



GOAL 6

Enhance the public experience of the waterways that surround New York—our Blue Network.

ENHANCE THE BLUE NETWORK

Three major waterbodies—the Hudson River, the Long Island Sound, and the New York Bight of the Atlantic Ocean. Four tidal straits. Two vast bays separated by narrows. Not to mention several other major rivers, streams, and canals. Together the waterways surrounding, and shaping, New York make up one of the most complex harbors in the world. Think of the waterways as a geographic entity in and of itself—a sixth borough, if you will, a space that unites rather than divides the various parts of New York. This Blue Network is not only a highly diverse and productive ecological system, it's also an incredible public resource for people who live and work in, as well as visit, New York City.

And it's one that hasn't been fully tapped yet. In the past few decades, huge advances have been made in our waterways: water quality is improved, and New York Harbor is healthier; waterfront access and water recreation have proliferated; and there's renewed interest in waterborne transportation as a more efficient and sustainable mode of transportation for passengers and freight, and in the potential use of tides and currents for renewable energy. Still, there are many unrealized opportunities to connect people with the waterways—physically, visually, and culturally—and to stitch the Blue Network into the city's urban fabric. Too many residents and visitors to New York do not get out on the water, whether because of lack of public programs, concern over water quality, or simply because they just aren't aware of all the Blue Network has to offer.

With this plan the City aims to change that. By giving planning for the waterways the same focus and attention given to planning for the land, New York can capitalize on the

Blue Network for recreational enjoyment, commerce, and beauty. To engage all residents and visitors with the Blue Network, the City is seeking to promote water recreation that is safe and accessible to all, expand waterborne transportation, and create the necessary waterfront infrastructure to maximize the use of the Harbor and its tributaries for cultural activities, historic events, educational programs, and energy generation.

These new uses present challenges. For instance, as the City increases recreational access, there is a need to prevent conflicts between recreational boaters and commercial ships. In addition, it is important to consider best usage standards for the water, along with short-term decreases in water quality after wet weather and other safety issues such as strong currents. Making the most of the Harbor and tributaries will improve quality of life for residents and increase the city's appeal to visitors. The Blue Network has the potential to enhance New York in infinite ways.

PROVIDING FOR WATER RECREATION

With its diverse waterbodies, New York offers a variety of possibilities for water recreation. And the advances in water quality and access to the waterfront have spurred participation in, and demand for, water recreation.

New Yorkers are taking to water-based activities like never before. These activities include the following sports and activities:

- In-water: swimming, surfing, bodyboarding, windsurfing, wake boarding, jet skiing, paddle boarding, snorkeling, scuba diving

- Boating: human-powered boating (canoeing, kayaking, rowing), sailing, power boating
- Near-water: Fishing, bird-watching, hiking, biking
- Cruises: Tour boats, dinner cruises, concert cruises

Access points and facilities are essential to these activities (as seen in Figure 1, page 87). Such sites are dependent upon natural landforms to a certain extent, but public and private entities also create and manage them. These access points and facilities include:

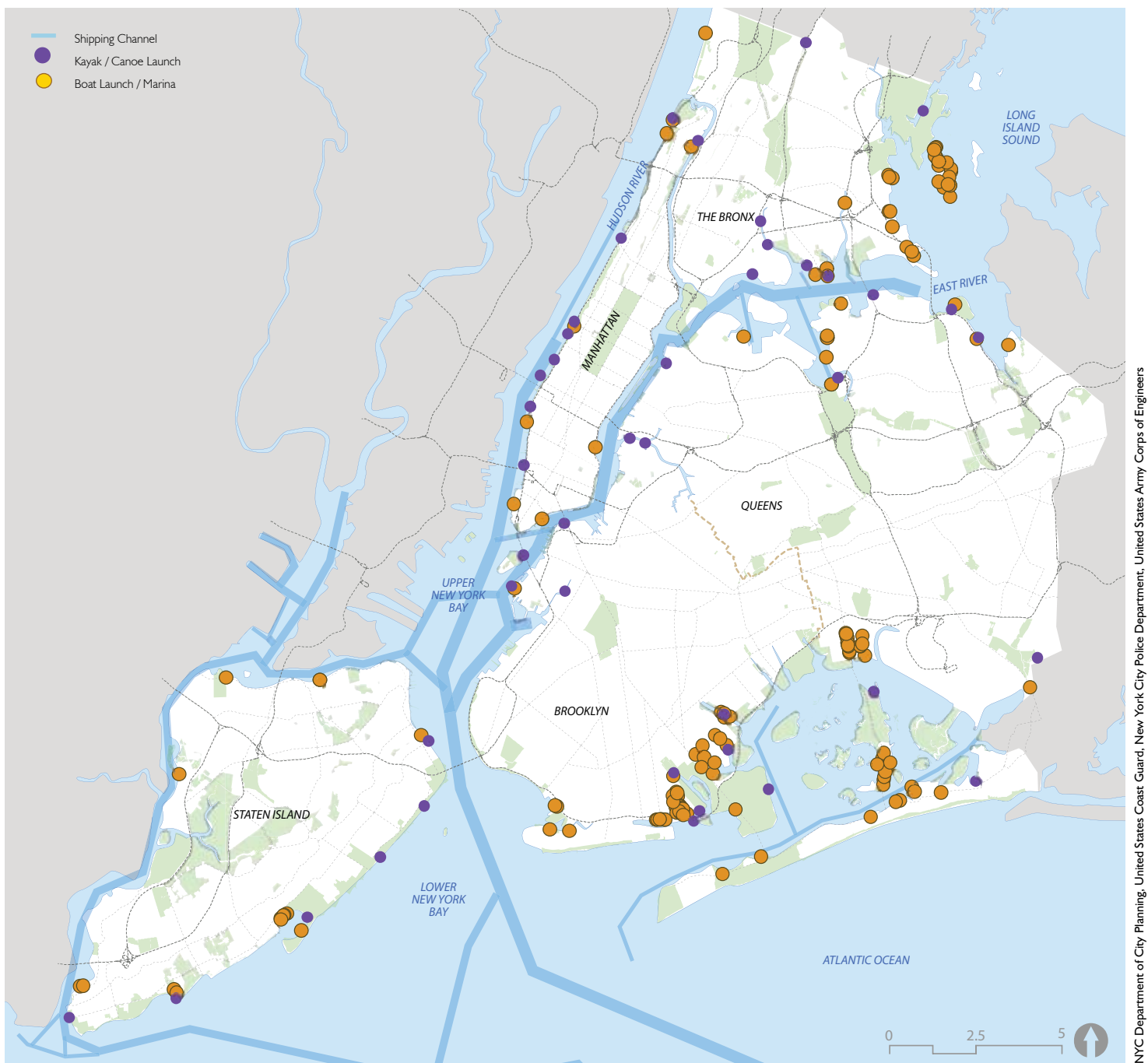
- Beaches: 14 miles of swimmable beaches in New York City
- Marinas: 13 public marinas and more than 100 private marinas
- Mooring Fields: two public mooring fields, in Sheepshead Bay and Great Kills Harbor
- Kayak/Canoe Launches: More than 40 launch sites, most managed by the City
- Boat Storage: Ranging from shipping containers repurposed as kayak storage to larger facilities at marinas.

More and more residents, schoolchildren, and visitors are experiencing the city by boat, and community boating clubs have emerged throughout New York. One of the most successful programs in promoting the use of the waterways for recreation is the New York City Water Trail, run by the New York City Department of Parks & Recreation in conjunction with a newly established partner organization, the New York City Water Trail Association. Capitalizing on the surge in popularity of human-powered boating, this program established launch sites for kayaks, canoes, and rowboats and provides online maps for guidance on routes to take.

Despite great progress in utilizing the city's waterways for recreation, more progress can be made. While there are many areas where the public has access to the waterfront, only a limited number of these places provide direct access to the water itself, necessary for any sort of water recreation. Many piers and waterfront parks have railings or rip-rap shorelines, which preclude boat access. New boat launches could

“When New York City was created, there was no Central Park. The park for Manhattan was the water's edge—a pristine and beautiful place. We need to recognize the water as this great resource again.”

—Roland Lewis, Executive Director, Metropolitan Waterfront Alliance



NYC Department of City Planning, United States Coast Guard, New York City Police Department, United States Army Corps of Engineers

Figure 1: Boat launch points, marinas, and shipping channels, demonstrating the diversity of activities on the Blue Network and also the potential challenges in securing the safety and productivity of its many users.

be added to the New York City Water Trail, and design guidelines should be developed for boat launch types and features appropriate for different kinds of waterfront areas. More marina facilities are needed so that more people can get out into New York’s Blue Network.

There are challenges and constraints that must be taken into consideration when planning for the expansion of water recreation. While water recreation promotes health and

provides a unique vantage point from which to take in the urban environment, there are possible threats to safety and security associated with recreational use of the Harbor. Within New York State, waterways that are affected by tides are considered to be “navigable by law,” and the public has a right to these waters. However, government may impose restrictions on the use of the waterways to protect the health, safety, and welfare of the public.

New York Harbor is a commercial port—the third largest in the country and largest on the East Coast. Our waterways are home to busy shipping channels frequented by container ships, oil tankers, and significant tug and barge fleets. These large ships require great distances to slow or change course. In addition to waterborne freight carriers, there are also passenger ferries, excursion vessels, and water taxis providing commuter service and sightseeing trips.

The vessels and their wakes, as well as the Harbor's tidal movements, can pose challenges for recreational boaters. For even the most experienced, getting caught in the wrong place in a small craft can be incredibly dangerous.

In addition, although the vast majority of the city's waterways are appropriate for recreation there are sites throughout the Harbor that are not compatible with recreational use. These sites are critical to ports and transportation, or perform other functions requiring a high level of security.

Another potential safety hazard is poor water quality in some areas. Though water quality has improved substantially over the past several decades, there are still certain areas where the water is not safe for direct human contact. This risk is partially due to combined sewer overflows, which can contaminate the water after wet weather—exacerbated in constricted waterways with little water movement. Another major factor is the presence of contaminated sediment caused by industrial pollution. Unsafe water quality limits water recreation.

Most recreational boaters are aware of tides, currents, shipping channels, secure sites, and water quality concerns and know how to ensure their own safety and the safety of those around them. Community boathouses are effective at instructing new boaters and providing excursions with able guides. There is, however, relatively little regulation or enforcement for individual boaters who may unknowingly place themselves in danger.

With increased recreation and commercial traffic planned, wakes caused by boats is also a concern. Wakes caused by motorized boats can cause erosion; damage piers, bulkheads, and other vessels; and pose safety hazards. Limiting and enforcing speed and wake restrictions as well as employing wave attenuators may be appropriate means of reducing wakes.

Despite these concerns, recreational enjoyment of New York's waterways is a priority for the City. Creating new facilities in appropriate locations and configurations, and providing guidance and support to the boating community, will promote safe and healthy recreational use of the Blue Network.



NYC Economic Development Corporation

A New York Water Taxi on the East River.

EXPANDING FERRY SERVICE

The New York metropolitan region has the largest ferry system in the U.S. in terms of ridership. The system is comprised of the Staten Island Ferry, the biggest municipally run ferry service in the country, linking the North Shore of Staten Island with Lower Manhattan, along with five private ferry operators. These private operators carry passengers between New Jersey and New York City, with limited private service within the City of New York. Together the Staten Island Ferry and the private services carry about 30 million people a year. By comparison, the Washington State ferry system, the second largest in the country in ridership, carries about 24 million passengers a year.

The ferries plying New York Harbor and the East and Hudson rivers provide an important transportation link for commuters throughout the region. Nearly 90,000 riders take to the rivers and Harbor as part of their daily commute, with approximately 60,000 riders on the Staten Island Ferry and 26,400 riders on the private ferries. Though the Staten Island Ferry has become one of the iconic images of New York City, it is also a vital mass-transit service. (Figure 2, page 89, shows the routes and daily ridership for the ferry services operating in the Harbor today.)

While ferry service in the metropolitan area is robust, ferry operations have not been uniformly successful. A 2006 study by the Regional Plan Association on behalf of the Port Authority of New York & New Jersey examined all the

routes that had been established since 1986. During that period 55 ferry routes were established. Of these, 24 routes remained at the time the report was published, and 31 had been discontinued, with most of the surviving routes focused on the trans-Hudson River market.

Ferries are an important alternative to New York's crowded roads and rails. Residents of New Jersey riverfront communities depend on the private ferries for frequent and fast transportation to New York City. Without these ferries, the PATH subway service would be overburdened, and additional stress would be placed on the tunnels and bridges connecting the two states. Ferry service provides an attractive alternative to other forms of transportation, but there are many challenges to maintaining and expanding ferry service.

Study of Ferry Service Viability

Despite increased interest in ferry service, ferries remain a very small percentage of total regional transit ridership (approximately 1 percent). To examine how ferry ridership could be increased, the New York City Economic Development Corporation (EDC) initiated a study in 2010 in partnership with NYHarborWay, an initiative of NYC & Company, the City's official marketing and tourism organization.

The *Comprehensive Citywide Ferry Study* reviews ferry service in New York City and the potential for expansion of service. The study considers the market prospects for service from 41 sites; identifies four possible corridors for new service; looks at the potential for combined recreational and commuter services; and

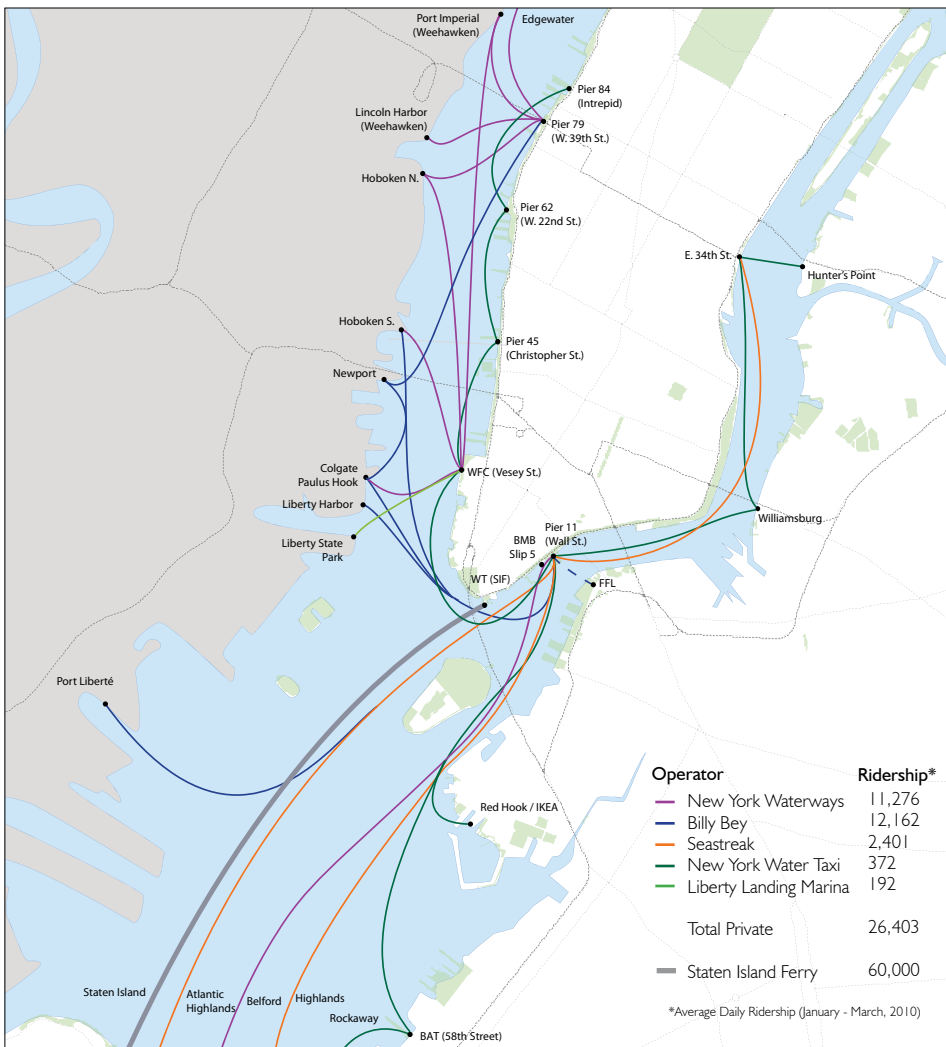


Figure 2: Current ferry routes and ridership in New York Harbor.

examines key policy issues including governing structure, funding, and integration into the larger transit network.

As part of the study, public meetings and discussions with local elected officials were held to identify 41 sites throughout the city for detailed examination (see Figure 3, page 90). Each site was assessed for its market size, its existing transit travel time to lower and midtown Manhattan, cost of operating the service, and other factors. Based on this analysis sites are ranked.

The study groups promising sites into four corridors and examines the ridership, cost, and public subsidy that would be required to run a service in these corridors. Corridors identified are along the Hudson River, both sides of the East River, and in southwest Brooklyn. The potential services are assumed to have frequencies of 20-25 minutes in peak commuter hours.

The analysis considers how adding off-peak

and weekend recreational service would affect ridership and cost. During off-peak hours, one of the boats that would otherwise sit idle would be used for recreational service to Harbor destinations such as Governors Island and Brooklyn Bridge Park. The analysis shows that during off-peak hours more riders could be attracted to recreational ferry sites than to commuter sites. And more riders could mean that the per-passenger subsidy would decline, reducing demands on public resources needed to operate the service while still maintaining necessary service levels during peak commuter hours.

To help determine whether it makes sense to initiate service in any of the corridors identified, the study asks a series of questions. The questions help establish criteria for evaluating ferry service potential and assessing whether a public subsidy should be considered:

1. Is the market underserved by other public-

transit options? Are the alternative transit services beyond a reasonable walking distance? Do the alternative transit services require more than one transfer to reach a final destination?

2. Are the transit alternatives overcrowded, and will the ferry service create new capacity in those corridors? Will that additional capacity help avoid the need for expensive capital investments in ground transit?
3. Will the riders of the ferry service save time by using the water?
4. Does the route provide needed emergency-evacuation capability?
5. Will the ferry service attract patrons who would otherwise drive to their destinations? Does the service promise the environmental benefits of reduced emissions?
6. Can the service be integrated into the existing transit network, both from service and fare perspectives?

Governing Structure and Funding of Ferry Service

The study indicates that private funding and operation of ferries within the city is unlikely without public subsidy. Just as other transit services need public subsidies to operate, all four corridors identified in the study would require funding beyond the farebox. Existing ferry services from New Jersey require no public subsidies because the west bank of the Hudson River has robust development and limited transit options, both of which make ferry service more competitive. Services within New York City would require public subsidy, raising questions of governing structure and funding.

The *Comprehensive Citywide Ferry Study* looks at a number of governing options. These range from a bi-state entity like the Port Authority to a regional entity like the Metropolitan Transportation Authority to a City agency like the Department of Transportation. Also being examined are special districts devoted to the provision of ferry service. No recommendations are being made regarding governing structure, but if ferry services continue to be pursued the question will need to be addressed.

Hand in hand with the issue of governing structure is funding. If a public subsidy is required, where should the funding come from? While public authorities in San Francisco, Seattle, and Boston subsidize private ferry provid-



Figure 3: Sites evaluated in the Comprehensive Citywide Ferry Study.

ers, public-sector operating subsidies for private ferry services in the New York metropolitan region have been limited. The ferry study reviews a host of tax and revenue sources, including general tax sources such as the property tax, sales tax, and income tax; federal and state sources; and special district funding. No recommendations are specified, but decisions will need to be made with respect to long-term funding.

Integration into the Regional Transit System

A key issue regarding development of future ferry service is whether the service can be integrated into the broader transit network. With the exception of Lower Manhattan and Jersey City, the densest employment centers in the New York City area are located inland. In many instances, commuters will have to transfer from the ferry service to some other transit mode before reaching a final destination. The more seamless that transfer can be, and the less costly it is, the more likely riders will use the ferry service. Connections between ferry service and bus or subway service are crucial. Ideally, trans-

fers should be offered at reduced or no cost. Achieving these goals will require agreements between transit providers to coordinate schedules, accept transfers, and share fare revenue.

Upcoming East River Pilot Program

The New York City ferry study identifies the East River corridor as the corridor most independently financially viable, requiring the least City subsidy. As a result, EDC is working with private providers to establish a publicly subsidized pilot program linking Brooklyn and Queens with Manhattan. The East River pilot program, which is scheduled to start service in spring 2011, will connect several destinations along the waterfront. The service will include the following sites: Queens West, Greenpoint, North and South Williamsburg, and Fulton Ferry on the east side of the East River, and E. 34th St. and Wall St./Pier 11 in Manhattan. A recreational component also may be added.

The service will test ridership demand from developing residential areas along the East River. The new route will connect communities in Brooklyn and Queens that have grown

as the result of recent rezoning of underutilized industrial areas with major economic centers in Manhattan. Ferry service offers the potential for a faster, more comfortable ride to the central business districts of Manhattan.

Other features will be examined as part of this pilot program: integration of commuter and recreational service; ridership; effectiveness of marketing; ticketing infrastructure; customer satisfaction; fare levels; sustainable funding; and intermodal connectivity to buses and bikes. The pilot will test many of the assumptions of the ferry study and is likely to serve as a template for the development of future ferry services.

PLANNING FOR MARITIME EMERGENCY EVACUATION

New York City's unique geography—a dense urban environment built on coastal islands—is a great asset. However, it carries certain risks: increased potential for hazards and increased vulnerability to their effects.

The Blue Network and maritime transportation are crucial to New York's ability to respond to emergency situations. The Nor'easter of 1992, the Northeast Blackout of 2003, the 2005 Transit Strike, and 9/11 caused major disruptions to the transportation system. Commuter ferry routes in New York Harbor played an important role helping the city during these incidents. Nearly 460,000 people evacuated lower Manhattan by ferries on 9/11, and during the Northeast Blackout of 2003 ferry service expanded to five times its normal capacity.

The New York City Office of Emergency Management (OEM) is responsible for helping the city prepare for emergencies. OEM works with public- and private-sector partners to develop plans that guide the city's response during these events. Many of these plans, including NYC's *Area Evacuation Plan* and *Disaster Logistics Plan*, rely on maritime operations.

Unfortunately, access to our waterways and the number of suitable maritime landing locations have steadily eroded over the past several decades. Furthermore, many of the existing landing sites cannot accommodate the wide range of vessels that operate in the Harbor today. Fewer and smaller landing sites diminish the capability of the City's emergency evacuation and disaster logistics operations. Increasing the number of ferry landings and expanding the capacity of existing locations will dramatically increase our resilience during and after disasters.

NYC Economic Development Corporation



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The historic Dutch Flat Bottomed Fleet in Atlantic Basin, Brooklyn, during an event cosponsored by PortSide and the NYC Economic Development Corporation.

USING THE WATERWAYS FOR EDUCATION

The Blue Network can play an important educational role. It can help us learn about New York City history and about environmental issues, climate change, and the aquatic habitat.

There are school programs throughout New York that utilize our waterways as a teaching tool. The Urban Assembly New York Harbor School, a public high school located on Governors Island, has designed its entire curriculum around the waterways. Students study the aquatic environment, marine vessels, fishing, and oyster gardening. They learn what New York's Harbor was once like and are challenged to consider what it can become. Many graduates go on to careers in the maritime industry or environmental sciences. The Harbor School could be a model for schools in waterfront locations elsewhere in New York.

Educational organizations also offer programs that provide learning opportunities. One example: Rocking the Boat, which engages schoolchildren in the South Bronx in building wooden boats, then learning to use the boats in the waterways near their community.

Higher-education institutions also use the waterways for teaching. The New York City College of Technology recently received a five-year \$3.1 million grant from the U.S. Department of Education to revise the general-education component of the college curriculum. As faculty design courses, they will integrate the study of the Brooklyn waterfront into all disciplines—from science to history, from literature to math—treating the waterfront as a living lab. As part of the grant, the school will receive matching funds of up to \$50,000 annually to endow a Brooklyn Waterfront Center that will sponsor research and public programs.

Boat tours, museums, and historic sites and vessels also highlight maritime history and aquatic ecology. Many boat tours, such as those offered by the Working Harbor Committee, provide a first-hand view of New York's maritime industry. The Waterfront Museum, located on a floating barge in Red Hook, Brooklyn, has educational programming for schoolchildren and adults. The museum's mission is to provide public waterfront access, promote historic preservation, and foster an understanding of the New York Harbor as a place for commerce and commuters, culture and recreation.

INCREASING PUBLIC AWARENESS

Though New York is bounded by water, it has not been perceived as a waterfront city. For too long New York cut itself off from the waterfront. If it hadn't been for places like the Battery launch to the Statue of Liberty and Ellis Island, some visitors might never have even been aware of the waters around the city. It is only in recent years that public attention has shifted to the shoreline. Now it's important to make people aware not only of the waterfront but of the waters themselves, and the benefits that can be gained from engaging with the Blue Network. Reconnecting with the water will provide social, economic, and environmental advantages.

Water-focused events help bring attention to the Blue Network. These events include the City of Water Day, an annual celebration organized by the Metropolitan Waterfront Alliance held on multiple sites throughout the Harbor, and the Mayor's Cup, an annual 28-mile kayak race around the island of Manhattan. Such events also have economic benefits such as stimulating tourism. In 2008, the artist Olafur Eliasson's "New York City Waterfalls" temporary art installation at locations along the waterfront drew hundreds of thousands of people and generated millions of dollars in revenue for the city. Events like these ultimately cause the

shoreline to be viewed as an attractive location for businesses, which, in turn, provide jobs for residents and more financial investment in protecting the water for continued public use.

Branding initiatives, such as NYC & Company's NYHarborWay, are another way to heighten the Blue Network's visibility among New Yorkers and visitors. This program, launched in 2006, promotes a unified identity for the sites that make up the Upper Bay in Brooklyn and Manhattan, including Governors Island, the East River Esplanade South, and Brooklyn Bridge Park. This program presents a model of how to bring vibrancy to waterfront public spaces through marketing, wayfinding, and transportation connections.

The City's Department of Cultural Affairs has provided funding to many cultural institutions on the waterfront that promote the use of the Blue Network. Funding has gone towards Figment, a free annual participatory-arts festival on Governors Island, and the annual Hunts Point Fish Parade and Summer Festival presented by The Point Community Development Corporation in the South Bronx.

Private and nonprofit groups also play a role in promoting New York's waterways. Through its advocacy and programming—and use of a former tanker, Mary A. Whelan—the organization PortSide introduces people to the working waterfront as well as theatrical events that bring them in contact with the water.



New York Harbor Foundation

Students from the Harbor School ready oyster spat for placement on the Bay Ridge Flats oyster reef.

Through these programs and others, more and more people are engaging with the Blue Network and learning about the importance of our waterways in New York’s history, ecology, and economy. Despite these successes, there are barriers to expanding the scale of these activities, including liability concerns, the challenges of getting to the waterfront with a large group of schoolchildren, and the need to integrate these activities into an already full educational curriculum. With the growing interest in making sustainability a priority in K-12 education, there is a great opportunity right now to make waterfront issues part of what every New York City student learns. After all, the children coming up through the school system today will one day advance knowledge of the waterways and become the future stewards of our Blue Network.

ADVANCING MARINE-BASED ALTERNATIVE ENERGY

Thanks to emerging technologies, the Blue Network can help supplement New York’s energy sources with clean, marine-based alternative modes of power generation. Along with other renewable sources—such as solar, geothermal, and biomass—marine-based energy is a potential tool for achieving the City’s goal of reducing greenhouse-gas emissions 30 percent by 2030, as articulated in *PlaNYC*.

Tidal Energy

Tidal energy, a form of hydropower that uses a turbine to convert the energy of tides into electricity, has great potential as a source of energy that is carbon-neutral and emission-free, as well as predictable and reliable. New York is one of only a few states that possess sufficient free-flowing waters in tides, rivers, and waves to make kinetic hydropower a viable energy source. Turbines are completely underwater, silent, and invisible from shore. They do not require dams or other structures that redirect the natural flow of water, so they have little impact on sediment.

This technology is currently being tested in a pilot project in the East River near Roosevelt Island. Verdant Power’s Roosevelt Island Tidal Energy (RITE), which utilizes the tidal strait’s

strong flows and currents that switch direction with the tides throughout the day, is the world’s first grid-connected array of tidal turbines. During the current demonstration phase of the project, six full-scale turbines (five meters in diameter) are installed in the east channel at a depth of 25 to 30 feet. The turbines are connected to the city grid, providing 70 megawatts of energy. The project is currently being expanded, and Verdant is applying for a license from the Federal Energy Regulatory Commission to provide energy to consumers. At full build-out, RITE could power 8,000 to 10,000 homes.

Tidal energy is also being explored at the Ward’s Island Renewable Energy Park. Here tidal-energy turbines, combined with wind turbines, provide renewable energy for lighting the park, community center, and stadium.

There are concerns related to the use of tidal energy. Environmental concerns include the issue of whether turbines will affect river flow patterns, damage fish through turbine blades or noise, or affect birds that nest nearby (though in studies conducted by RITE, there were no detectable impacts on fish or birds in the project area). In addition, the maritime industry has raised concerns about potential impacts on channel navigability.

Offshore Wind Power

Wind turbines offshore are another potential source of marine-related renewable energy. Ocean-based wind power is stronger and more consistent than power from land-based facilities. And due to the city’s geography and intensive use of land, it has more potential for New York City than onshore options. However, it is more expensive—about twice as expensive—to build offshore.

There currently are no offshore wind projects operating in New York (or elsewhere in the country, for that matter), but several have recently been proposed in our region. The New York City Offshore Wind Project, a partnership between the New York Power Authority and a private developer, is exploring the possibility of setting up a 64,500-acre wind farm 13 miles off the Rockaway Peninsula. Feasibility and wind studies are still ongoing, but the project is being designed to yield 350 megawatts of energy, with the ability to expand to 700 megawatts. A 350-megawatt facility operating at 30 percent capacity would generate energy for more than 250,000 homes.

There are environmental concerns associ-



Wind turbine at the Tides at Charleston, Staten Island.



Installation of Verdant Power tidal turbines in the east channel of the East River.

Kris Unger/Verdant Power, Inc.

ated with offshore wind power, including potential effects on bird and marine life and contribution to coastal erosion. These issues would need to be studied before any project could move forward. Another concern is the sight of wind turbines from the shore—the cause of opposition to offshore wind projects elsewhere in the country. In order for the wind farms not to be visible from the land, they would need to be located 12 to 15 miles offshore. Finally, the locations of off-shore wind turbines must be evaluated for impacts on shipping lanes and commercial fishing areas.

Onshore Wind Power

Coastal winds are another potential source of power. While no significant large-scale projects within the city have been proposed, smaller demonstration projects are under way at several sites throughout New York. At the Brooklyn Navy Yard, a three-story building finished in 2009 includes six 6-foot wind turbines on its roof, which provide 10 percent of the building's

power. Brooklyn Navy Yard also has streetlights designed by Duggal Energy Solutions, a Navy Yard tenant, which use solar and wind power and are expected to save \$600,000 on installation and \$11,000 a year on energy costs. The Tides at Charleston, a residential development on the west shore of Staten Island, has 45-foot freestanding wind turbines along the Arthur Kill. While Con Edison had concerns about connecting the turbines to the city's grid for fear of power disruption, the turbines were eventually connected and now provide power to the development's streetlights and sewage system.

Like offshore wind power, onshore turbines raise aesthetic concerns. Another problem: inconsistent wind speeds within the city. Speeds average only six miles an hour, and are dispersed by densely packed buildings.

Aqua-Thermal Heating and Cooling

A major energy demand in New York City is the heating and cooling of buildings. The Blue Network can play a role in providing these

services to buildings located directly on the waterfront through aqua-thermal systems that involve loops to coils submerged in the water. In the summer, the loops transfer heat away from buildings and into the water, where it is absorbed. In the winter, the loops draw on the latent warmth of the water to return heat. The Battery Park City Authority is proposing the development of a heat pump system to provide for the heating and cooling of the Pier A building, located on the Hudson River at the foot of Manhattan. The system would involve a closed loop installation utilizing the river water beneath the piers.

Aqua-thermal heating and cooling systems are considered more efficient than those based on ground or air sources because the loops are in water at a depth that maintains a consistent temperature. Since these systems would result in the discharge of heat to the surrounding water, they must meet state regulatory standards for potential heat load on the water.

Enhance the Blue Network: Strategies and Projects

This plan envisions a waterfront in 2020 that is better integrated with the waterways. By capitalizing on New York's waterbodies for recreation, transportation, education, and energy generation, the City will make better use of this natural asset and enhance the role of the Blue Network in the city's daily life.

To realize this goal, the City will pursue the following set of strategies over the next 10 years. Through improved infrastructure, policies, and programs, the City will expand the use of the

waterways for activities as diverse as human-powered boating, ferry service, and renewable energy generation. The City will also increase public awareness of the Blue Network, both to promote the enjoyment of the waterways and to educate residents about potential safety concerns such as poor water quality, strong currents, and ship traffic.

Vision 2020's 10-year strategies are complemented by the *New York City Waterfront Action Agenda*, a set of projects chosen for their ability

to catalyze investment in waterfront enhancement. The City commits to initiating these projects over the next three years and will be tracking progress on an ongoing basis. For each project, the lead agency and implementation year are noted.

Together, these strategies and projects lay out a comprehensive vision for the waterfront and waterways and a plan of action to achieve that vision.

1. Promote water recreation in suitable locations with access points, docks, and on-shore facilities.

VISION 2020 STRATEGIES

- Working with city, state, federal agencies and stakeholders, explore ways to promote recreational boating by building more or expanding existing marinas and facilities. This includes exploring opportunities to promote small marinas city-wide, such as town docks and eco-docks, and constructing one or more super marinas somewhere in the city with a mariner center for repairs, leasing, etc.
- Examine potential funding sources for construction and maintenance of public boating facilities.
- Encourage public boathouses and boat storage containers at launch sites on private and public property.
- Explore reducing or eliminating fees for historic vessels and educational and non-profit uses of public marinas, docks, etc. where feasible.
- Examine dredging needs for supporting recreational boat traffic.
- Expand and improve the New York City Water Trail for human-powered boating.
- Establish siting criteria and guidelines to expand opportunities for new human-powered boat launches, taking into account water quality and potential conflicts with commercial vessels and other recreational boats such as power and sail boats. Criteria must also be related to advisory and educational efforts to advise the public to avoid primary contact and ingestion with water that is not within a designated bathing beach for 48 hours after a storm event.
- Explore ways to create a centralized insurance program for boathouses.
- Explore opportunities to create a waterfront swimming area in Manhattan.
- Consider allowing human-powered boat launches on public beaches.
- Explore permitting or other appropriate mechanisms to allow ship crews, or ship keepers, to remain on board vessels overnight.
- Work with city, state, and federal agencies as well as stakeholders to examine and implement effective measures to limit the damages caused by wakes. This may include limiting and enforcing speed and wake restrictions as well as employing wave-attenuating devices, where appropriate.

ACTION AGENDA PROJECTS

- Create design guidelines for best human-powered boat launch types and features. (DPR, 2013)
- Hunts Point, the Bronx: Complete expansion of launch platform for canoes and small boats for floating dock at Hunts Point-Riverside Park. (DPR, 2013)
- Manhattanville, Manhattan: Activate West Harlem Piers Park's excursion boat pier and ferry barge. (EDC, 2011)
- Inwood, Manhattan: Complete repair and replacement of floating docks, and construct restaurant, snack bar, and restrooms at Dyckman Street Marina. (DPR, 2012)

2. Clarify and enhance regulatory and organizational mechanisms to ensure safety of water recreation and reduce potential conflicts among various users of the waterways.

VISION 2020 STRATEGIES

- Explore establishing a Harbor Management Plan (or plans for specific areas of the city's waterways) by working with the Coast Guard and other key partners, including the public. The Plan would guide water uses based on such criteria as water quality, locations of sensitive infrastructure, and adjacent uses.
- Consider creating a centralized data center for incident reporting, conflicts between users, and dangerous areas and conditions by working with the Coast Guard.
- Consider other mechanisms to increase boater safety and education including exploration of New York State certification and licensing for operators of motorized vessels and increasing the role of boathouses and marinas in providing boater safety education.

ACTION AGENDA PROJECTS

- Develop comprehensive policy for water use, navigation, and access. (Mayor's Office/DEP/DOHMH/ DPR/DCP/EDC, 2012)
- Develop more detailed human health protection advisories to keep boaters safe from environmental and physical threats. (DEP/DOHMH/DPR, 2013)

3. Increase waterborne public transportation.

VISION 2020 STRATEGIES

- Examine long-term opportunities for increased ferry and water taxi service.
- Encourage potential ridership by creating more public destinations and residential populations at appropriate locations.
- Seek opportunities for improved intermodal connections to waterborne transportation, such as MetroCard integration and scheduling of connecting services.

ACTION AGENDA PROJECTS

- Test feasibility of commuter ferry service on the East River connecting Brooklyn and Queens with Manhattan. (EDC, 2011)
- Coney Island, Brooklyn: Complete Coney Island Ferry Study to determine feasibility of ferry service. (EDC, 2011)
- St. George, Staten Island and Whitehall, Manhattan ferry terminals: Develop recommendations for an enhanced docking system for the Staten Island Ferry fender racks. (DOT, 2012)
- Murray Hill: Construct E. 35th Street ferry landing that provides sheltered waiting area, ticketing, and pedestrian amenities. (EDC, 2012)

4. Increase New York City's preparedness for waterborne emergency evacuation.

VISION 2020 STRATEGIES

- Increase the number and size of ferry landings adequate for emergency evacuation.
- Modify waterfront infrastructure to allow for emergency ferry access, such as providing openings in railings, mooring features, and dual-docking capacity.
- Improve coordination between emergency-response administrators and private ferry operators.
- Work with partners to acquire essential resources for emergency ferry operations during times of crisis.

ACTION AGENDA PROJECTS

- Develop procedures to coordinate real-time support for maritime evacuation including ferry routes and landings, crowd control, enhanced mass transit service, and public information. (OEM, 2011)
- Identify waterfront infrastructure projects that increase capability for emergency evacuations and disaster logistics. (OEM, 2011)

5. Increase public knowledge and awareness of the waterfront and waterways.

VISION 2020 STRATEGIES

- Create website with information on public access locations, including type of access (launch, dock, esplanade etc.), water quality, depth, currents, and tides.
- Encourage growth of programs for water-related education for youth and schools, including swimming classes.
- Work with local and non-profit organizations to provide environmental education and training.

ACTION AGENDA PROJECTS

- Install new CSO outfall signs, enhance CSO website notification, and increase water quality sampling sites. (DEP, 2011)

6. Explore renewable energy opportunities on our waterfront and in our waterways.

VISION 2020 STRATEGIES

- Explore opportunities for renewable energy generation along the waterfront and in the waterways, such as the Roosevelt Island Tidal Energy project.
- Explore options for increasing City involvement in the review of off-shore wind projects.