and the New York City Housing Authority, to identify opportunities for green infrastructure retrofits on publicly owned properties around the city. To date, DEP has completed 10 projects with these partners: five are in construction and nearly 200 more are under consideration.

While the City continues to make new strides in reducing CSOs, we are also developing a comprehensive plan to address water quality from runoff in separately sewered areas. On July 31, 2015, New York State issued a Municipal Separate Storm Sewer System (MS4) permit for New York City that requires the City to develop a stormwater management program plan over the course of three years. Building on previous permit preparation and engagement efforts, DEP recently hosted multiple interagency and stakeholder working groups to evaluate best practices and develop plans to address issues such as floatables, good housekeeping for municipal facilities, and industrial and commercial stormwater sources. DEP also worked with the Department of Sanitation and GreeNYC to develop a media outreach campaign on litter, debris, and floatables, which was submitted to the State in October 2015 and officially launched in February 2016.

In 2016, DEP will submit the first annual progress report on the development of the citywide MS4 stormwater management program plan, as well as an interim report on the development of the State Pollutant Discharge Elimination System.

Operational Status and Performance Metrics

Water and Sewer Operations

DEP is maintaining its focus on preventive maintenance techniques, with the aim of improving efficiency and the operations of our vast infrastructure network. For example, we are inspecting and maintaining key valves and pressure regulators in our water system in order to reduce the potential for water main breaks due to pressure changes. Additionally, our Sewer Operations and Analysis Program cleans, repairs or replaces sewer segments with recurring issues. While sewers can surcharge during major storms that exceed the design capacity of the sewers, we deploy resources to ensure that the existing system consistently performs at the capacity for which it was designed. Additionally, working with the Office of Emergency Management and the Departments of Sanitation and Transportation, we pre-inspect historically flood-prone areas in advance of major rain events.

Beginning this July and ramping up through FY17, in accordance with recently passed and signed legislation, DEP will be inspecting all 148,000 catch basins annually.

One key issue to highlight that the Committee is well aware of is the significant impact on sewer backups that fat, oil, and grease buildup causes. While we have seen the percentage slightly decrease this year, it still is the cause of approximately 66% of confirmed backups. Grease entry into sewers is preventable and relies on choices made by individuals. Focusing on public education and outreach, we have worked closely with schools, community organizations, and elected officials, to help reduce the occurrence of grease being poured down the drain. Additionally, using Southeast Queens as a pilot area, staff is distributing information door-to-door. By the end of the year, we project we will have reached over 50,000 homes in these neighborhoods. Finally, our staff follows up directly with restaurants in areas where there is persistent grease buildup in the sewers to ensure proper use of grease traps. This focus on enhancing operational efficiency and targeting our resource deployments has effected a positive trend in our metrics. Some key performance statistics showing changes from FY 11 to FY 15 include:

- Sewer backup resolution time: 31% decrease
- Catch basin resolution time: 38% decrease
- Number of catch basins with open work orders: 58% decrease from July 2011 to June 30, 2015.
- Confirmed sewer backups: 47% decrease
- Sewer segments with recurring backups: 49% decrease
- Sewer segments with recurring backups in dry weather: 56% decrease
- Total sewer cleaning: 15% increase

Air/Noise

Since the passage of the updated Air Code last year, the City has met with agencies and external stakeholders to craft the necessary regulations to implement the updated Air Pollution Control Code, and DEP will promulgate new rules by the Code's effective date of May 6, 2016. To enhance air compliance and enforcement capability, DEP added eight new air and noise inspectors last year, allowing us to deploy inspectors on weekends and evenings when many air and noise complaints occur. These additions will also increase the number of inspections across the City, enabling DEP to send inspectors to more events and projects to ensure compliance with the Air and Noise Codes.

Customer Services

As the Committee knows, DEP operates a customer service office in each borough, in addition to a Call Center, to collect water and sewer rate payments, enroll customers in payment agreements, and answer questions. Our call response time has slightly increased this year from 46 seconds to 54 seconds, primarily due to staff attrition early in the fiscal year. However we have recently increased the number of staff from 21 last July to 33 as of January 2016, as well as hiring additional staff on a quarterly basis. In addition, we continued to use a virtual Call Center, which allows for staff from our borough offices to support the Call Center during peak periods. With this increase in staff and the virtual call center, we have begun to see a decrease in call waiting time to 30 seconds in the second quarter of FY16.

Key Programs and Projects

Green Infrastructure Program

Expanding further on our Green Infrastructure (GI) Program, DEP continues implementation of the program, which incorporates different techniques to reduce stormwater runoff into the combined sewer system and ultimately reduce CSOs as an alternative to gray infrastructure (building massive tanks and tunnels). The GI program reflects the City's goal to improve water quality, as outlined in the NYC Green Infrastructure Plan, by reducing CSOs into waterways by 40 percent by 2030. In Fiscal Years 2016 to 2019, $554 million is planned for various GI projects on public property, including in the public right of way, as well as the Green Infrastructure Grant Program, which funds stormwater management projects for private property owners.

Some examples of GI projects include permeable paving and rain gardens at City schools, parks, and public housing, and most notably bioswales and stormwater greenstreets within City streets and sidewalks. Bioswales look like enlarged and densely planted tree pits but are designed with specific plants and soils and below-grade engineering that can soak up rain water. Bioswales "intercept" storm water coming down the curb, preventing it from going into the sewer system. In addition, they provide other important environmental benefits, including improved air quality and greening of streets and neighborhoods.

DEP, with the support of the Economic Development Corporation and the Department of Design and Construction (DDC), is designing and constructing green infrastructure in priority watershed areas of the Bronx, Brooklyn, and Queens including:

- Hutchinson River, Westchester Creek, and Bronx River in the Bronx;
- Flushing Bay, Flushing Creek, parts of Newtown Creek, and Jamaica Bay areas of Queens;
- Gowanus Canal, Newtown Creek, and Jamaica Bay areas of Brooklyn
- Work in select areas of the East River and Open Waters watershed in all three boroughs.
- Future work being planned for the Harlem River watershed that will include western Bronx and areas of northern Manhattan

Automated Meter Reading

As the Committee knows, DEP began installing Automated Meter Reading (AMR) transmitters in early 2009. AMR has played a vital role in ensuring that all property owners are appropriately and accurately billed for their actual water usage, leading to significantly fewer estimated bills. In January 2009, 17.4% of bills were estimated, while in February 2016, only 3% of bills were estimated. As of February 25, 2016, Automated Meter Reading (AMR) transmitters have been installed in over 819,000 meters, representing over 97% of meters citywide (based on a citywide total of approximately 844,000 meter registers).

Service Line Protection Program

As the Committee knows, the water and sewer service lines that connect homes to the City-owned water and sewer mains are the responsibility of the homeowner. Repairs to broken service lines can cost between $3,000 and $15,000, and can be financially devastating to a homeowner. Therefore, in January 2013 we announced the availability of an optional Service Line Protection Program (SLPP). Under the SLPP, American Water Resources (AWR) will cover repairs to an enrolled customer's leaking water service line or a broken or clogged sewer service line. Homeowners who choose to

enroll in the program sign a contract with AWR and have the convenience of paying the small monthly enrollment fees—currently $4.49 per month for the water service line and $8.47 for the sewer service line—through their water bills. In a little over three years, over 205,000 customers have enrolled in the Plan, with 97% of subscribers having enrolled in both the water and sewer plans. These enrolled customers generated nearly 4,500 claims in Fiscal Year 2015, with SLPP coverage saving them more than $16 million.

Land Acquisition

DEP is in the ninth year of the 10-year Filtration Avoidance Determination (FAD) secured in 2007. Land acquisition continues to be an important part of our source water protection program, and DEP remains on track to meet the land solicitation goals established in the FAD. We continue to prioritize solicitation, taking into account the high levels of protection we have attained in many parts of the watershed. Since 1997, DEP has acquired more than 145,500 acres of land in the watershed.

The Preliminary FY 2017 Budget

Turning now to our Preliminary FY 2017 Expense and Capital Budget:

Expense Budget

The projected Expense Budget for the current fiscal year, FY16, is $1.5 billion, including approximately $261 million in Community Development Block Grant funds for the "Build it Back" program, for which DEP serves as the contracting entity for the City. For FY17 we expect DEP's Expense Budget to be $1.2 billion.

The Preliminary FY 17 Expense Budget breaks down into the following large categories:

- $499 million (41%), in personal services to pay the salaries for our nearly 6,000 funded positions
- $732 million (59%), for other than personal service costs (OTPS), which includes:

  - Taxes on upstate watershed lands, accounts for $167 million or nearly 14% of the expense budget. As you know, the ownership of watershed lands represents a critical investment in maintaining the high quality of NYC's drinking water by protecting it at the source and ensuring that it does not require more expensive treatment, such as filtration. I am pleased to report that we have successfully negotiated agreements with upstate jurisdictions to make our tax obligations more stable and predictable and, in some cases, to reduce them.

  - DEP's energy costs, including heat, light and power, account for $107 million or 9% of the FY17 Expense Budget. DEP is the third-largest municipal consumer of electric power in New York City after the Department of Education and the Health and Hospitals Corporation, and our consumption will grow as we bring online new treatment processes for wastewater. To control energy costs and meet Mayor de Blasio's major commitment to reduce greenhouse gas emissions, DEP is investing in projects to reduce energy needs, including a cogeneration plant at North River.

  - Chemicals are estimated to cost $55 million in FY17 or about 5% of the Expense Budget. For drinking water, DEP continues to add chlorine and fluoride to Cat/Del water in order

to meet federal, state and city treatment requirements. Also for drinking water, the treatment processes at the new Croton Water Filtration Plant require chemical additions. Our wastewater plants rely on the addition of polymers and other chemicals to improve removal rates and continue to disinfect their effluent with chlorine.

- Sludge management of 1,200 tons per day is projected to cost about $45 million in FY17, or about 4% of the Expense Budget.

FY17 Preliminary Four-Year Capital Plan (FY16-19)

DEP's FY17 Preliminary Four-Year Capital Plan (Plan) is approximately $10 billion for FY16-19, as presented by Mayor de Blasio on January 21, 2016. This is $1.7 billion, or a 21 percent increase, over the FY 16 September Capital Plan of $8.3 billion.

Major changes in the Plan for Fiscal 2016-2019 include:

Gowanus Combined Sewer Overflow Retention Tanks
To significantly reduce the combined sewer overflow discharges into Gowanus Canal, $510 million was added in the Plan to secure land, design two CSO tanks and construct one of two planned CSO tanks adjacent to the Gowanus Canal.

Hunts Point Wastewater Treatment Plant (WWTP) Digesters
A total of $155 million (an addition of $55 million and acceleration of $100 million from FY20) was added to replace the Hunts Point WWTP digesters. This includes $21 million for design, $20 million for construction management, and $200 million for construction to fully fund this project at $241 million in the Plan.

Ashokan Reservoir/Olive Bridge Dam/Dividing Weir Bridge
An additional $97.7 million was added in the Plan to ensure continued compliance with New York State dam safety regulations of the Ashokan Reservoir's dams and dikes. This construction will also ensure that selective withdrawals of water from the Ashokan Reservoir to the Catskill Aqueduct (40% of daily supply) continue uninterrupted to New York City residents and the continued safety of the public traveling over the Dividing Weir Bridge.

Additional highlights of the FY17 Preliminary Four-Year Capital Plan include:

Wastewater Treatment
The Plan projects a $4.1 billion investment in wastewater treatment projects, $2.8 billion of which is for the upgrade, reconstruction or replacement of components of the wastewater treatment plants and pumping stations.

The remaining $1.3 billion investment will be used to mitigate combined sewer overflows, with $570 million for green infrastructure such as green roofs and bioswales, and the remainder for gray infrastructure, such as tanks and tunnels to store wastewater.

The above funding also includes $210 million budgeted for the construction of a new cogeneration plant at the North River Wastewater Treatment Plant. The new cogeneration plant will use renewable digester gas produced by the wastewater treatment process to both power equipment and heat the

facility. It will help us reduce our energy use and help the City meet the Mayor's major commitment to reduce greenhouse gas emission.

Reservoirs, Dams, Treatment Facilities and Water Mains

For FY16-19, the Administration is proposing to invest an additional $2.6 billion in protecting the quality of our reservoirs and the integrity of our dams, providing for treatment where necessary, and maintaining and repairing the water main system conveying potable water to all New Yorkers.

We have budgeted a total of $875 million for our upstate projects. Funding of $148 million is provided for additional closeout work for the Croton Filtration Plant (inclusive of Parks projects), and an additional $727 million for projects upstate, including the continuation of our current FAD programs totaling $140 million (of which $85 million is for land acquisition) and $189 million for the reconstruction of dams in our three watersheds.

There is $1.7 billion available for the replacement of in-City water mains, which includes $1 billion in specific water main work, $277 million for the accelerated replacement of underground water distribution infrastructure, $72 million for trunk-main work related to the sewer build-out in Southeast Queens, $71 million for emergency contracts for water distribution, $66 million for DDC-managed City Water Tunnel 3 connections, $65 million for state of good repair, and the balance of $158 million for ancillary water main projects.

The Rondout-West Branch Tunnel and Water for the Future

Although this project extends even beyond the four-year FY16-19 period, the Plan provides over $250 million for projects related to providing supplemental sources of water during the Delaware Aqueduct shutdown. This funding includes $131 million to increase the capacity of the Upper Catskill Aqueduct.

Long-Term Control Plans

There is $635 million of funding to cover planned consent-order work related to the Long-Term Control Plans for combined sewer overflows and stormwater control. This is a portion of a larger commitment being negotiated with DEC to invest $3 billion over 30 years to improve water quality in designated water bodies. The most significant element of this commitment is $560 million in the Four Year Plan for improvements to reduce CSO discharges into the Gowanus Canal. In addition, DEP will undertake projects such as disinfection in Alley Creek, Hutchinson River, and Flushing Creek and measures in other waterbodies yet to be agreed upon.

Sewers

The Plan for FY16-19 projects $2.5 billion of spending on sewers, which includes the build-out for South East Queens for $584 million. In addition, there are:

- $637 million for replacement of sewers (storm, sanitary or combined), including the Mayor's initiative for accelerated replacement;
- $1.3 billion for new sewers (of all types) of which;
    - Storm sewers as a category by itself (either new or reconstructed) accounts for $1.2 billion of projected spending, of which $240 million is for high-level storm sewers; and

- $304 million of the total is for both the conventional sewers and the lands necessary to create Bluebelt systems, which are being extended beyond Staten Island to Springfield Lake in Queens, Van Cortlandt Park, the Bronx Botanical Garden, and other locations.

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On behalf of the almost 6,000 employees of the Department, I want to express our appreciation for Chairman Constantinides's strong leadership, and our continued commitment to work closely with the members of this committee and the Council as a whole.

This concludes my prepared statement. I thank you for the opportunity to present testimony today and look forward to answering any questions you have.

New York Harbor Foundation
New York City Council Environmental Protection Committee Hearing
Friday, March 11, 2016

City Hall

Public Testimony

Good afternoon. My name is Murray Fisher and I am the Executive Director of the New York Harbor Foundation, a marine restoration and education organization that supports the New York Harbor School on Governors Island and runs the Billion Oyster Project, also known as BOP. I'd like to thank the Chair of the Environmental Protection Committee Councilmember Costa Constantinides and the entire committee for giving me this opportunity.

The Harbor Foundation has requested $100,000 from the City Council's Environmental Initiative for FY 17 and would like the support of the Environmental Committee to help bring Billion Oyster Project to 40 more middle schools in citywide.

We live and work in a city of Islands that surround the third most active port in the country and yet most New Yorkers do not identify as living on the water. The port of New York employs 300,000 people, fewer than 12% of them went to public schools in New York City. SUNY Maritime, in the Bronx has near 100% job placement for graduates who earn an average starting salary of almost $70,000. 85% of SUNY Maritime students are white and 85% come from outside the five boroughs.

Meanwhile, our natural ecosystem is massively degraded. New York Harbor was once one of the most biologically productive places on earth. The engines of that productivity were the oyster reefs. Long since gone as a result of over harvesting and pollution; oysters filter the water, provide food and habitat for thousands of species fish and invertebrate, stabilize the Harbor floor and protect our shorelines during extreme weather.

We have a generation of young people who have been denied knowledge about and access to real, well-paying careers in the marine industry, a school system on the hunt for exciting inquiry led STEM learning opportunities... and a massively degraded natural ecosystem in need of their help.

In the Billion Oyster Project, The New York Harbor Foundation has developed a system for addressing these needs by engaging students directly in the challenging work of restoring New York Harbor.

Our primary educational partner is the New York Harbor School on Governors Island. Harbor School students are integral to the work of oyster restoration through their Career and Technical Education Programs.

These students are engaged with city and state agencies, dozens of non-profit AND commercial firms on a number of large-scale restoration and research projects.

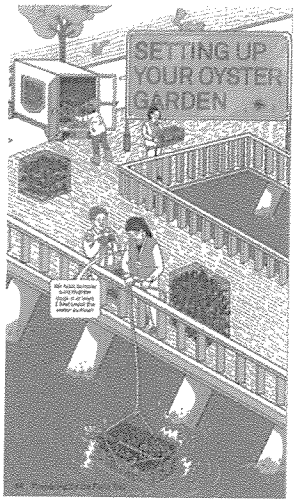
They are also joined by over 55 other schools, 30 of which are public schools, throughout the five boroughs that represent 25 city council districts. Each year over 6,000 new middle and high school students are engaged through a robust educational program that is scalable and inexpensive, funded in large part by the National Science Foundation.

At each school, students participate in hands-on, inquiry-led science and math lessons through a curriculum that aligns with the New York City Scope and Sequence and leverages the performance expectations of the Next Generation Science Standards. Teachers are given a restoration station filled with live oysters at a waterfront site near their school and water quality testing equipment. Students and teachers work both in the field at their Restoration Station and in the classroom. Authentic research data gathered on these missions are shared through a cloud based digital platform that connects all 50 school.

This committee's support in prioritizing $100,000 to the Environmental Initiative during this year's budget will help us to make Harbor literacy a reality for thousands of middle school students.

Thank you.

BOP Restoration Station Fact Sheet for NYC Parks (9/25/2015 draft)



The Oyster Gardening Program (now Restoration Station Research and Monitoring Program) was established by NY/NJ Baykeeper in 2003 and developed over the past ten years in collaboration with NYS DEC, NYC Parks, and more than 150 local gardening groups and individuals. In April of 2014, Baykeeper transferred leadership of the Program to New York Harbor Foundation (NYHF). NYHF is a 501(c)(3) non-profit that supports New York Harbor School on Governors Island and has recently launched the **Billion Oyster Project (BOP)**, a citywide restoration and education initiative for NYC students. As a core component of BOP, Restoration Station Research and Monitoring is both a "citizen science" program for individuals and a hands-on curriculum for schools and community groups to engage young people in marine science, urban restoration, and stewardship at the water's edge. The main goals of the program are:

1) **Environmental Restoration:** to help rebuild native oyster populations of NY Harbor by installing small, protected breeding colonies of "spat-on-shell" oysters in strategic locations throughout the Harbor.
2) **Education and Citizen Science:** to engage students, teachers, schools, and community groups in environmental monitoring, science, and stewardship around their local marine environment and waterfront.

What is a "Restoration Station"?

- An in-situ laboratory on the end of a line
- A multi-parameter monitoring platform that allows for a wide range of data collection through the following components
    - Top unit: Standard cage, to contain 3-500 spat on shell.
    - Middle Unit: Removable mobile trap, divided into two sub-areas, each of which contains a different substrate: cured shell and plastic mesh.
    - Lower unit: Triangular sessile trap with ceramic tiles, oriented in different ways to the water column.
    - Sediment tube: Graduated PVC pipe, to collect sediment for measurement and analysis.
- The Restoration Station is attached to the dock with 1/2" marine poly line and 3/8" nylon coated steel cable.
- Unlike commercially grown (individual) oysters, spat-on-shell are clusters of multiple oysters growing on a single recycled shell - meant to mimic the way oysters grow in the wild.
- All spat-on-shell are produced by Harbor School's hatchery on Governors Island.
- Restoration Stations remain in place for a minimum of TWO YEARS with the same oysters, to allow time for maturation and at least one season of spawning. After two years, oysters are transferred to reef sites and cages are restocked or removed depending on local data and results.

How Do New Scientists Get Trained?

All first time gardeners are required to attend a 2-day training at Harbor School's aquaculture facilities on Governors Island. The training includes: how to build your own cage, count and measure oysters, data collection and monitoring procedures, cage installation, and maintenance. After the training, each new gardener signs a two-year contract and receives a designated cage with tag and number.

Site Selection Process:

Each new gardener selects a site from our map of NYSDEC permitted oyster gardening sites. The site should be in relative close proximity to his/her school, home, or place of work. BOP then facilitates communication between the gardener and the site manager to coordinate exactly how, where, and when the cage will be installed.

Participants MUST:

- Complete a 2-day training
- Monitor their Restoration Station monthly from April through November

Participants Receive

- A Restoration Station at a waterfront site

- Water Quality monitoring equipment
- Access to a community of oyster restorers and educators
- Access to a growing, interdisciplinary curriculum for school teachers
- COMING SOON: access to an online dashboard for storing, manipulating and visualizing data

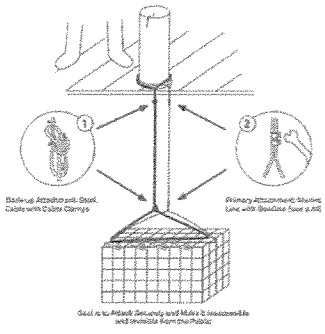
What do Good Oyster Gardening Park Sites Look Like?

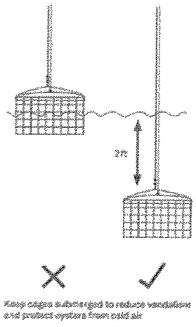
- Pier, dock, or bulkhead (wall) with minimum water depth of 3 ft. at low tide
- Secure point of attachment for marine line and steel cable
- Point of attachment is set back, hidden, or otherwise out of public reach
- For school based oyster gardens, there must be space on the shoreline for teachers to manage a class of up to 30 students in small groups as they conduct oyster garden monitoring procedures.
- Park staff will be made aware of the program and be invited to work with school based gardening programs whenever possible.
- The site should be well monitored and ideally covered by 24/7 security cameras.
- **Optional**: BOP can provide outdoor signage to explain the program and educate the general public

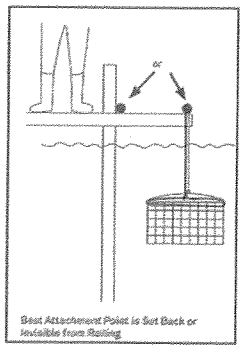
Installation and Monitoring

- The BOP and local gardener will communicate with Parks staff to 1) request permission the site, 2) choose the specific location, 3) coordinate day-of installation with Park staff present, and 4) follow up as needed to ensure the cage(s) remain safely and securely installed. If the local gardener is also a teacher, BOP will review with Park staff the requirements for school group access, monitoring trips, and data collection with students.
- Park workers are not specifically responsible for any ongoing maintenance or monitoring; however they are encouraged to visually inspect the site periodically to ensure the cage and lines are intact.
- All BOP oyster gardeners are required to monitor their cages once per month during the warm months (mid April through early November). BOP will communicate the results of these monitoring events to local Park staff and Parks administration.
- At each monitoring event, the local gardener will: raise the cage, measure and count live oysters, test water quality, catalogue associated species, clean/defoul the cage, and check lines and cables.
- A detailed explanation of installation and monitoring is found in the BOP Oyster Gardening Manual.
- **Liability and Insurance:** all oyster gardening school groups are self insured under NYC DoE policies; school groups follow Chancellors Regulations A-670 for Field Trips including a minimum of 10:1 students to adult ratio in the field.

How to Install:







LINKS

1. **BOP Website**: http://billionoysterproject.org/
2. **Oyster Gardening Manual:** http://billionoysterproject.org/manual/
3. **Oyster Gardening Contract:** http://billionoysterproject.org/wp-content/uploads/2013/06/BOP-Oyster-Gardening-Contract.pdf
4. **Data Collection Sheet:** http://billionoysterproject.org/wp-content/uploads/2013/06/Individual-field-data-sheet.docx
5. **Oyster Gardening Sites:** https://mapsengine.google.com/map/edit?mid=zzi7Rr8laSvs.kzqjBmjAU2aQ

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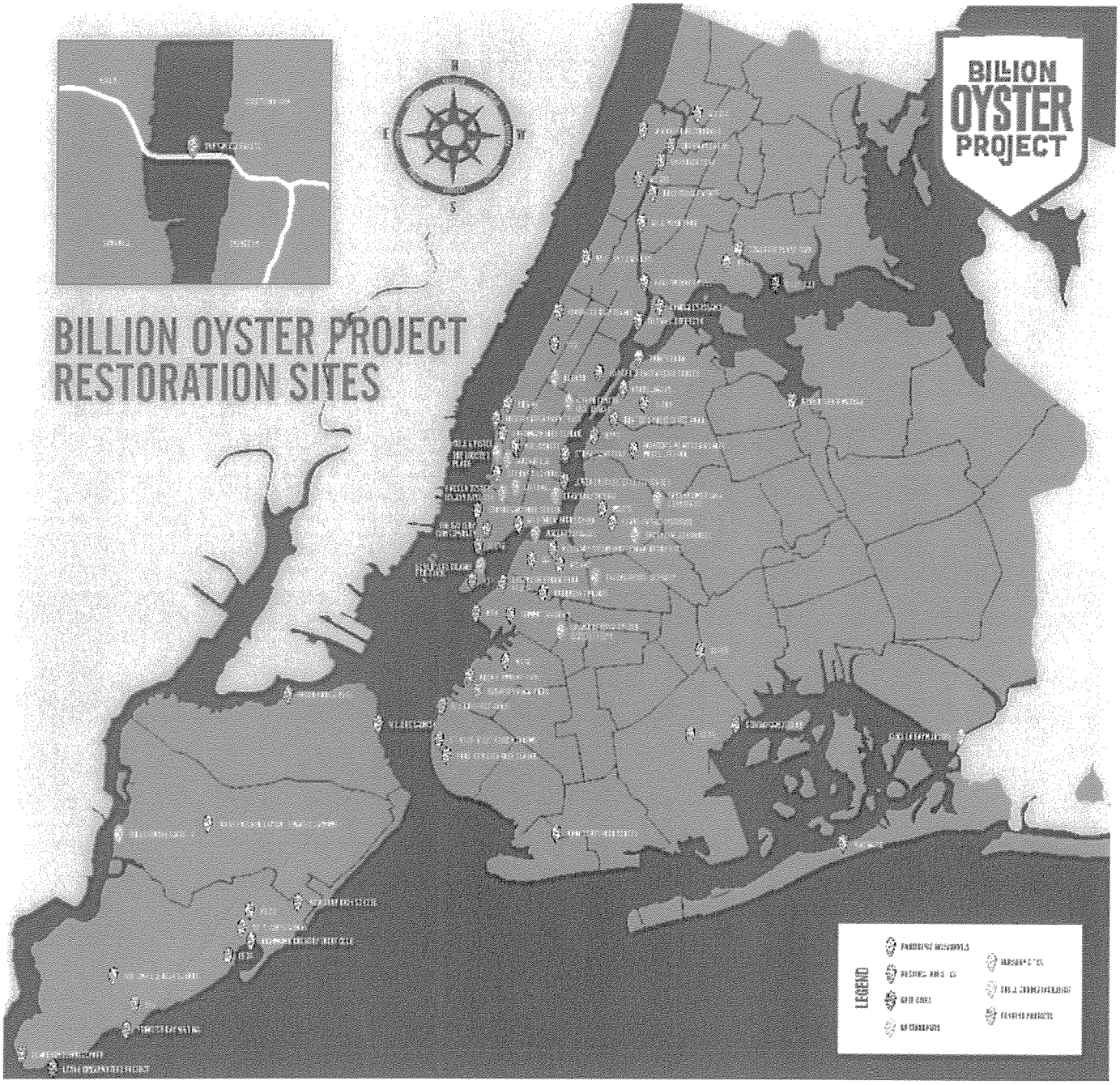
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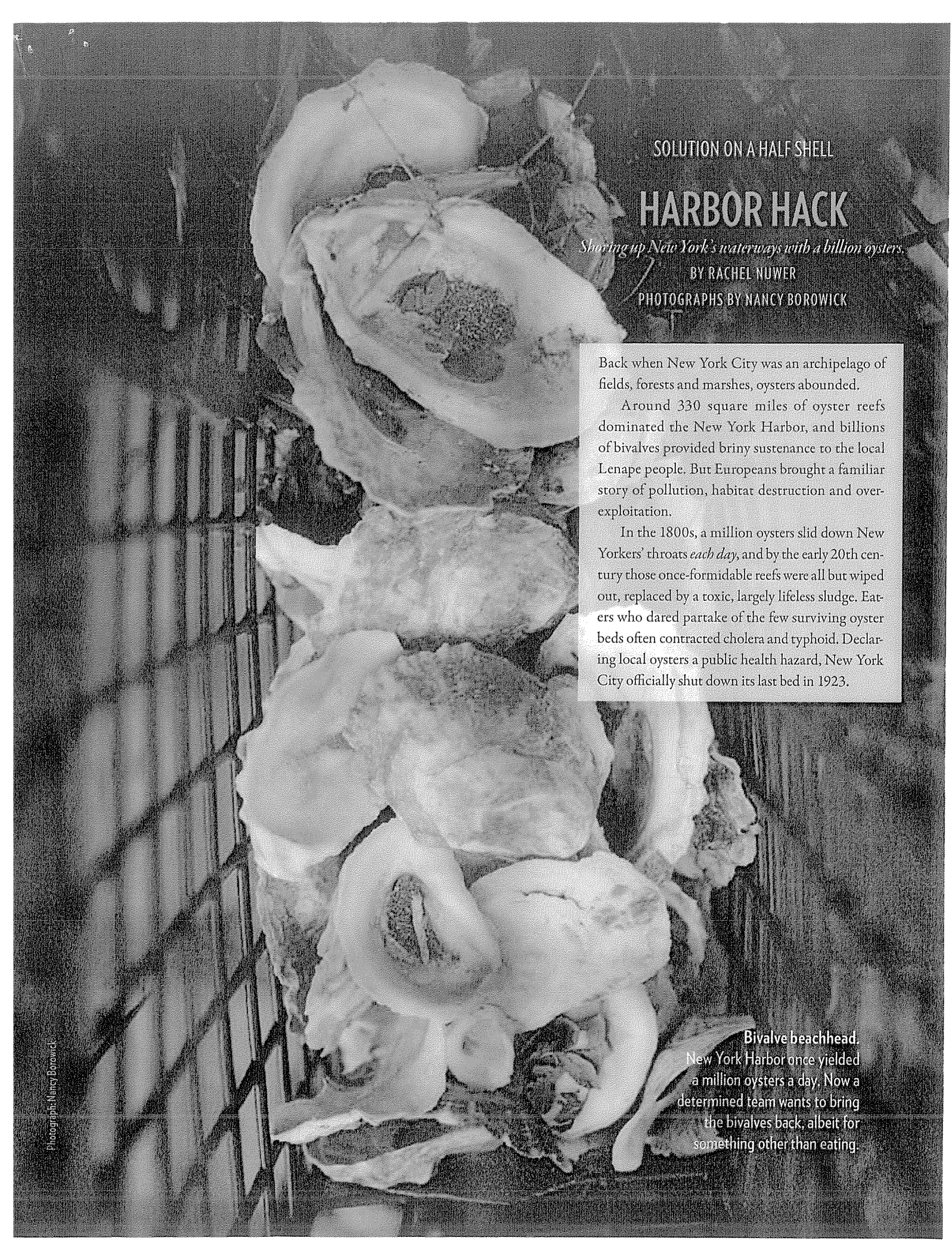


SOLUTION ON A HALF SHELL

HARBOR HACK

Shoring up New York's waterways with a billion oysters.

BY RACHEL NUWER

PHOTOGRAPHS BY NANCY BOROWICK

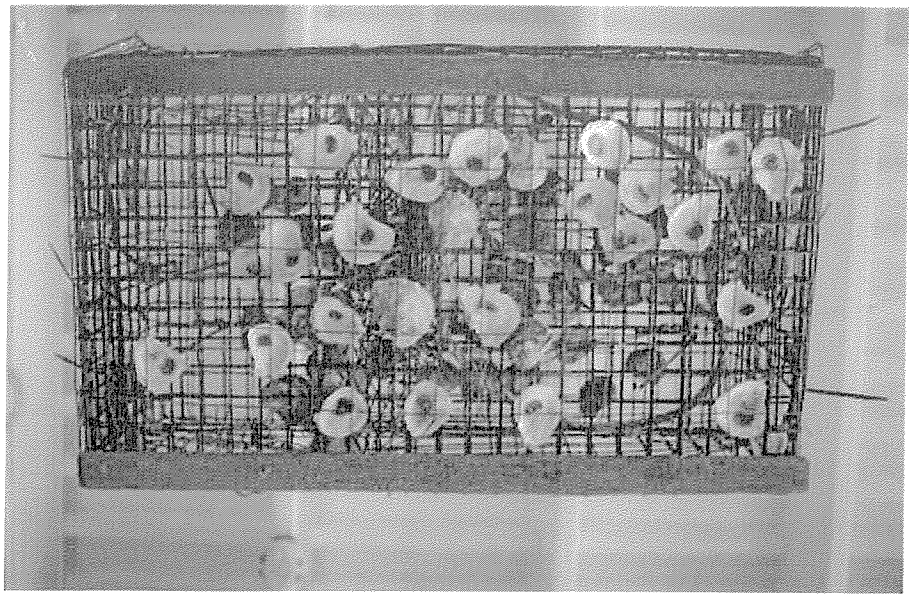
Back when New York City was an archipelago of fields, forests and marshes, oysters abounded.

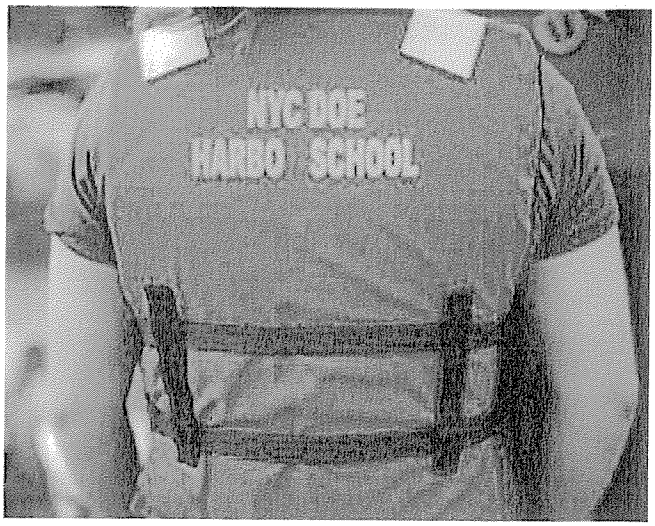
Around 330 square miles of oyster reefs dominated the New York Harbor, and billions of bivalves provided briny sustenance to the local Lenape people. But Europeans brought a familiar story of pollution, habitat destruction and overexploitation.

In the 1800s, a million oysters slid down New Yorkers' throats *each day*, and by the early 20th century those once-formidable reefs were all but wiped out, replaced by a toxic, largely lifeless sludge. Eaters who dared partake of the few surviving oyster beds often contracted cholera and typhoid. Declaring local oysters a public health hazard, New York City officially shut down its last bed in 1923.

Bivalve beachhead. New York Harbor once yielded a million oysters a day. Now a determined team wants to bring the bivalves back, albeit for something other than eating.

Photograph: Nancy Borowick





A single oyster can filter between 24 and 50 gallons of water per day, so a billion could make a real difference. And as water quality improves, more wildlife will begin calling the harbor home.

Immersion learning. Students from New York's Harbor School are involved in every aspect of the project, from rearing oysters in the classroom to building new beds in the East River, often scuba diving just around the bend from the Statue of Liberty.

Photographs: Nancy Borowick

"To me the New York oyster is more important as a symbol than as an appetizer," says Paul Greenberg, whose beautiful book *American Catch* opens with an impassioned ode to that organism. "It proves that complex marine life is still possible in a place that most people assume has been killed off by human abuse. But it's also a tether to the past, kind of like the Truffula seeds the Once-ler tosses down to the boy in Dr. Seuss's *Lorax*."

Now, a team of determined New Yorkers wants to bring those bivalves back, albeit for something other than eating. Last April they launched an initiative called the Billion Oyster Project, which largely relies on the efforts of students at the New York Harbor School on Governors Island, within casting distance of the Statue of Liberty. As its name implies, that public school sits smack dab on the NYC harbor, a boon for its water-heavy curriculum whose topics range from ocean engineering to scientific diving.

Oysters also feature heavily on the teaching menu. *Mollusca* aficionados and ecologically minded instructors are training a fleet of teenage marine biologists who, after five years of work, now churn out around two million oysters annually, with an ultimate goal of seeding the harbor with a billion bivalves.

Why? Not to sate NYC's half-shell cravings—given pollution levels, homegrown oysters won't be edible for decades or even centuries to come—but because these hard-shelled filter feeders provide free ecological services like cleaning the water and buffering coasts against storms.

"One billion oysters distributed across 100 acres would theoretically filter the entire standing volume of the New York Harbor—75 billion gallons, from the Goethals to the Verrazano to the GWB—in just three days," says Sam Janis, project manager at the New York Harbor Foundation.

But the project's more fundamental goal, he adds, is "to educate all New York City students about the harbor and what they can do to restore it, work on it, play in it and make it theirs."

The students work both on the water and in the classroom, but the oyster rearing begins in the aquaculture lab on Governor's Island's southeast bend. Pete Malinowski, BOP's director and the lab's adviser, is an oysterman by birth: His family owns Fishers Island Oyster Farm off the eastern tip of Long Island, so he's an old hand at tending shellfish. He and the Harbor School's cofounder, Murray Fisher, imagined a multidisciplinary, immersive curriculum that combined various aspects of engineering, marine biology, conservation and maritime skills. At the same time, they wanted to do something for the city itself. From these ideas, the Billion Oyster Project was born.

While the New York Harbor is no Great Barrier Reef, legislation like the 1972 Clean Water Act has helped it improve enough over the years to sustain some marine life. Wild oyster reefs, however, have yet to return because those shellfish are exceptionally poor pioneers. They begin life as free-swimming larvae, but in order to settle down and grow they must affix themselves to a solid surface—preferably other oysters.

This creates a tricky predicament: Without existing oyster beds, even wild oysters that somehow stray into the city's waters cannot grow. The oysters, in other words, need a bivalve beachhead.

Creating manmade oyster beds, Malinowski and others say, is the solution. This strategy has worked in other places, including the Chesapeake Bay. Once established, oysters can improve the water quality by sucking up pollutants—including excess nitrogen, phosphorous and other organic effluents—along with the microorganisms and algae they feast on. They digest the nutritious bits and spit out the unpalatable ones in mucousy secretions, which fall to the sea floor, removing them from the water column. A single oyster can filter between 24 to 50 gallons of water per day, so a billion could make a real difference. And as water quality improves, more wildlife will begin calling the harbor home.

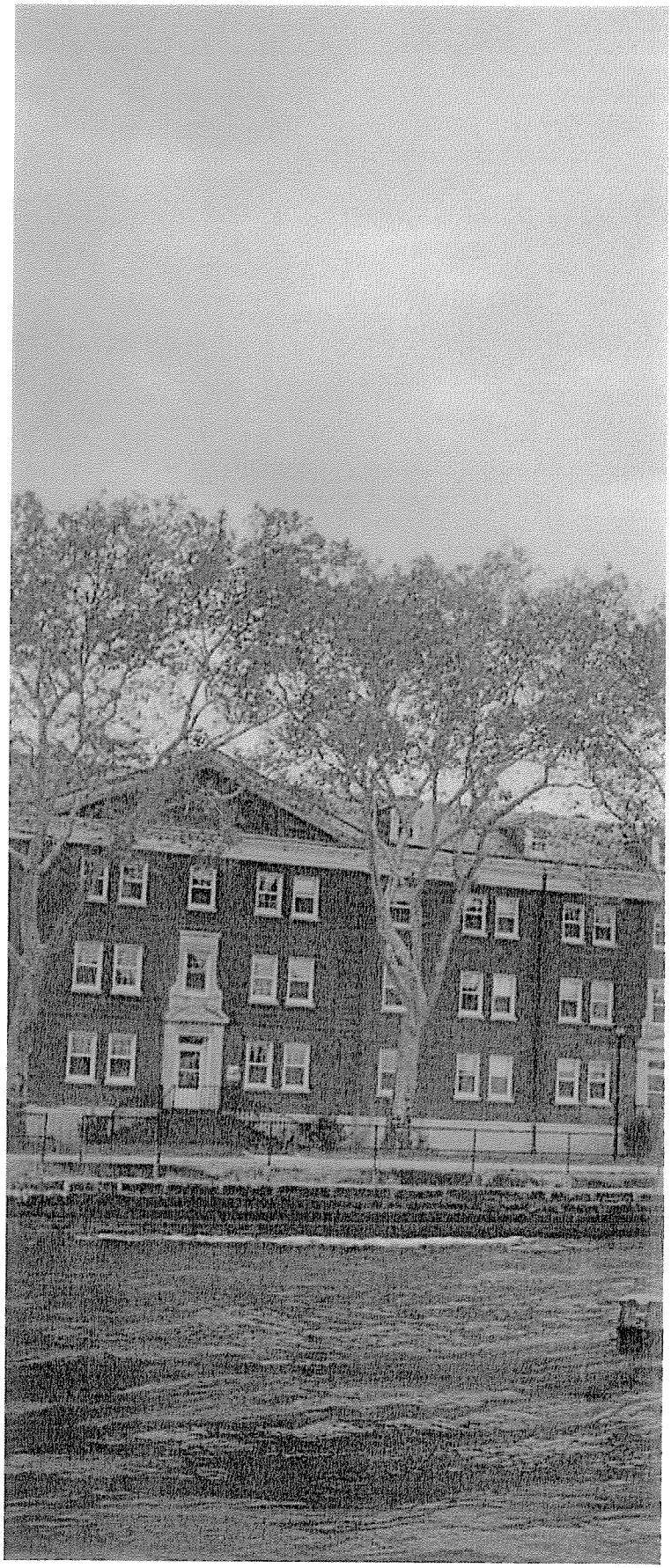
Unfortunately, the bivalve's filtration superpower also means oysters from our harbor will not be shucked and slurped anytime soon. But despite their toxic inedibility, there are more important reasons to restore oyster reefs. As Hurricane Sandy showed, New York is vulnerable to storm surge; natural obstacles such as reefs, mangroves and sand dunes help blunt the force of a charging storm. Again, a few hundred oysters won't stop a hurricane in its tracks, but an entire reef system could reduce its damage.

"After we get more serious interest and investments," Janis says, "maybe in 10 to 20 years, we'll begin to see real physical resiliency."

Besides cleaning and protecting the harbor, education is also at the heart of these oyster efforts. The majority of the city's 1.1 million school kids spend all of their time "in boxes" (aka classrooms), Janis says, and their science lessons are far removed from the natural phenomena they're supposed to study.

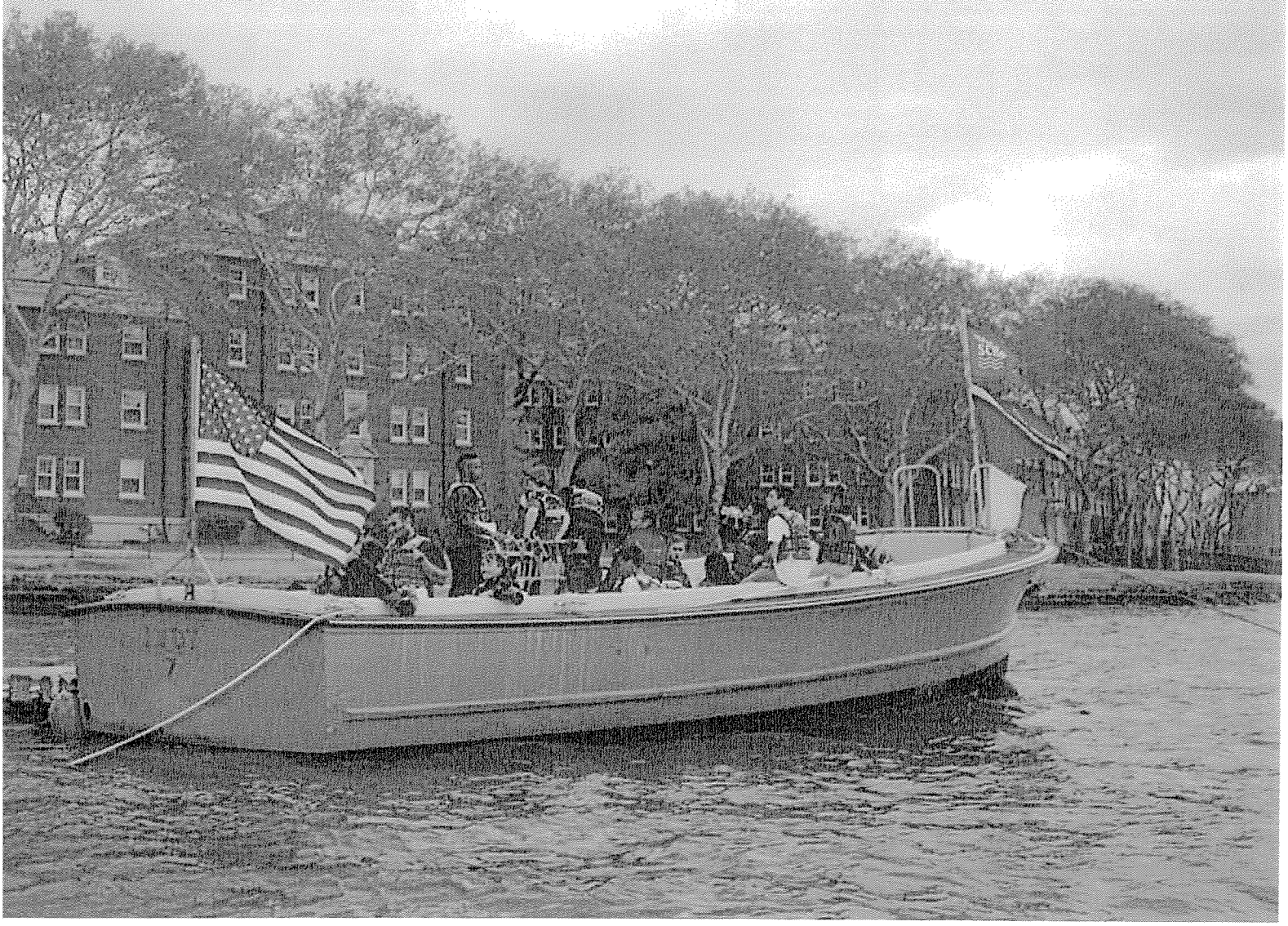
But not at the Harbor School. In its aquaculture lab, cauldrons of plankton glow green, and large cylindrical plastic tanks brim with spawning oysters. Students' posters cover the walls, with titles such as "Spawning Dioecious Bivalves," "Phylum Mollesca" and "Gamete Stripping." Pupils are involved in every aspect of the project, including rearing the oysters, designing and building aquaculture facilities, testing water samples for nitrate levels and fecal contamination and, best of all, scuba diving to build underwater reefs. So far, they have established large-scale sites near Governors Island and at the mouth of the Bronx River.

This learning experience isn't reserved only for Harbor School students. Any school or organization can adopt its own Billion Oyster garden, a mini-reef consisting of 300 to 500 oysters that can be visited on field trips. More than 30 city schools have signed



Photograph: Nancy Borowick

"One billion oysters distributed across 100 acres would theoretically filter the entire standing volume of the New York Harbor—75 billion gallons, from the Goethals to the Verrazano to the GWB—in just three days," says Sam Janis, project manager at the New York Harbor Foundation.



up along with groups like the Lower East Side Ecology Center and the Sebago Canoe Club.

"Whether we're successful in getting a billion oysters here in 10 years, 20 years or never, the most important thing is that we're connecting kids to the water," Janis says. Indeed, it was getting his own feet wet as a child—playing in a polluted New Jersey stream and a scrappy plot of woods—that fueled his lifelong love of the outdoors. "The harbor is NYC's natural classroom," he says.

When Crown Heights native Derek Thompson first heard of the Harbor School, he was 13 and "in a bad spot." He loved science, though, so he attended all the school's events and put his name into its entry lottery as many times as possible. His efforts paid off, and he landed a spot.

When Thompson began his studies, he knew nothing about oysters. In fact, he had never even eaten one, the case for most new students. But he and his freshmen comrades got their chance to slurp in a sort of oyster-initiation ceremony.

"The teachers said, 'You're not a Harbor student unless you eat an oyster!'" he recalls.

On a recent Friday, 30-something Google employees spent an afternoon volunteering with the oysters. Some built cages that would become oyster gardens; others cleaned shells rescued from restaurants.

Thompson's slid down easily with some hot sauce and lemon juice; now, he loves steamed oysters, especially in a butter sauce. He graduated from the Harbor School three years ago and comes back to work as an aquaculture technician during breaks from Skidmore College. More importantly, he and a few friends have plans to open their own version of the Harbor School in Boston.

But as other oyster restoration efforts from around the country show, it takes constant effort to meet the demands of rearing millions of oysters. "The students do a lot, but we couldn't do this without volunteers," Malinowski says.

Volunteers assemble in Battery Park for the short ferry ride to Governors Island, where Malinowski gives them a lab tour and puts them to work. On a recent Friday afternoon, 30-something Google employees—all wearing matching blue shirts adorned with hearts, recycling signs and the label "Google Serve"—left their desks on 8th Avenue to spend an afternoon with the oysters. Some built cages that would eventually become oyster gardens, while others cleaned shells rescued from restaurants.

Ben Pollinger, executive chef at Oceana, helped conceive of the shell collection, and was the first restaurant to sign up. He's bought oysters from the Malinowski family for 15 years and knows quite a bit about oyster life cycles himself.

"I'm naturally inquisitive, and I've always been very ecologically minded," he says. "At my house as a kid, we always composted everything." He remembers his parents and grandparents in New Jersey warning him not to swim in the polluted river, and forcing him to release the fish and eel he caught there, for fear of contamination.

Given his background, Pollinger was both concerned about the river's health and aware of the environmental burdens humans place on the watershed. Each time another dozen empty oyster shells hit the trash at Oceana, he cringed, knowing that there must be some use for that organic material besides filling up landfills.

Pollinger wondered if his friend Pete might be able to use the shells from the 3,000 to 4,000 oysters the restaurant tossed out each week. Malinowski jumped at the idea.

Now, around half a dozen other restaurants donate their shells, too, including the Lobster Place in Chelsea Market, Grand Central Oyster Bar, Maison Premiere, Brooklyn Crab and Aquagrill.

"For me, the benefit is the satisfaction in knowing I'm diverting something that has a use away from the landfill," Pollinger says. Volunteers from Earth Matter, a compost-centric nonprofit, pick up to 1,500 pounds of shells donated by restaurants each week, just skimming the surface of the approximately 300,000 pounds that seafood-loving New Yorkers leave behind every seven days.

Back on Governors Island, heaps of the rescued shells swarm with flies and reek of marine decay, but if the Google volunteers working behind "Do Not Enter" fences are put off by that pungent perfume, they do a good job of hiding it. Teams sift shells, spray them down and bag them in mesh tubes that will be put back out to sea for a year, where sun and elements will clean them of any remaining cocktail sauce. Once sterilized, each shell can support 10 to 20 baby oysters, although only a fraction will survive to adulthood.

After hours of wet, messy work, Janis and Malinowski reward the volunteers' efforts with oysters on the half shell—from Virginia, that is, not New York Harbor. "I came here for the oysters," one Google employee jokes. "There was a bit of a miscommunication with what this project was about."

Wisecracks aside, the volunteers enjoyed "giving back," as one puts it. And they've also learned. Earlier that day, when Janis asked the fresh-off-the-boat recruits if they knew why oysters are so important for the harbor, most shook their heads. Now, they emerged as knowledgeable New Yorkers versed in the restorative capabilities of the humble oyster.

"The ultimate goal," Janis says, "is to reconnect all New Yorkers to the water."

billionoysterproject.org

Rachel Nuwer is a Brooklyn-based freelance journalist who can never pass up a $1 oyster happy hour.

Testimony of Judi Kende
Vice President & New York Market Leader
Enterprise Community Partners, Inc.

To the New York City Council
Committee on Environmental Protection
Preliminary Budget Hearing
Department of Environmental Protection

March 11, 2016

Good morning. My name is Judi Kende and I lead the New York office of Enterprise Community Partners, a non-profit affordable housing organization that has worked to create and preserve affordable housing here and nationwide for 30 years. Thank you, Chair Constantinides and the members of the City Council's Committee on Environmental Protection for the opportunity to provide testimony on the Department of Environmental Protection's budget.

Today's hearing is an opportunity to consider priorities for green initiatives in the coming year. When allocating resources for environmental protection, I encourage this committee to keep in mind the unique needs of affordable housing and low-income New Yorkers. We would be happy to speak with the committee further about ways to incorporate these considerations.

At Enterprise, we believe that green is about more than energy efficiency, it is about social justice. Low-income households suffer disproportionately from the effects of inefficient housing, including poor health, high utility costs and little protection against extreme weather events. That's why, more than ten years ago, we created the Enterprise Green Communities Criteria to achieve the health, environmental, and economic benefits of green building using the limited resources available for affordable housing.

New York clearly recognizes the important role that housing plays in achieving both sustainability and equity. We are proud to work closely with the Department of Housing Preservation and Development (HPD) to implement their Green Policy for affordable housing, which requires that all new construction and substantial rehabilitation projects receiving funding from HPD comply with a specific version of the Criteria called the "New York City Overlay." The City is further working to support energy and water efficiency in affordable housing through HPD and HDC's Green Housing Preservation Program, which assists owners of multifamily properties in undertaking efficiency improvements while preserving affordability. Importantly, the Green Housing Preservation Program and other initiatives like the Retrofit Accelerator are reaching owners of small and mid-sized buildings, a part of our housing stock not well served by other programs.

I commend the Council for its commitment to bold environmental goals, and as the committee considers its budget for Environmental Protection, I would urge you to keep in mind the unique needs of affordable housing. Affordable housing organizations have limited resources, and they

must keep their own costs down in order to maintain affordability in the long-term for residents. Enterprise would be happy to work with you to make sure affordable housing is considered in any green legislation going forward. We look forward to continued work with the Administration, the Council, and our partners in the affordable housing and sustainability sectors to make New York City a greener place for all residents.

Thank you, again, for the opportunity to testify today.

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Murray Fisher Harbor Foundation

Address: 10 South Street Slip 7 NY NY 10004

I represent: _____

Address: _____

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Name: Vincent Sapienza

Address: Deputy Comm. for Engineering

I represent: Design & Construction

Address: _____

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Name: James Roberts

Address: _____

I represent: Deputy Commissioner for

Address: Water & Sewer Operations

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Name: Angela Licata

Address: Deputy Comm. for Sustainability

I represent:

Address:

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Address: Assistant Commissioner for Budget

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Address:

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Name: Eric Landau

Address: Acting Deputy Commissioner

I represent: NYCDEP

Address: Bureau of Public Affairs & Communication

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Name: Steve Lawitts

Address: First Deputy Commissioner

I represent: NYC DEP

Address: _____

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Name: EMILY LLOYD

Address: _____

I represent: Commissioner NYCDEP

Address: _____

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