New York City Comprehensive Waterfront Plan

2021

NYC PLANNING

The Comprehensive Waterfront Plan and planning process are funded by the New York State Department of State under Title 11 of the Environmental Protection Fund.

Additional funding support provided by the Mayor's Grant for Cultural Impact from the NYC Department of Cultural Affairs.

New York City Comprehensive Waterfront Plan

2021

www.waterfrontplan.nyc

NYC PLANNING

Table of Contents

Overview

The New York City Department of City Planning (NYCDCP), on behalf of the City of New York (the City) and in collaboration with agency partners, citywide and local groups and everyday New Yorkers, has created the Comprehensive Waterfront Plan (the Plan) to outline a 10-year vision for a more equitable, more resilient and healthier waterfront for all New Yorkers. The Plan lays out goals that can guide planning and policies for the New York City (NYC) waterfront and NYC waterways over the next decade and beyond. These goals are accompanied by strategies that can achieve the goals. The Plan's goals and strategies are far-reaching yet realistic and have been informed by extensive public outreach, close interagency coordination and analyses of key waterfront issues.

Since the City released its first Comprehensive Waterfront Plan nearly 30 years ago, much of NYC's waterfront has been cleaned up and transformed to address critical needs for housing, jobs and open space. More work remains. Beginning in 2010 and every 10 years thereafter, the City restarts a formal process of thinking collectively about NYC's waterfront and creating a vision for the next decade and beyond. This Plan, NYC's third Comprehensive Waterfront Plan, builds upon the vibrancy of today's waterfront while also putting forth new strategies for an equitable, resilient and healthy waterfront in the face of climate change.

The Plan is organized by six interconnected and interdependent topic areas, each with its own vision for the next 10 years of NYC's waterfront:

Climate Resiliency and Adaptation (p.49)
Waterfront Public Access (p.107)
Economic Opportunity (p.163)
Water Quality and Natural Resources (p.205)
Ferries (p.235)
Governance (p.255)

Each topic area includes a set of goals to advance a vision for a more equitable, more resilient and healthier waterfront. Each goal is followed by strategies the City has identified that can achieve the specific goals. Many strategies provide examples of site- or project-specific initiatives and policies that are currently underway to demonstrate how the City is implementing these strategies.

"With over 520 miles of waterfront, we could have it all. Beaches, fishing, parks, volleyball and slick, quiet ferries moving millions of people leaving a wakeless trail."

Opposite:
Domino Park, Williamsburg, Brooklyn.

Do you only have a few minutes?

Jump to the Beacons (p.12) or the values that guide this Plan and then read Planning for NYC's Waterfront: A 10-Year Vision (p.47), which lays out the City's vision for the future of NYC's waterfront. Check out Our Future Waterfront (p.281) to imagine what could be achieved a generation from now.

Do you have 30 minutes?

In addition to reading the Beacons (p.12) and Vision (p.47), review the section on NYC's Changing Waterfront (p.39) which describes the transformative changes along NYC's waterfront over the past several decades and lays the foundation for this Plan. Then, review the topic areas that interest you most, and Our Future Waterfront (p.281).

Do you have 60 minutes or more?

Read the full Plan, which integrates input from thousands of New Yorkers and dozens of community-based and advocacy organizations with City-agency data to gain a full understanding of the current and future issues facing NYC's waterfront and the strategies to advance the Plan's 10-Year Vision.

Transmitter Park, Greenpoint, Brooklyn.

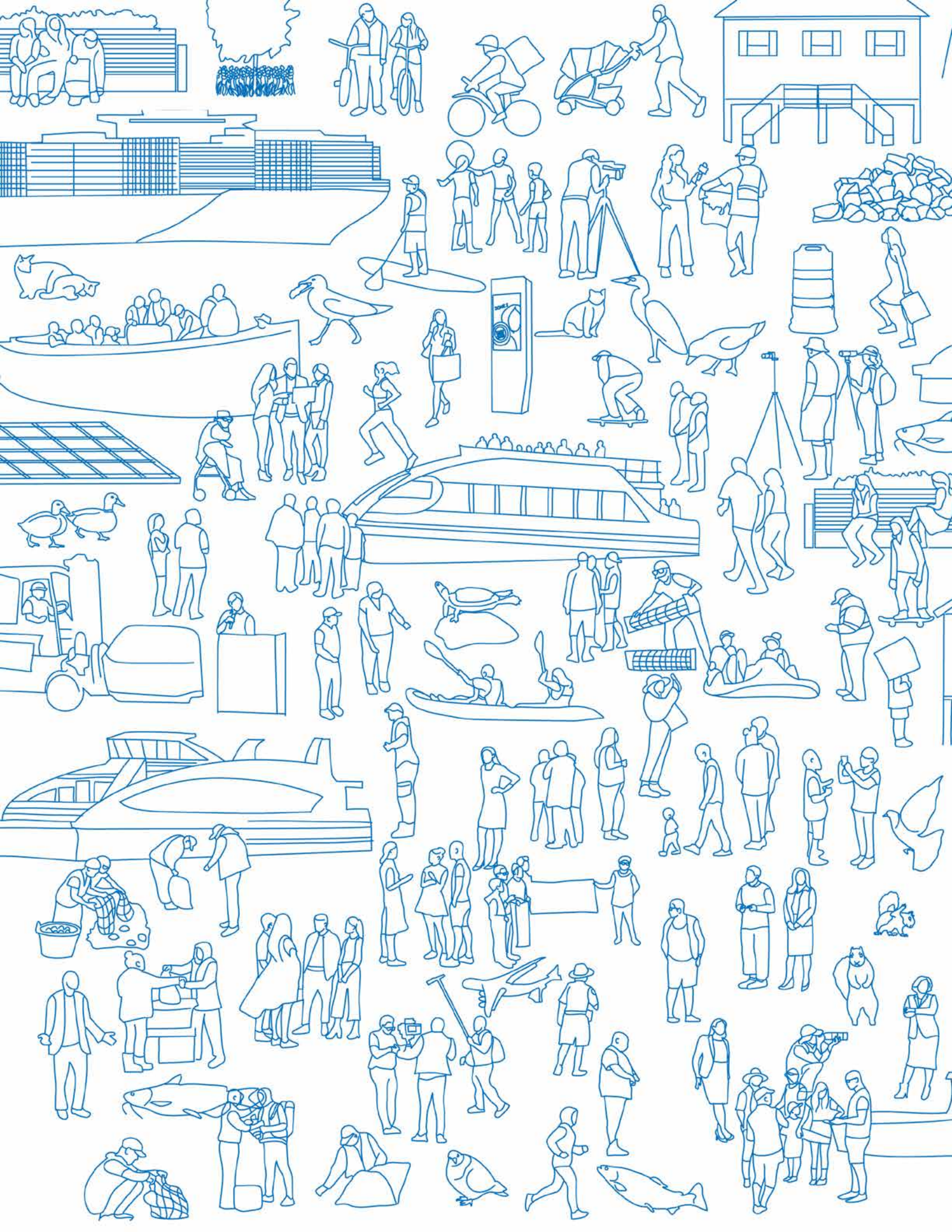
Credit: Julienne Schaer, NYC & Company

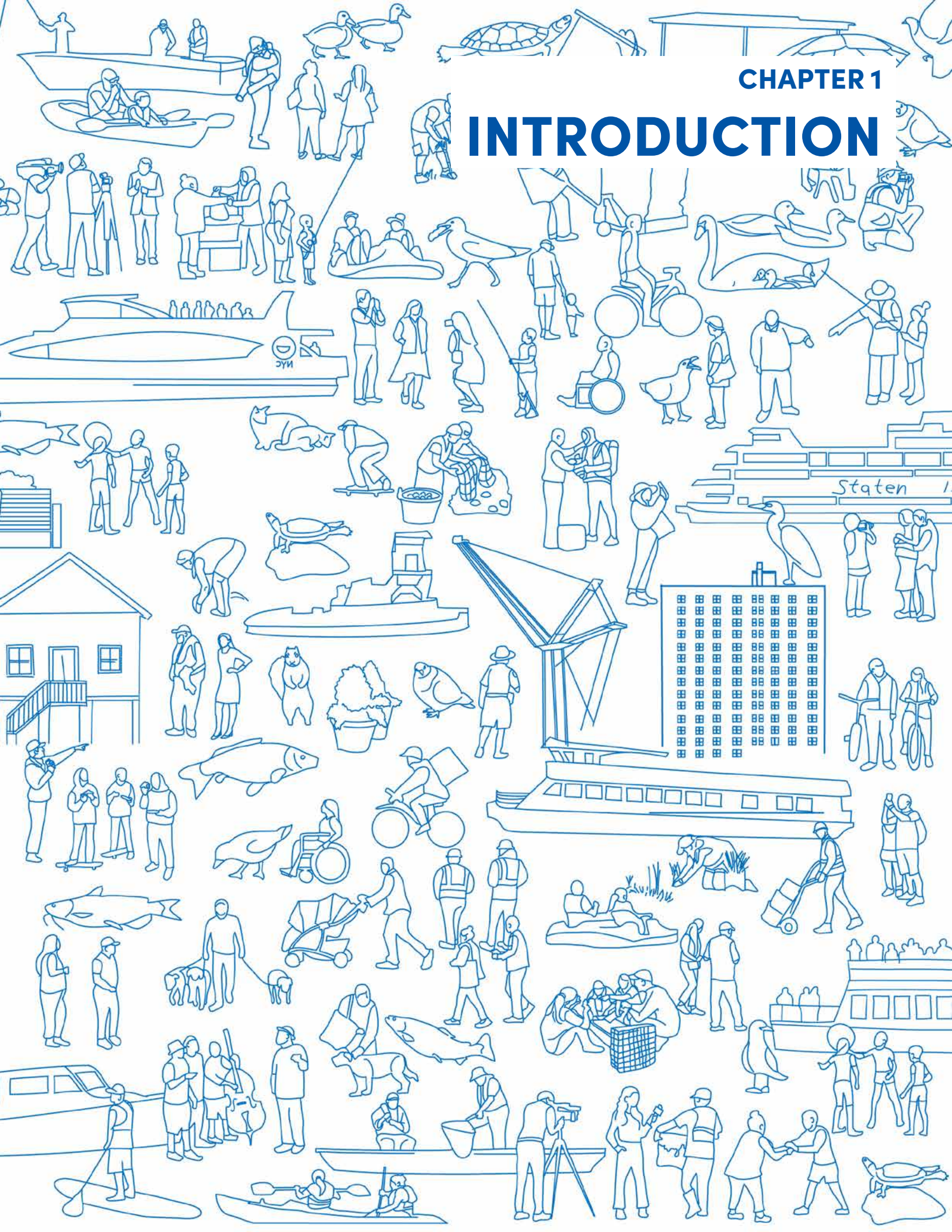
The COVID-19 Pandemic and the Plan

The COVID-19 pandemic delivered shocks to every aspect of life in NYC. The pandemic laid bare deep, long-standing inequities in our society, demonstrating how systemic racism contributes to outcomes that are not only unfair but potentially lethal. This experience proved that NYC's waterfront must be resilient not only to natural hazards but also to crises like the pandemic. The COVID-19 pandemic also dealt an unprecedented blow to NYC's economy, causing entire industries to idle. At the pandemic's peak, one in five workers was unemployed. Traditional commuting patterns were upended. Distribution networks and supply chains were forced to adapt to unpredictable circumstances. As NYC emerges from the pandemic, NYC's waterfront and waterways present opportunities to address these challenges so that communities can move forward toward a better future.

Rockaway Beach, Queens.

Credit: NYC Parks – Daniel Avila





CHAPTER 1

INTRODUCTION

Introduction

From the Bronx River to the Atlantic Ocean, NYC is defined by its waterfront setting. NYC's 520 miles of waterfront—longer than the combined waterfronts of Miami, Boston and San Francisco—is an incredible asset. NYC's waterfront is home to beautiful beaches where New Yorkers and visitors alike enjoy fun in the sun, to the port that brings goods to the region and to the natural areas supporting significant ecosystems. This Plan lays out how, over the next 10 years, the waterfront can continue to play a central role in the economic, residential, recreational and natural vitality of NYC and bolster its resilience against a changing climate. By harnessing the transformative opportunities that it presents, the waterfront will help make NYC a more equitable, more resilient and healthier place for all New Yorkers.

"What does your ideal waterfront look like? Better than 2020! Active and accessible to all, but with working uses and habitats protected."

NYC's waterfront has changed dramatically since the **first Comprehensive Waterfront Plan** was released in 1992, following extraordinary shifts away from its historical industrial use waterfront and reversal of the shoreline's neglect that followed. This plan outlined how NYC could reclaim its waterfront and led to the creation of new public parks and greenways along the water's edge — bringing many New Yorkers to the waterfront for the first time. In 2011, City released its second Comprehensive Waterfront Plan, known as ***Vision 2020: New York City Comprehensive Waterfront Plan***, which reasserted New Yorkers' desire to access the waterfront and proposed new ways for people to explore and enjoy NYC's waterways. ***Vision 2020*** also identified strategies to increase NYC's resilience to climate-related events, including coastal storms, sea level rise and higher temperatures.

The last decade has seen significant progress in the reactivation and reimagining of NYC's waterfront. This report details these accomplishments and the work that still needs to be done. Waterfront public access has been expanded in all five boroughs through a combination of public investment and private development. The City has invested billions of dollars in wastewater and sewer infrastructure. Together these programs have reduced combined sewer overflows (CSOs) so the waters surrounding NYC today are cleaner and healthier than they have been in over a century. Critical investments in the Port of New York and New Jersey (the Port) have helped modernize how freight enters NYC and helped the City keep up with increasing consumer demand. Innovation and a focus on restoration have rekindled New Yorkers' relationship to the natural environment. This deeper understanding of NYC as a coastal city has heightened New Yorkers' awareness of and action on climate resilience. City agencies have embedded climate resiliency into their work and billions of dollars have been invested in climate resiliency projects that will come online in the next decade.

Opposite:
Brooklyn Bridge Park, Brooklyn.

Credit: Julienne Schaer / NYC & Company


POLO

Despite these advances, long-standing inequities remain, manifesting in many forms such as increased chronic flooding and urban heat, limited housing choice, uneven access to waterfront open spaces and environmental hazards that contribute to poor health outcomes particularly for low-income communities and communities of color. These disparate outcomes illustrate the need for a comprehensive, multilayered, long-term vision of how the waterfront and waterways can play a role in addressing inequity in NYC.

This, the third Comprehensive Waterfront Plan, presents strategies for building on successes that have made NYC's waterfront more attractive, accessible, livable and vibrant. It builds on other City efforts such as ***Where We Live***, the ***Wetlands Management Framework***, and ***FreightNYC*** to better understand a range of topics that relate to the waterfront including fair housing, natural areas, the movement of freight, access to jobs and workforce development resources. The Plan also reflects what the City heard directly from residents in communities that experience persistent inequities and outlines how City agencies can work with waterfront communities and other stakeholders to address historic discrimination and disinvestment. The Plan embraces decisive action on climate change as it leverages opportunities to harness the waterfront to transition NYC toward a more diversified 21st century economy. Sustaining this commitment over the next 10 years will ensure that the long-term vision laid out in this document can be realized for all New Yorkers.

The 10-year vision is driven by the **climate justice principle** that all New Yorkers should live, learn, work and play in safe, healthy, resilient and sustainable environments, even as the climate changes. In this vision, New Yorkers have more equitable access to all that NYC's waterfront has to offer — from parks to jobs, as well as affordable and resilient places to live. New Yorkers are better informed about their climate risks and equipped to make decisions about managing these risks, including how to stay safe during floods and heat waves. The economic vitality of waterfront areas is sustained by buildings and infrastructure being designed and retrofitted to withstand climate impacts of today and tomorrow. New Yorkers have more access to water safety education and interaction with nature. The rewilding of treasured estuaries and wetland ecosystems is supported by collaborations between City agencies and community stewards. The waterfront continues to serve as a lynchpin in the regional supply chain and hosts innovative industries that employ New Yorkers in well-paying jobs. And New Yorkers continue to keep the City accountable to their evolving needs by participating in local democratic systems and structures.

Opposite:
"Trout in the Classroom" event.

Credit: NYC DEP

Beacons: Guiding Change for the Future Waterfront

This Plan's 10-year vision is guided by three "beacons" or values: **Equity, Resiliency, and Health.** These beacons inspired the planning process for the Plan and the Plan itself. No single beacon can be achieved in isolation, so success is interdependent. These beacons frame the Plan's ambitions for NYC's waterfront and waterways and, combined with other factors, help the City to prioritize actions within its means.

Equity: Removing Barriers to Housing, Jobs and Open Space Across All Waterfront Communities

An equitable waterfront means that all waterfront communities can access quality affordable housing, well-paying jobs and safe, attractive open spaces. The fight for equity acknowledges disparities in power and access across communities and strives to create a fairer waterfront for everyone. The effects of Hurricane Sandy in 2012 and more recently the 2020 COVID-19 pandemic fell hardest on low-income communities and communities of color who are most vulnerable to flood damage, the public health crisis and the economic recession due to decades of discrimination and unjust policies.

"An equitable waterfront looks like access to a clean and safe waterfront that is most importantly well maintained for future generations to enjoy."

Many waterfront communities, particularly in lower-income areas and communities of color, are underserved by jobs, housing, open space and other resources. The City has an opportunity to equip residents with resources and tools to maintain housing and economic stability in the face of changing environmental and economic conditions.

This Plan aims to improve the lives of New Yorkers by identifying strategies to improve the quality of waterfront public spaces, ensure fair access to workforce development and other sources economic opportunity, and enhance day-to-day quality of life across all waterfront neighborhoods.

Equity also means increasing access to water safety education, advancing universal design standards for park users of all abilities, and overcoming obstacles to connect neighborhoods with their waterfront.

By making it a priority to work with lower-income communities and communities of color, the City can strengthen their role and influence in planning processes and projects to ensure a variety of outcomes, such as safer and more enjoyable waterfront parks, investments to improve water quality improvements, or strategies to adapt neighborhoods in the face of climate change.

Read more on efforts that support the Equity Beacon:

From Climate Research to Climate Action (p.62)

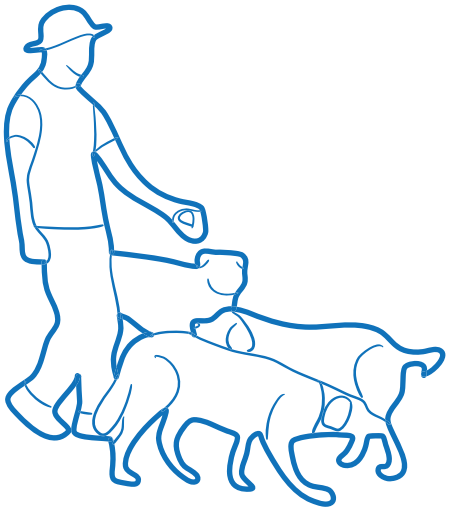
Supporting Community Ownership for Just Transition (p.86)

Universal Accessibility (p.155)

Reactivating Waterfronts Through Community-Led Visioning Processes (p.158)

Positioning the Next Generation for Career and Technical Education on the Waterfront (p.189)

Connecting New Yorkers to Nature (p.228)



"A resilient waterfront will also have strong, social cohesion where neighbors can help other neighbors when disaster strikes."

Resiliency: Equipping Communities to Thrive in a Changing Environment

A resilient waterfront means that residents and communities have the capacity to cope with everyday stresses of climate change and to minimize disruptions from extreme heat and flooding. Climate hazards — such as more frequent and intense heat, heavy rainfall and chronic flooding — strain NYC's infrastructure, cause travel disruptions and power outages, and challenge everyday life. Climate change also adds pressure in addition to the cumulative effects of persistent inequality that have contributed to poor health, lower incomes and wealth and diminished quality of life for generations — particularly for lower-income communities and communities of color.

Achieving climate justice will require uncovering and addressing the structural causes of disproportionate vulnerability to climate risk and inequality. The compounding impacts of climate risks include uneven opportunities for constructing coastal flood protection on public lands, potential health risks for people living and working near industrial areas who may be exposed to pollution during floods, and varying infrastructure service levels that may increase the likelihood of power outages or other service disruptions during extreme weather events. Many New Yorkers are still recovering from the emotional and physical trauma, loss and devastation of Hurricane Sandy in 2012. Through nearly a decade of recovery, storm survivors, their communities and City agencies managing essential services are calling for deeper, sustained dialogue on community preparedness. Many New Yorkers are also calling for continued investments to improve New Yorkers' resiliency to both the physical effects of climate hazards and their financial implications.

The effects of climate change will continue unfolding for generations. Although the full scope of these climate effects is impossible to predict, they will extend beyond flooding and heat to affect people, places and systems across NYC more widely. Adapting the waterfront to these challenges requires focusing on both direct action today and implementing a long-term vision for climate justice to amplify the knowledge, power, and leadership of historically disempowered communities.

The roadmap to a resilient future incorporates consideration of climate risk into every decision about infrastructure investments, land use planning and operational strategies to sustain a safe, thriving city while reducing vulnerability to the effects of climate

change. The City's response to climate change also includes maximizing opportunities to shift to renewable energy and taking additional measures to reduce greenhouse gas emissions from critical infrastructure, vehicles and buildings. The City will continue to use transparent processes and advocacy to integrate citywide policy and planning priorities with community-specific needs and perspectives and to equip those New Yorkers most affected by climate change to make more informed decisions to improve their lives.

Read more on efforts that support the Resiliency Beacon:

NYC Climate Adaptation Roadmap (p.56)

NYC Hazard Mitigation Plan and Risk Education Tools (p.63)

Coastal Land Use Framework (p.69)

Supporting Thriving Neighborhoods Through Climate Adaptation: Eastern Rockaway, Queens (p.70)

From Post-Storm Buyouts to Housing Mobility Services and Land Adaptation (p.82)

A Multilayered Approach to Coastal Flood Protection Systems (p.91)

Identifying Regional Coastal Flood Protection Solutions (p.92)

NYCHA: Spearheading Resilient Design in NYC's Multifamily Public Housing Campuses (p.98)

Zoning for Coastal Flood Resiliency (p.100)

Creating Design Tools for Climate Resiliency (p.102)

Offshore Wind (p.175)

Activating City-Owned Sites for Economic Development (p.182)

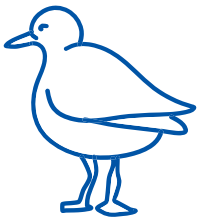
Planning for the Future of NYC's Supply Chain (p.197)

Pursuing In-Water Material Placement at the Shoreline or in NYC's Waterways (p.275)

Health: Enhancing NYC's Waterfront and Waterways to Maximize Well-Being

A healthy waterfront means that people, natural areas and wildlife can all flourish and support each other's well-being. The Plan aims to strengthen the connection among these elements — the health of NYC waterways, access to open space and thriving ecosystems — with the health of residents of waterfront communities.

"A healthy waterfront would be flourishing with wildlife. These are very important ecosytems. We must also protect them from numerous pollutants such as solid waste, heavy metals and plastic."



Accessible, pedestrian- and bicycle-friendly waterfront open spaces can encourage healthy activity and reduce urban heat. However, the industrial history of much of NYC's waterfront requires that many shoreline areas undergo extensive remediation on land or underwater before the public can enjoy them safely. The Plan acknowledges these challenges and offers opportunities to address them in ways that respond to community needs and promote public and ecological health, but also recognize that some industries must remain on the waterfront to provide NYC with well-paying jobs and global access to goods. The Plan advocates for continuing to identify and pursue innovative solutions and greener practices to improve the health of surrounding neighborhoods.

The COVID-19 pandemic highlighted the importance of the waterfront during emergencies. Access to open space and fresh air helped support and maintain mental health and well-being. Additionally, the Port — second largest in the United States — played a critical role in preventing food and essential supply shortages as port leaders implemented necessary measures to ensure the health and safety of frontline employees. The Port remained open and operational throughout the pandemic, and NYC's shoreline infrastructure played a crucial role in meeting NYC's emergency response needs. Shoreline infrastructure and emergency dredging enabled the USNS Comfort hospital ship to anchor in NYC to assist local hospitals in treating patients during the pandemic's peak. During the darkest days of the pandemic, the waterfront served as a lifeline to safe, healthy fresh air for everyday New Yorkers, provided space for emergency response operations, and enabled continuity for a supply chain supporting more than 8 million people.

Implementation of stormwater management practices helped to create greener, more livable neighborhoods and boost community resiliency to climate-related hazards. Green infrastructure can improve air quality and reduce the urban heat island effect for nearby residents. The Plan also recognizes that improving water quality allows the ecology of natural areas to flourish and also creates enhances

opportunities for New Yorkers to connect with the waterfront and nature through recreation and educational programs. Through this Plan, the City can promote equitable investments in resources to provide health-related benefits for NYC's waterways, waterfront communities and all New Yorkers.

Read more on efforts that support the Health Beacon:

Designing for Public Access and Industrial Uses (p.127)

Street Ends: From Forgotten Pavement to Hyperlocal Havens (p.134)

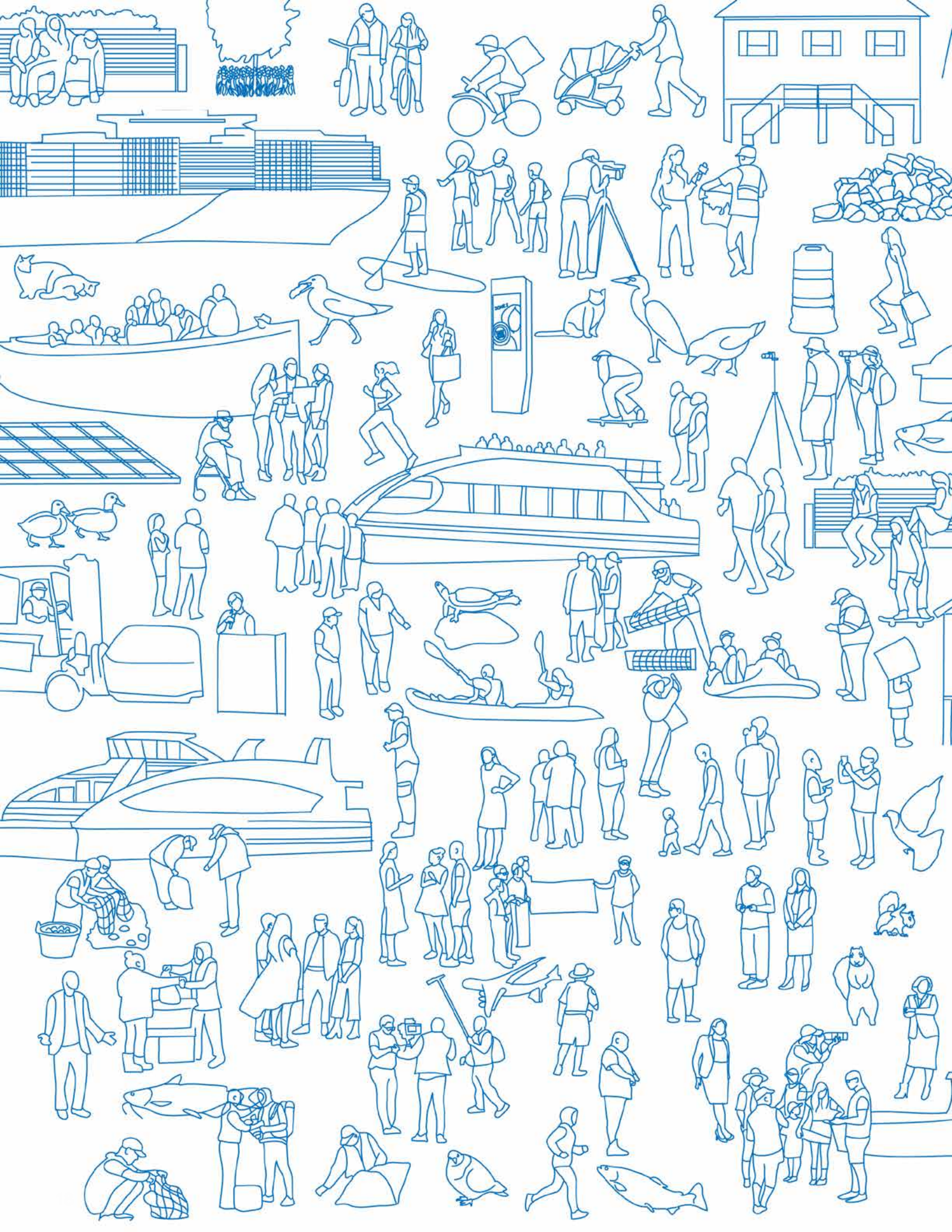
Advancing a Five-Borough Greenway Plan (p.136)

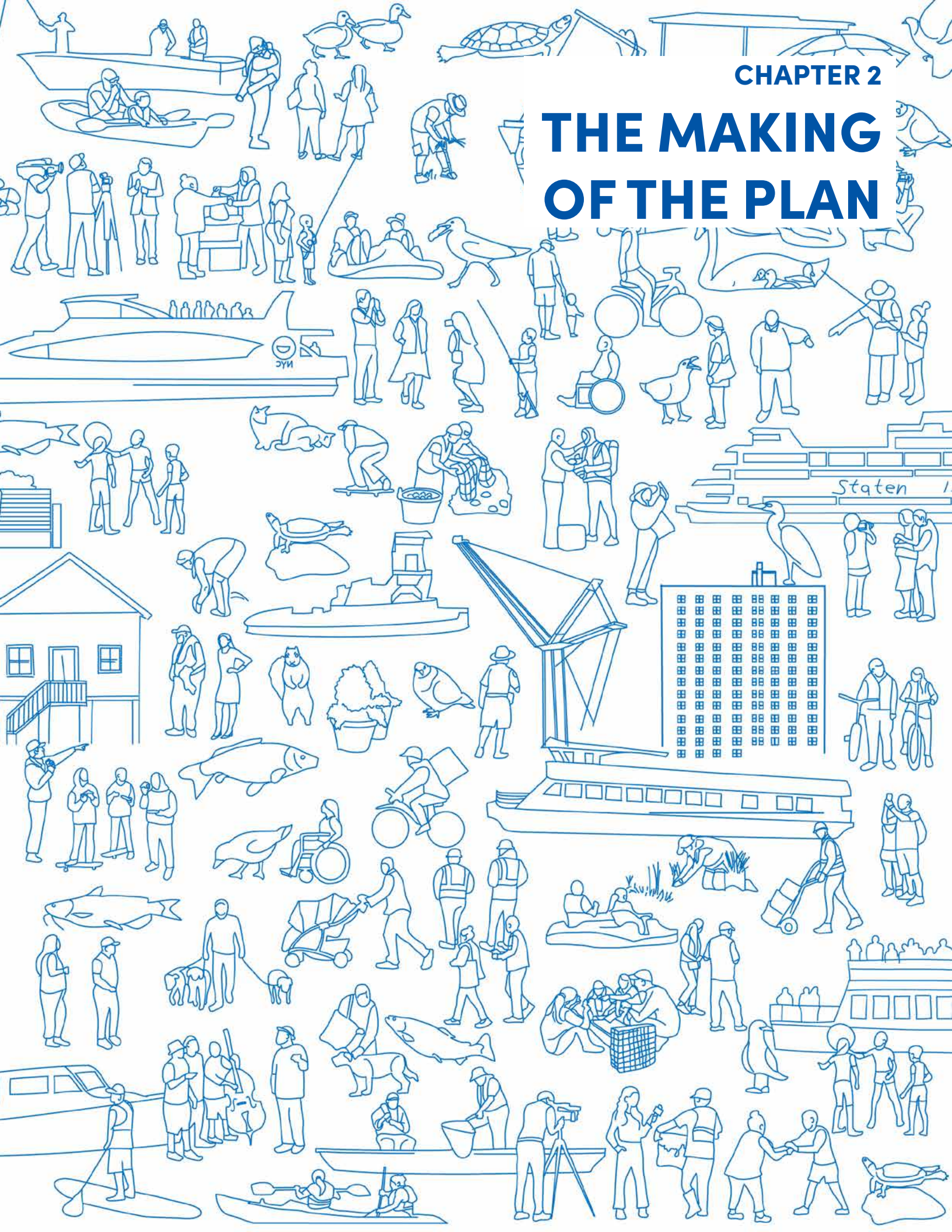
Unified Stormwater Rule (p.216)

Innovative, Nature-Based Methods for Treating and Transporting Water (p.217)

Restoring Ecosystems and Promoting Biodiversity (p.222)

Connecting New Yorkers to Nature (p.228)





CHAPTER 2

THE MAKING OF THE PLAN

The Making of the Plan

NYC's waterfront and waterways are integral to its identity and the Plan aims to make them a part of everyday life for all New Yorkers. The process includes extensive public engagement, close interagency collaboration, and research and analysis to capture a collective vision and develop the Plan's framework, goals and strategies.

This Plan was developed in close coordination with City agencies, as well as local arts, education and advocacy organizations. The process involved considerable research of various waterfront topics, surveys of existing waterfront conditions and analysis of data provided by other City organizations. Some topics were identified by public stakeholders; others were from NYCDCP's internal assessments of waterfront issues. The Waterfront Public Access Implementation Study (WPAI) is a New York State Department of State-funded analysis of existing citywide public access conditions and areas with historic access gaps. It also looks at communities and their increased need for access. The study informed strategies within the Plan to expand public access to underserved neighborhoods. NYCDCP also reviewed plans and data produced by other City agencies and organizations to understand a range of waterfront topics better, including natural areas, the movement of freight, and access to jobs, workforce development recourses and housing. These plans included ***Where We Live***, the ***Wetlands Management Framework***, and ***FreightNYC***.

The **Waterfront Management Advisory Board (WMAB)**, made up of individuals with expertise on waterfront issues and representatives of various sectors (industrial, commercial and residential) from all five boroughs, also provided guidance, encouraging the City to articulate bold and inspirational visions for NYC's waterfront and waterways.

Opposite:
"Back to the Beach" event, Staten Island, 2019.


NYC Department of City Planning
SUBMERGE
Festival Passport

This Plan is the result of more than three years of talking and listening to New Yorkers about the past, present and future of NYC's waterfront. Together, the public and City staff experienced the North Shore of Staten Island on kayaks, as well as on foot, exploring the vibrant history and present of the maritime industry. City staff joined New Yorkers boating in the Bronx River, learned about living shorelines on Randall's Island and celebrated NYC's horseshoe crab community (during their annual mating and migration season). These experiences were great reminders of the incredible biodiversity that exists in NYC and the importance of adapting the city's infrastructure and sensitive ecosystems to the threats of climate change.

NYCDCP launched public outreach on the Plan in May 2019. While this process began by engaging thousands of New Yorkers in person across the five boroughs, the COVID-19 pandemic moved these conversations to remote formats. Despite the change in format, NYCDCP's commitment to thorough and inclusive outreach remained. With initial lessons learned from the pandemic and renewed social and racial justice movements, NYCDCP redoubled its commitment to equity, both in the process and in the substance of the plan itself.

Left:
NHS Brooklyn, Waterfront Planning Camp, Governors Island, 2019.

Opposite:
Submerge Festival, Hudson River Park's Pier 84, Manhattan, 2019.

SUMMER 2019

Visioning Phase

Involved joining and organizing events across the city to get the word out about the Plan and ask New Yorkers to share their visions for the future of the waterfront.

Co-hosted five thematic listening sessions with the Waterfront Alliance and seven roundtable discussions with the New York Chapter of the American Institute of Architects (AIANY).

FALL 2019/ WINTER 2020

Internal and External Meetings

NYCDCP partnered with Brooklyn Boatworks to incorporate youth voices into the planning process. NYCDCP hosted workshops with students at P.S. 306 in East New York, M.S. 88 in Sunset Park and Growing Up Green LIC in Long Island City. Students shared their ideas about the future of the waterfront.

SPRING/ SUMMER 2020

Virtual Engagement

Used social media to expand outreach and connect New Yorkers to the waterfront from their homes through #WaterfrontWednesdays.

"Walking the Edge" was a collaboration among NYCDCP and the arts organizations Culture Push and Works on Water. Every Friday from May to September 2020, a different artist created prompts, questions or activities to help New Yorkers think about the past, present and future of NYC's waterfront.

FALL 2020

Framework Release

Development and release of the Plan's Framework and website

12 virtual workshops to solicit feedback on the Plan's Framework

Collaboration with City agencies to review feedback received

WINTER 2020/ SPRING 2021

Draft Goals and Strategies

Development and release of the Plan's Draft Goals and Strategies

Two public meetings to solicit feedback on the Plan's Draft Goals and Strategies

FALL 2021

Release Plan

Collaboration with City agencies to review feedback received

Development and release of the Plan

Charting the Course

This Plan is not a binding document. Rather, it expresses a collective vision for the waterfront that is used to guide and shape subsequent efforts. Such plans achieve implementation and desired outcomes through the depth and breadth of support for the ideas within them. The City, through NYCDCP, sought to expand the coalition of waterfront advocacy organizations, City agencies and everyday New Yorkers involved in the process of identifying and refining the Plan's goals and strategies. This notion led NYCDCP to create a public outreach strategy guided by four objectives:

Event from "The Future of the NYC Waterfront Initiative" in collaboration with AIANY and the Center for Architecture.

Balance breadth and depth: Provide levels of engagement to encourage participation outside of typical public meeting formats

NYC's waterfront is an incredible asset and a perfect background for envisioning with New Yorkers what it could be like in ten years. NYCDCP met with New Yorkers at public festivals such as the Hunts Point Fish Parade and "Rocking the Boat" in the Bronx, "Back to the Beach" in Staten Island and the Waterfront Alliance's "City of Water Day" in Manhattan. Participating in these events enabled NYCDCP to reach thousands of New Yorkers from across the five boroughs who are passionate about the waterfront and engage them outside of the spaces where and timeframes when public meetings typically take place. This approach was important because NYCDCP was able to reach new participants and capture perspectives that traditional public engagement methods might not reach.

A "Request for Visions" initiative gathered ideas from New Yorkers in online and in postcard formats. A LinkNYC campaign encouraged residents to think about the role of the waterfront in their lives as they walked through their neighborhoods. An increased presence on social media and collaboration with waterfront organizations and other City agencies focused on sharing fun and educational content about NYC's waterfront among people across all age groups.

In the summer of 2019, NYCDCP welcomed hundreds of New Yorkers to a Waterfront Planning Camp on Governors Island, with NYCDCP's City agency, community and artist partners to allow New Yorkers of all ages to have hands-on experiences with aspects of NYC's waterfront. Activities included getting into scuba gear with the Billion Oyster Project and prepping go-bags and demonstrating flood protection measures with NYC Emergency Management (NYCEM). The event demystified what planning for NYC's waterfront looks like and enabled City staff to get out of the meeting room and into a shared space with the public.

NYCDCP also launched "Waterfront Passport," an online program of events and activities designed to inspire and inform conversations about how New Yorkers can strengthen their connection to NYC's waterfront and waterways.

Establish a wide waterfront constituency: Build a coalition to support and implement the Plan for years to come

Through existing and new partnerships, NYCDCP developed a series of programs and events for different audiences.

With the Waterfront Alliance, a non-profit coalition advocating for NYC's waterfront communities, NYCDCP co-hosted five topic-based listening sessions in the fall of 2019. These sessions featured presentations by agency partners, industry experts and waterfront advocates, followed by breakout groups where more specific ideas, priorities and themes emerged. Such ideas, priorities and themes included a need to address physical and policy barriers to accessing the water; trade-offs involved in accessing the water; designing shorelines for sea level rise; the need to green and improve access to jobs in NYC's maritime and industrial waterfronts; and ways to reduce conflicts between ferries and recreational activities.

In collaboration with AIANY and the Center for Architecture, NYCDCP launched the "Future of the NYC Waterfront Initiative" in June 2019, to engage practitioners in a series of panel and roundtable discussions focused on different NYC waterbodies and themes. The group engaged in passionate conversations about development and public access along the East River, the trade-offs between conservation and development in Jamaica Bay, and opportunities for regional coordination across the Hudson River with New Jersey. In response to the pandemic and social and racial justice movements during the summer of 2020, "An Equitable Waterfront: Racial Justice and Social Inclusion" session was organized to allow participants to reflect on the many areas of improvement for addressing the disproportionate effect of the COVID-19 pandemic on communities of color and the movement for racial equity.

Recognizing the importance of youth involvement in the planning process, NYCDCP partnered with the nonprofit Brooklyn Boatworks, an organization that introduces NYC youth to boating, to facilitate waterfront activities with elementary and middle school students in January and February of 2020. After learning about the planning profession and having fun with maps, the students were asked

to prepare posters showing their visions for the future of NYC's waterfront. The outcome was a presentation of their far-ranging ideas to the former Director of NYCDCP and other City staff.

A partnership with the arts organizations Culture Push and Works on Water envisioned "Walking the Edge"— a 24-hour, relay-style walking event of NYC's 520 miles of shoreline to reconnect to the diversity of the city's shorelines and add community voices to the city planning process. Because of the COVID-19 pandemic, this project was reimagined as a virtual experience in which artists created weekly prompts and activities to encourage New Yorkers to see and think about their waterfront from different perspectives. To continue this collaboration, Culture Push, Works on Water and NYCDCP developed "Tending the Edge" to spur awareness and action with NYC mayoral candidates about the importance of NYC's waterfront and the Plan.

Artwork by Reijin Leys for Works on Water and Culture Push.

Credit: Reijin Leys for "Walking the Edge," 2020.

Strive for transparency and inclusivity: Identify multiple touch points for New Yorkers to access and inform the Plan

NYCDCP identified multiple milestones to engage New Yorkers and seek their feedback on the Plan's topics. The first milestone was the release of the Plan's Framework and website in September 2020. The purpose of the Framework was to outline the preliminary issues and goals that the Plan could explore. NYCDCP organized 12 remote public workshops across NYC to discuss the Framework and encouraged New Yorkers to submit feedback on it through the Plan's website. The second milestone was the release of the Plan's Draft Goals and Strategies in May 2021. NYCDCP held two public hearings to receive feedback on the draft goals and strategies. At the request of many stakeholders, NYCDCP extended the deadline to submit written feedback via the Plan's website.

Screenshot from virtual "Walking the Edge" meeting.

Focus on process: Create an engagement process where we learn, adjust, and adapt as we connect with different groups

From traditional engagement strategies to out-of-the-box ideas, NYCDCP identified creative ways to engage new groups, inspire New Yorkers, and spark a renewed interest in NYC's waterfront from the very beginning of the process. NYCDCP also set out to create a process that enriched, and challenged, its own understanding of what it means to plan for NYC's 520 miles of waterfront. New and established waterfront enthusiasts were involved in co-designing the engagement processes. This approach created multi-way knowledge building that allowed NYCDCP to pivot during key moments of the process and to address and respond to relevant issues as they emerged over time.

As engagement transitioned from in-person to virtual, NYCDCP worked with waterfront organizations across the five boroughs to develop online content that allowed New Yorkers to connect with their waterfront from home. These activities included waterfront trivia and drawing with Brooklyn Boatworks, virtual tours with the Bronx River Alliance to learn about water quality monitoring and observed improvements, a live show-and-tell of an oyster reef with the Billion Oyster Project, and an exploration of wetland restoration efforts in Jamaica Bay and a new park on the Rockaway Peninsula with the New York City Department of Parks and Recreation (NYC Parks). This process enabled NYCDCP to try new ways to engage New Yorkers on the Plan's content, which may also inform other planning processes.

Brooklyn Boatworks learning session.


In ten years,
I want my waterfront to be...

What We Heard

This document reflects the passion New Yorkers have expressed for the waterfront and their desires for the City to inspire and build coalitions around shared interests of equity, resiliency and health. NYCDCP heard from New Yorkers who embrace the diversity of the waterfront and who believe that City plans, policy and projects must reflect the unique conditions found across the waterfront. Ideas shared during public outreach and agency collaboration continuously reshaped the Plan's goals and strategies.

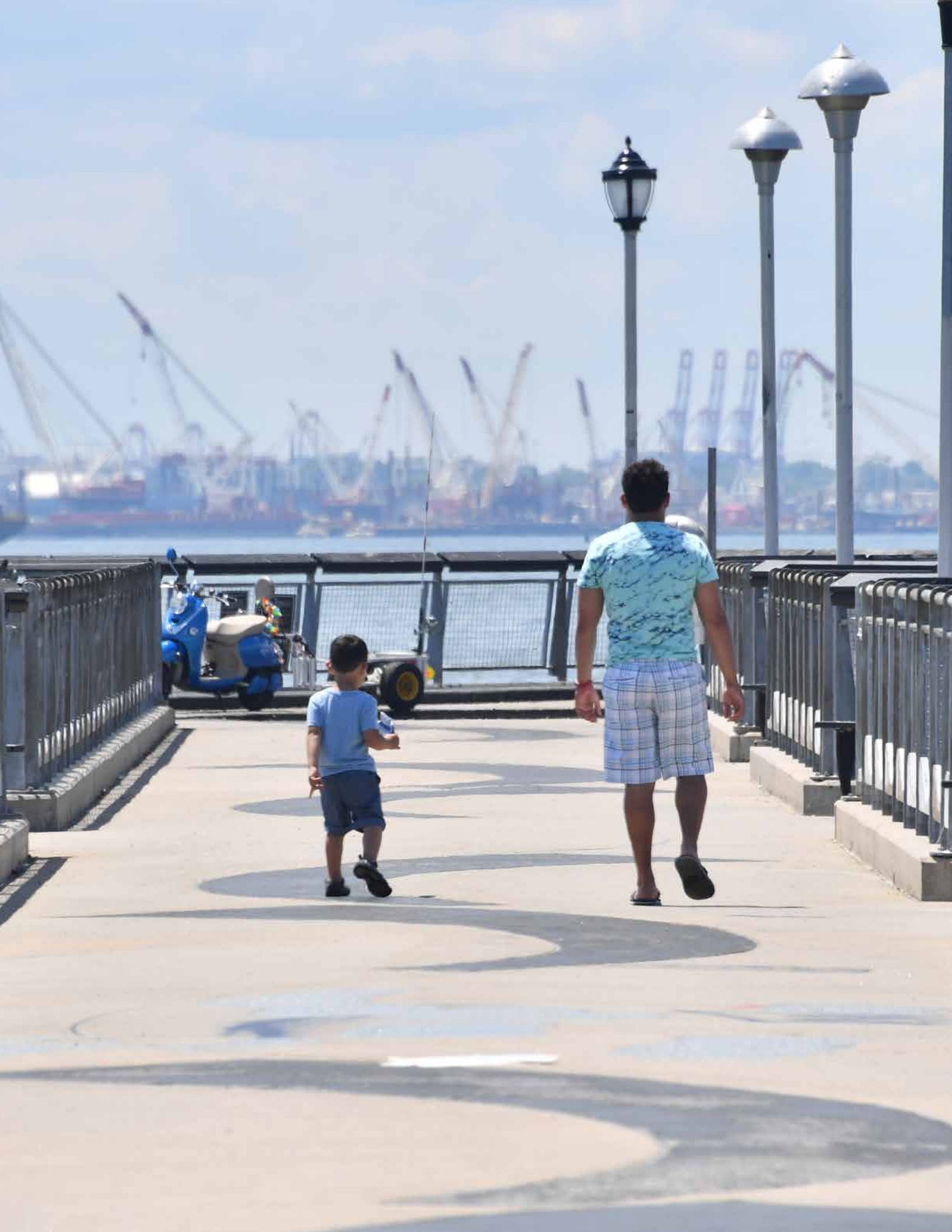
New Yorkers said they want more opportunities to get close to and into the water. This includes improving the design of public spaces and strengthening the connections between the waterfront and nearby upland areas. They also want to foster a better relationship to the water through educational programming, increased awareness and water safety. New Yorkers also said that they want to expand stewardship programs to connect other New Yorkers to the natural environment better. They also want to raise awareness to ensure that other New Yorkers are better informed about a range of topics, including water quality, climate risks and pathways to well-paying jobs. Above all, these New Yorkers want waterfront spaces to reflect a diversity of needs.

NYCDCP heard from New Yorkers who are deeply concerned about climate change, in particular rising sea levels, precipitation and higher temperatures. New Yorkers called for the City to act urgently on climate change as they envision a resilient future. New Yorkers also called for investment in the green economy to include historically excluded communities in the jobs it provides.

NYCDCP also heard from New Yorkers who want the Plan to acknowledge the many waterfront planning efforts being carried out outside of government — from local stewardship efforts to community-led waterfront plans. They also wanted the City to develop an enforcement mechanism for the Plan and to evaluate progress toward goals by identifying success metrics or check-in points throughout the next decade.

Many New Yorkers said that they want the Plan to reflect their expanding aspirations for what the waterfront can offer. They noted that this document is an opportunity to articulate a new, ambitious vision for NYC's waterfront. The three beacons identified at the beginning of this document resonated with many New Yorkers who urged NYCDCP to address them throughout the Plan and planning process.

Opposite:
Workshops with students at P.S. 306 in East New York, Brooklyn. Students shared their ideas about the future of the waterfront.



Walking the Edge

NYCDCP invites you to read and reflect on the first prompt for "Walking the Edge" as an introduction to the Goals and Strategies that are presented in the Plan.

Walking the Edge – Prompt One
By Works on Water, Culture Push and NYCDCP

Visit your closest waterfront edge either in-person or remotely.
As you travel and once your arrive, ask yourself the following questions:

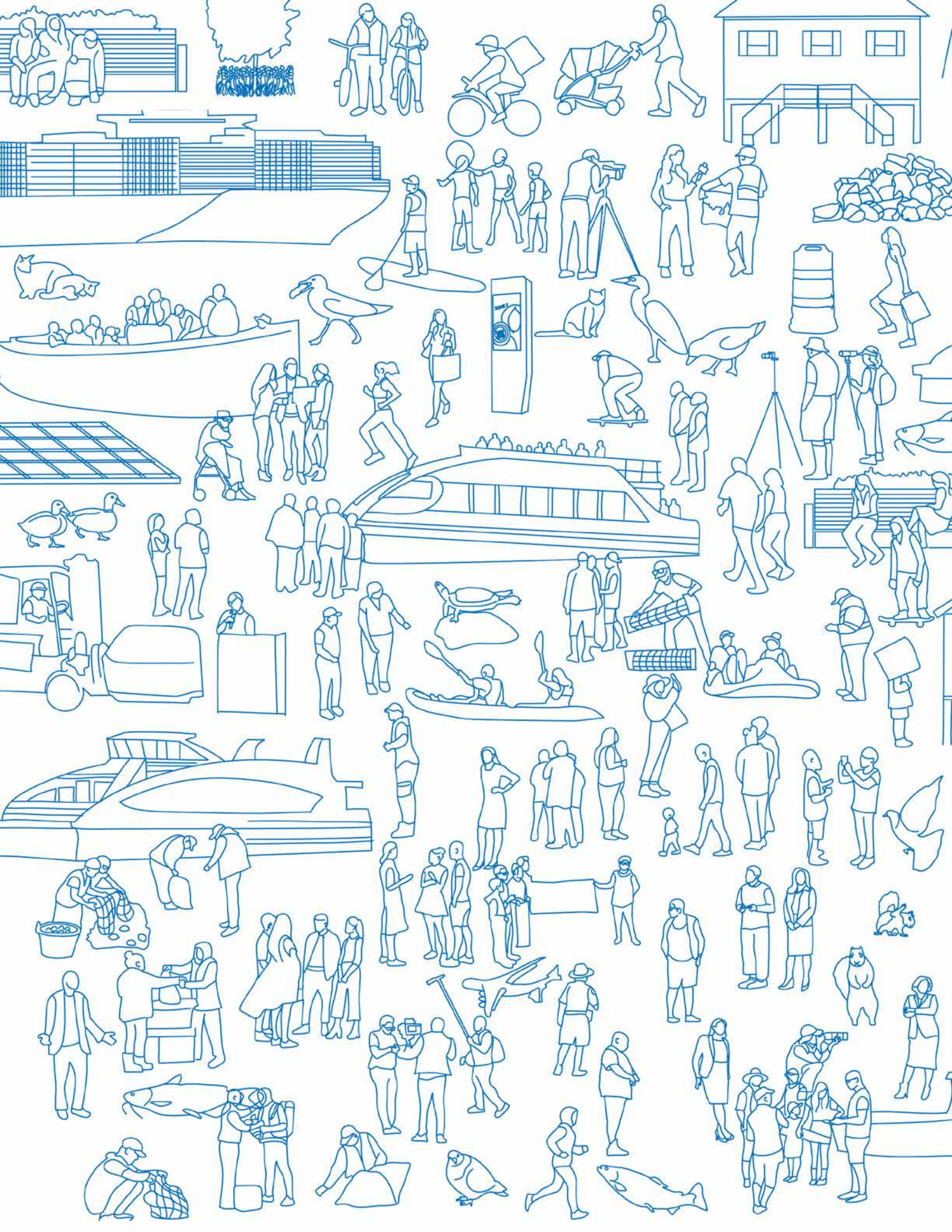
What is your waterfront?
How do you get there?
Have you ever walked there?
Is it a canal, a river, an estuary, a bay, a creek, the ocean?
Is it accessible?
Is it a beach, a dock, a greenway, fenced off?
Look on a local map (hard copy or online) and trace a path
from your home to your nearest waterfront.
Have you walked this path before?
What are some familiar sights? Name them.
If you feel safe going outside once a day,
is this a walk you would choose to do?

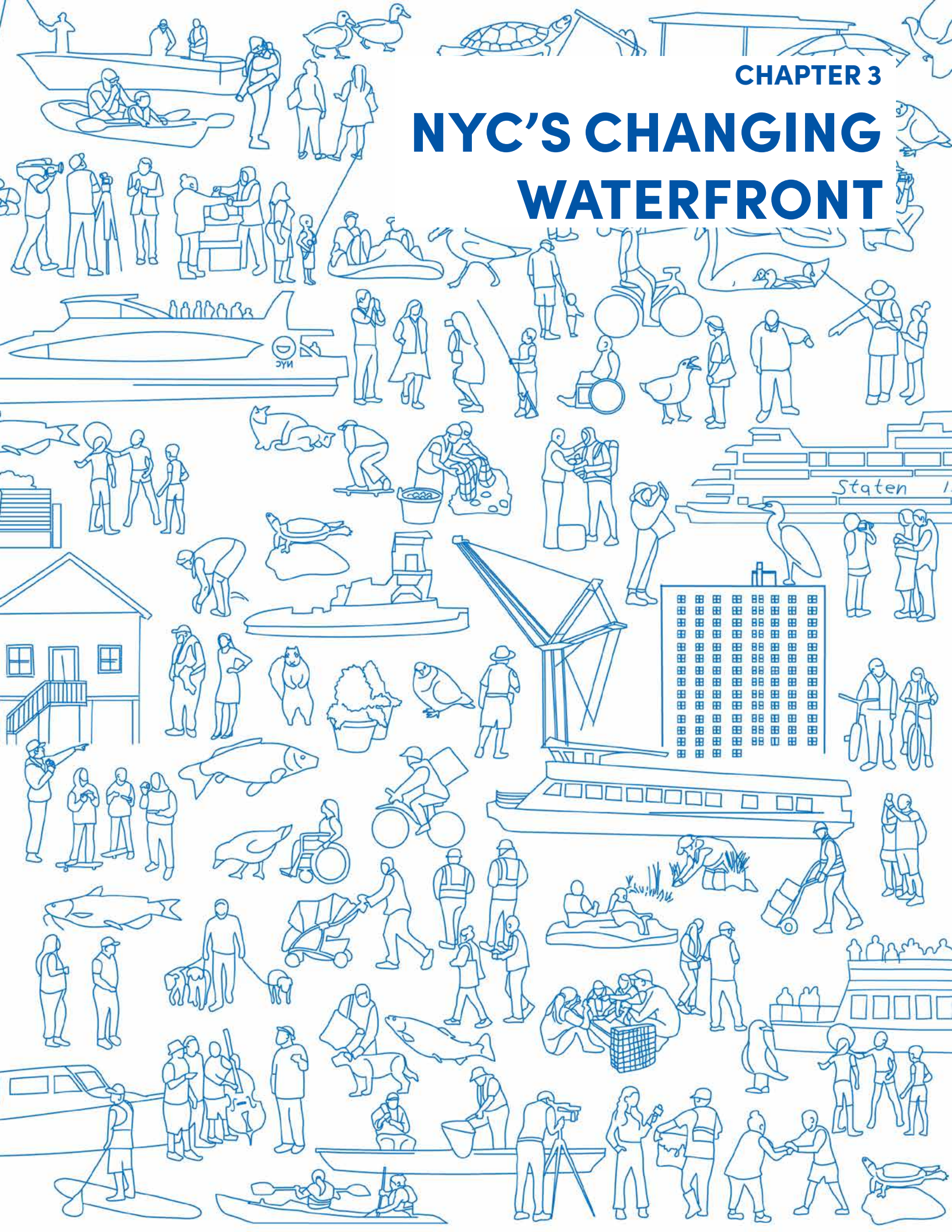
From here, you can imagine your walk with your map or take
an actual walk to the edge.
Pause at some point on your journey.
Look around.
What do you see?
What do you hear? What do you smell?
How much sky can you see?
How many trees are there?
What lines, what shapes, what light, what shade?

Continue to the water's edge.
How many twists and turns were there?
Do the sky, trees, lines, shapes, and light change
as you get closer to the edge of the water?
Can you get to the water?
In person or on your screen in streetview: is there a barrier?
What is the waterfront?
Is your water's edge what you hoped it would be?
If not, what would you want it to be in the future?

Opposite:
Valentino Pier, Brooklyn.

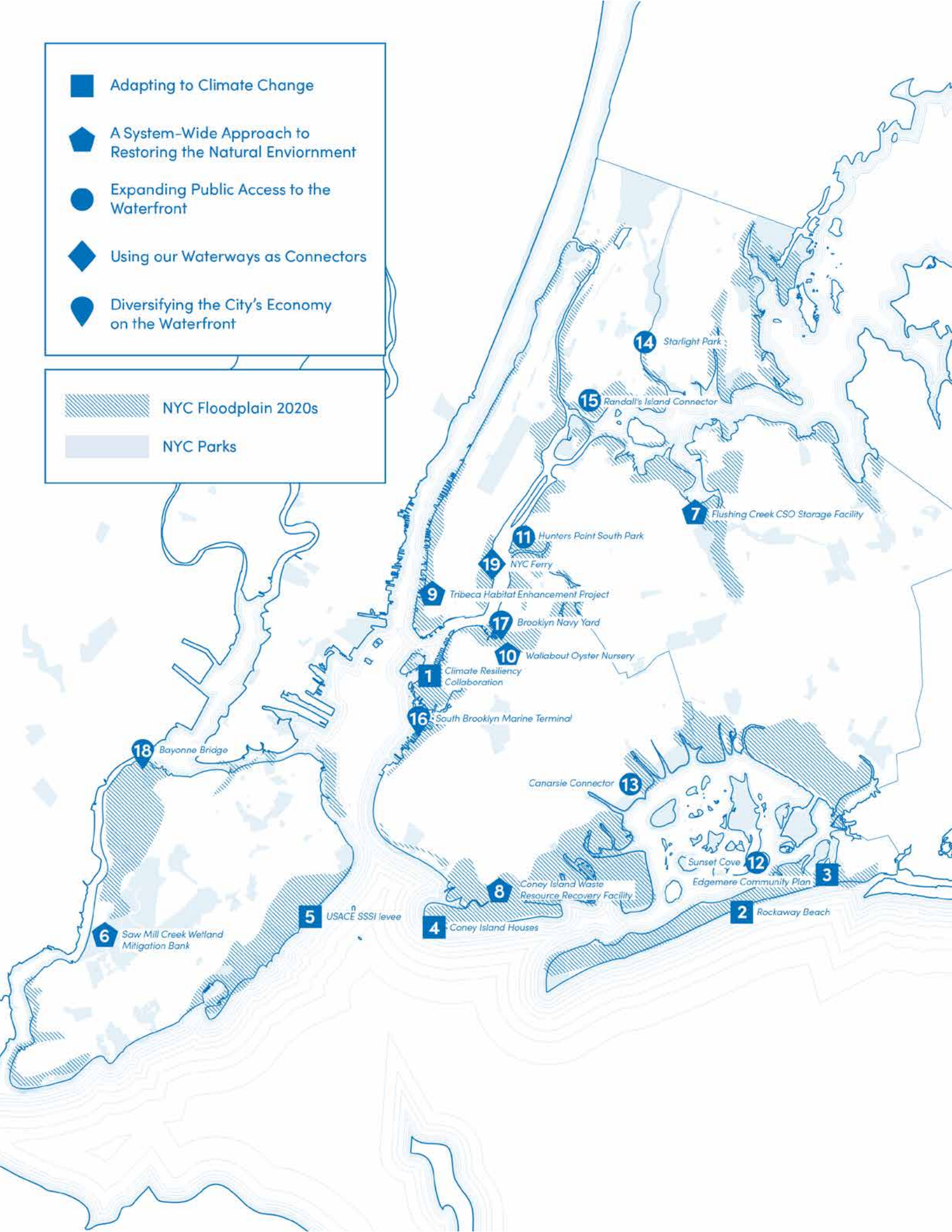
Credit: NYC Parks





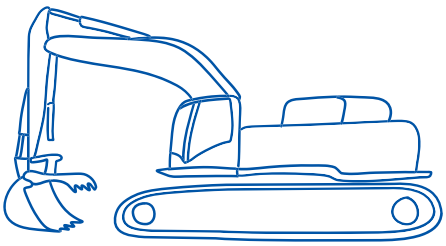
CHAPTER 3

NYC'S CHANGING WATERFRONT


Adapting to Climate Change
A System-Wide Approach to Restoring the Natural Enviornment
Expanding Public Access to the Waterfront
Using our Waterways as Connectors
Diversifying the City's Economy on the Waterfront
NYC Floodplain 2020s
NYC Parks
1 Climate Resiliency Collaboration
2 Rockaway Beach
3 Edgemere Community Plan
4 Coney Island Houses
5 USACE SSSI levee
6 Saw Mill Creek Wetland Mitigation Bank
7 Flushing Creek CSO Storage Facility
8 Coney Island Waste Resource Recovery Facility
9 Tribeca Habitat Enhancement Project
10 Wallabout Oyster Nursery
11 Hunters Point South Park
12 Sunset Cove
13 Canarsie Connector
14 Starlight Park
15 Randall's Island Connector
16 South Brooklyn Marine Terminal
17 Brooklyn Navy Yard
18 Bayonne Bridge
19 NYC Ferry

NYC's Changing Waterfront

NYC's story over the last few decades reflects its changing relationship to its harbor and waterways. Centuries of land development, growth in maritime transport, and proliferation of industry along the waterfront resulted in effectively closing off recreational access to the waterfront. The subsequent decline of industry's prominence — first within NYC, and then at many other locations throughout the region — led to steady public and private disinvestment from the wharves, piers and waterfront infrastructure supporting the maritime industry. The maritime industry's decline was intensely felt by the neighboring communities that had relied on waterfront jobs and related services. By the early 1990s, much of the NYC was underutilized, polluted and inaccessible for productive use or public enjoyment. Many waterfront-adjacent communities were left economically depleted, with residents concerned about the siting of environmentally adverse activities on vacant waterfront plots and the lack of safe public access to their shoreline.



Many of the changes that have occurred on NYC's 520 miles of waterfront are the result of ideas embedded within the previous Comprehensive Waterfront Plans. These transformations are the result of significant planning efforts involving extensive collaboration between government agencies and the many New Yorkers who have expressed their passion for making NYC's waterfront and waterways better places to live, learn, work and play. Several significant changes are highlighted below to document how NYC's waterfront and waterways have transformed over the past 30 years and provide context for how they will continue to evolve over the next decade. These examples show the progress the City and waterfront communities have made to increase use of the waterfront for open space, housing and jobs, and to improve waterways for transportation, recreation and natural habitats.

Adapting to Climate Change

1

This past decade, practitioners, elected officials, public agencies, advocates, residents, and community leaders have come together to redefine the way work on climate resiliency and adaptation issues occurs citywide and at the neighborhood level. "Zoning for Coastal Flood Resiliency," an update to citywide zoning text approved in 2021, improved the ability of homeowners' and business owners' to withstand and recover from future storms and other disaster events by providing them with greater flexibility and better guidance on flood-resilient design.

2

NYC parks, which are important spaces that connect communities to the waterfront, are being adapted to address the threat of rising sea levels. After Hurricane Sandy, the City invested more than $140 million to repair and restore the Rockaway Beach Boardwalk. Sections of the boardwalk reopened in 2015 and 2016. The entire boardwalk opened on time and under budget for the 2017 Memorial Day weekend, signaling the beginning of beach season.

3

In 2015, New York City Housing Preservation and Development (HPD) launched the Resilient Edgemere Community Planning Initiative as a collaboration among City agencies, community members, elected officials and local organizations. Moving from comprehensive planning towards implementation, the plan lays out clearly defined goals, strategies and 60 concrete projects, representing millions of dollars in planned investment over the next 10 years and beyond.

4

New York City Housing Authority (NYCHA) employed resilient design principles to retrofit the structures and critical infrastructure at 33 campuses across the city to protect buildings from the impacts of future storm surges. Some examples include the Coney Island Houses in Brooklyn and the Ocean Bay Houses in Queens.

5

The City has introduced a new class of infrastructure and is breaking ground on generational coastal flood protection projects that will protect New Yorkers from storm surge and other coastal flooding. Projects include the United States Army Corps of Engineers (USACE) South Shore Staten Island Levee and the Raised Shorelines project in Travis Avenue, Staten Island, which are advancing through final design and construction, respectively.

A Systemwide Approach to Restoring the Natural Environment

The implementation of ecosystem-scale wetland restoration initiatives reflects a shift in how NYC tackles wetland restoration. For example, by setting up New York's first-ever mitigation credit bank at the Saw Mill Creek Wetland in Staten Island, the New York City Economic Development Corporation (NYCEDC) and the City are helping to streamline the mitigation process, while also funding an important wetland restoration work. The City has also led over 35 salt marsh restorations, including the Salt Marsh Restoration at Soundview Park in the Bronx, totaling over 150 acres across all five boroughs.

The City has spent nearly $2.7 billion in grey infrastructure projects to reduce CSOs and is implementing a $1.6 billion green infrastructure program.

A $110 million upgrade to the Coney Island Wastewater Resource Recovery Facility is underway. Once completed, the upgrades will provide reliable sewage pumping capacity for the next 30-plus years, improve public health and wastewater treatment reliability to the surrounding community, and improve the facility's energy efficiency by 20 percent through engineering design improvements.

In 2019, NYS announced $1.5 million in capital funding to help create approximately four acres of enhanced habitat for 5 to 10 million oysters in the Hudson River Park's Estuarine Sanctuary.

The Billion Oyster Project, in collaboration with scientists, maintains monitoring stations and community oyster reefs throughout all five boroughs. The Wallabout Oyster Nursery in Brooklyn is an example of a spawning sanctuary, where oysters spawned on Governors Island grow and breed, adding to the larvae in Upper New York Harbor and increasing the diversity of life at the Brooklyn Navy Yard's edge.

Expanding Public Access to the Waterfront

Over the last decade, the design of waterfront parks has embraced NYC's unique native marine ecology, diverse landscapes and the desire to connect land and water. Hunters Point South in Queens is a great example of a vibrant and sustainable community. NYCEDC completed the park in summer 2018, transforming 11 acres of an abandoned post-industrial landscape into a vibrant and resilient waterfront park.

NYC's parks, such as Sunset Cove and Bayswater Park in Queens, are increasingly being adapted to respond to climate resilience challenges, since they can serve as important buffers between rising sea levels and waterfront communities.

New strategies to integrate pedestrian and bicycle access within shoreline transportation infrastructure have led to safer connections and access for communities previously severed from their waterfront. Projects like Sheridan Boulevard in the Bronx or the Canarsie Connector in Brooklyn are great examples of these strategies.

In recent years, new community boathouses, get-downs and built or proposed pier infrastructure will improve New Yorkers' in-water access for human-powered boating and other watercraft. Bay Breeze Park Boathouse in Queens and Starlight Park HPB floating piers showcase this type of spaces.

Sustained efforts to align interagency coordination with community partnerships, such as on Randall's Island, have demonstrated strategies for reconnecting communities to waterfronts. Construction of the Randall's Island Connector and improvements to the South Bronx Greenway have made Randall's Island directly accessible to Bronx residents, joining other enhancements to the island such as establishment of the Parks as Lab educational facility, tidal wetland restoration and major improvements to active open space amenities.

Diversifying the City's Economy on the Waterfront

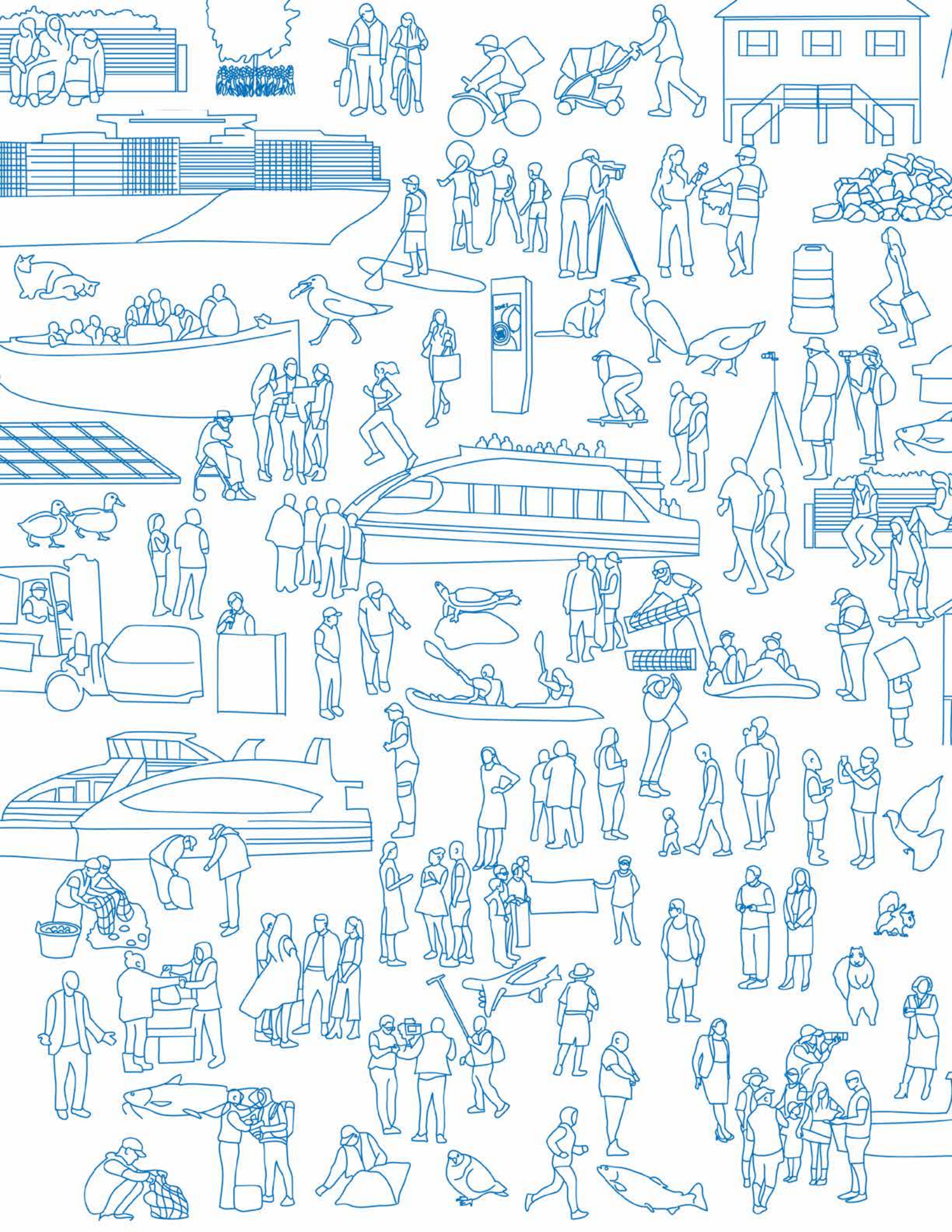
Key investments in NYC's waterfront industrial campuses, such as the Sustainable South Brooklyn Marine Terminal, have strengthened the maritime industry and helped connect New Yorkers to quality jobs.

Educational partnerships and workforce development initiatives have connected job seekers and incumbent workers to careers in urban manufacturing and innovation. Brooklyn STEAM at the Brooklyn Navy Yard is a great example of these collaborations.

Raising the Bayonne Bridge opened the East Coast's largest seaport to the world's largest ships.

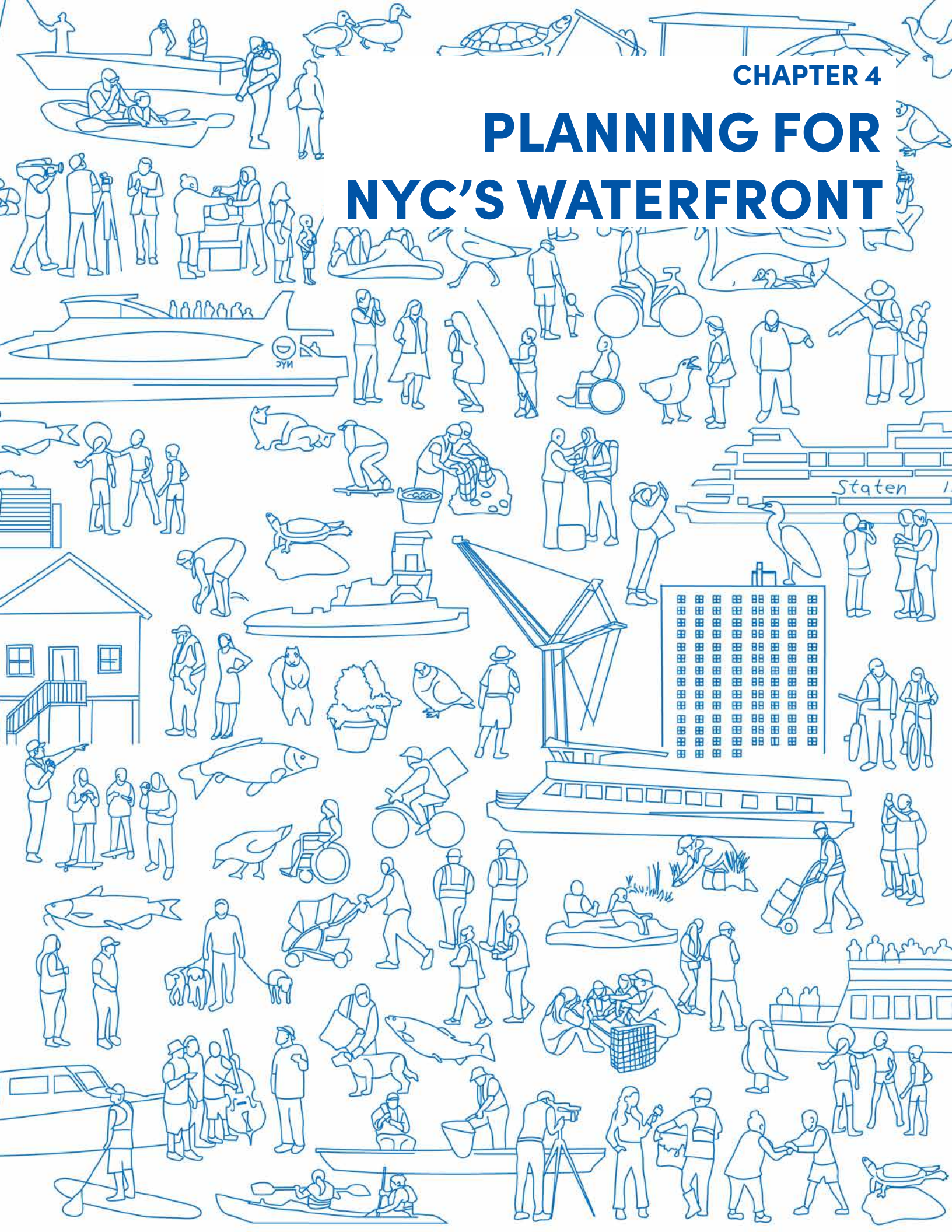
Using our Waterways as Connectors

The 2017 launch of NYC Ferry brought much-needed transit service to connect waterfront job centers and waterfront communities previously underserved by other forms of mass transit.



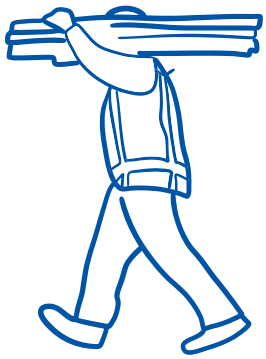
CHAPTER 4

PLANNING FOR NYC'S WATERFRONT




NYC Comprehensive Waterfro

Planning for NYC's Waterfront: A 10-Year Vision

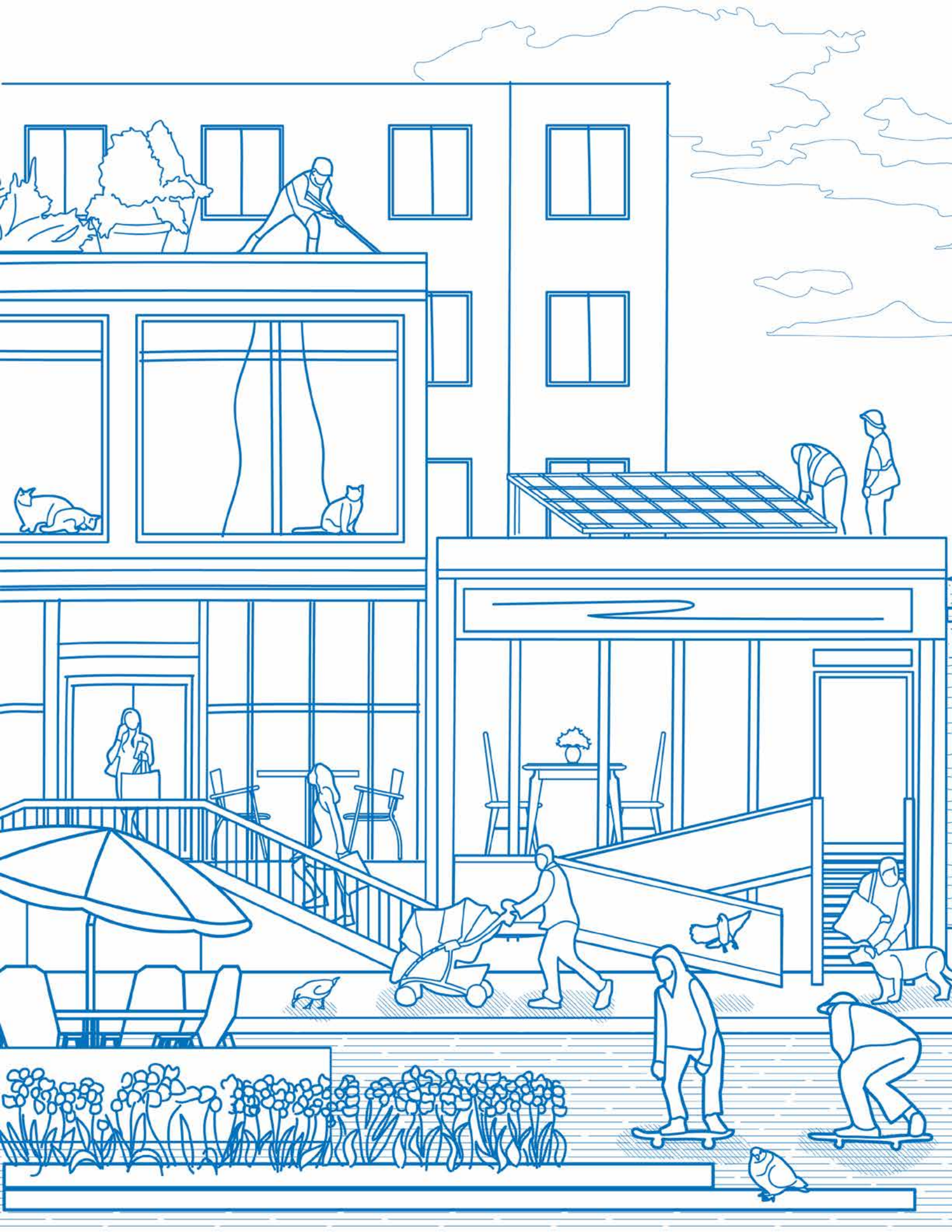


This Plan's vision is informed by NYCDCP's extensive public outreach and is intended to reflect the voice of New Yorkers in describing the waterfront that they want to inherit a decade from now.

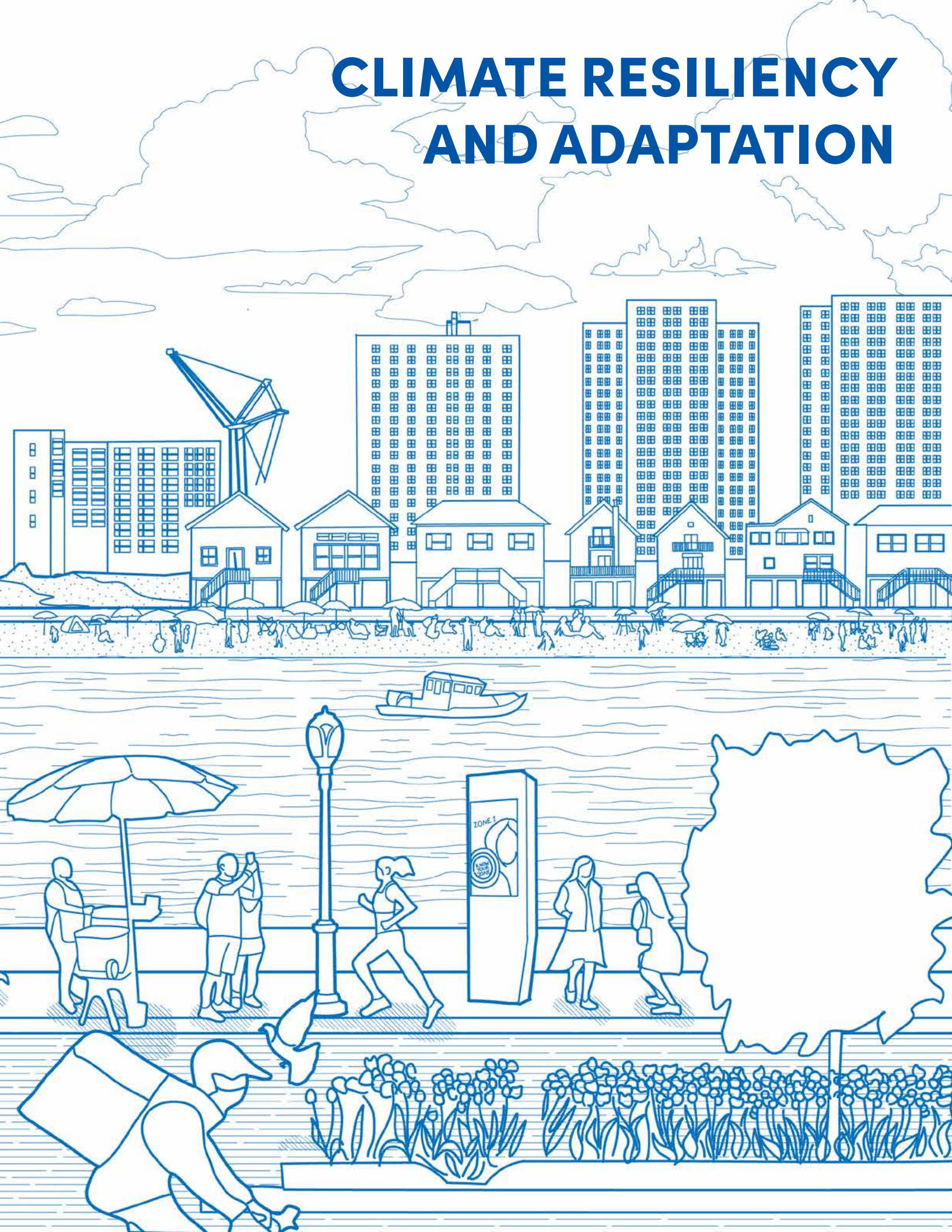
NYC is experiencing some of the toughest challenges in New Yorkers' lifetimes. The cumulative effects of the COVID-19 pandemic, climate hazards, a legacy of discrimination and disparity, dwindling public revenues, and eroded trust in institutions threaten our physical, mental, economic and civic health. Although these challenges are complex and affect more than the waterfront, they have not diminished the ambition and expectations NYCDCP heard from New Yorkers for how NYC's 520 miles of shoreline can address them head-on.

The 10-year vision is driven by the **climate justice principle** that all New Yorkers should live, learn, work and play in safe, healthy, resilient and sustainable environments, even as the climate changes. In this vision, New Yorkers have more equitable access to all that NYC's waterfront has to offer — from parks to jobs, as well as affordable and resilient places to live. New Yorkers are better informed about their climate risks and equipped to make decisions about managing these risks, including how to stay safe during floods and heat waves. The economic vitality of waterfront areas is sustained by buildings and infrastructure specifically designed and retrofitted to withstand the effects of climate today and tomorrow. New Yorkers have more access to water safety education and interaction with nature. Collaborations between City agencies and community stewards support the rewilding of treasured estuaries and wetland ecosystems. The waterfront continues to serve as a lynchpin in the regional supply chain and hosts innovative industries that employ New Yorkers in well-paying jobs. And by participating in local democratic systems and structures, New Yorkers continue to keep the City accountable to their evolving needs. All of these elements are essential to realizing a future that centers the health and quality of life of New Yorkers in the 21st century and beyond.

Opposite:
"Coastal Conversations" with Brooklyn Boatworks



CLIMATE RESILIENCY AND ADAPTATION



NYC's 520 miles of shoreline feature dozens of diverse, vibrant, mixed-income neighborhoods. Throughout the 21st century, these waterfront neighborhoods will become a proving ground for new policy and planning practices that address climate risks and ensure that New Yorkers can thrive in a changing environment. NYC has the opportunity to realize a vision of climate resiliency and adaptation that centers on climate justice, the principle that all New Yorkers should live, learn, work and play in safe, healthy, resilient and sustainable environments, even as the climate changes.

Climate change is one of the defining issues of our time. For the next generation of climate resiliency and adaptation policies and programs, City agencies will collaborate with communities and each other in new ways to advance climate justice for all New Yorkers, especially those who have been excluded or marginalized based on their race, income, abilities or neighborhoods in which they live. NYC will employ a wide range of different solutions to adapt to a hotter, wetter city – from designing buildings and infrastructure that can safely withstand flooding to training community-based organizations on how to help vulnerable groups stay cool during heat waves. The Goals in the Climate Resiliency and Adaptation theme focus on expanding climate risk awareness and action, using climate risk information in public policies and investments, supporting the housing needs of waterfront residents, managing risks from flooding in NYC's coastal communities, and promoting the design of climate-resilient buildings and infrastructure systems. These goals and strategies present opportunities for the City to proactively and permanently weave climate resiliency and adaptation into processes for long-term planning and everyday decision-making.

Goal 1: Broaden awareness of climate risks and how New Yorkers living and working on the waterfront can take action to adapt to the impacts of climate change.

Goal 2: Apply an understanding of systemic climate vulnerabilities to guide land use policies and infrastructure investments in coastal areas.

Goal 3: Preserve and create new housing for a mix of incomes in appropriate locations and provide waterfront residents with new resources to manage flood impacts on their homes.

Goal 4: Identify opportunities for coastal flood protection, where feasible and practicable, to manage the impacts of coastal storm surge and high tide flooding.

Goal 5: Expand resilient design practices that allow waterfront buildings and infrastructure to withstand the impacts of coastal storms, increased precipitation, extreme heat and sea level rise.

Overview

New Yorkers take pride in living and working by the water. Waterfront communities and City agencies are already taking climate action and rising to the challenges of increasing flood risk. At the same time, NYC is confronted with increasingly severe climate impacts that — without intervention — could strain NYC's infrastructure, increase the frequency of power outages, cause property damage, and challenge everyday life for waterfront residents and communities.

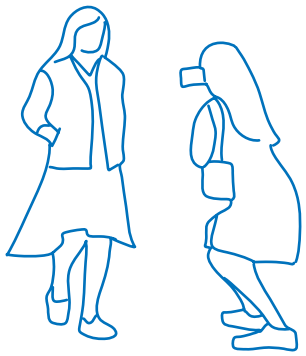
The City's leadership on climate resiliency — the ability to prepare for, respond to and move forward from climate events — gained momentum after terrible devastation and tragedy. In 2012, Hurricane Sandy swept through waterfront neighborhoods, killing 44 New Yorkers and temporarily displacing tens of thousands of households. Hurricane Sandy caused flooding, fires and power outages, leaving $19 billion in damage in its wake. The groundwork and research presented in ***Vision 2020: New York City Comprehensive Waterfront Plan*** (released in 2011) enabled the City to respond quickly and decisively after Hurricane Sandy. Federal funding was put into action through ***PlaNYC: A Stronger, More Resilient New York*** in 2013. Additional resiliency planning continued with ***OneNYC*** in 2015 and ***OneNYC 2050*** in 2019. Hundreds of projects across the city have been completed, including the reconstructed Rockaway Boardwalk and newly restored wetlands in Queens and Staten Island. Others are currently under construction, including the six-mile-long Rockaways-Atlantic Shorefront project in Queens and the East Side Coastal Resiliency project in Manhattan.

Climate change is a public health, environmental and racial justice priority in NYC. Although waterfront neighborhoods are undoubtedly better prepared today than before Hurricane Sandy, much work remains to be done. The City will continue to be proactive in addressing the needs of populations most vulnerable to harm from climate threats. Today we see the ways that COVID-19 has affected New Yorkers — particularly the pandemic's shocking disparate effects on the health and livelihoods of people of color and low- and moderate-income households. As climate impacts increase, many of the same New Yorkers who have been most vulnerable to climate impacts will face disproportionate threats to their health, well-being, financial security and livelihoods.

Extreme rainfall adds another layer of risk to NYC's climate landscape. The ***NYC Stormwater Resiliency Plan***, released in May 2021, outlines the City's approach to managing the risk of extreme rainfall, improving emergency response and planning for increased rainfall in NYC's infrastructure. In 2021, rainfall records were broken twice: at Central Park during Tropical Storm Henri on August 22 and from

the remnants of Hurricane Ida on September 1. Any New Yorker who experienced the severity and intensity of these storms had a glimpse through a frightening window into a new reality where extreme events will occur more frequently. Ida resulted in 13 fatalities and over $223 million in estimated damage. These impacts underscored the need for a multihazard approach to address combined flood risk, where waterfront areas are prepared for extreme rainfall in addition to coastal storm surge. ***The New Normal***, released in September 2021, provides a blueprint to prepare for and respond to extreme weather in NYC. The Mayor received the report from the Extreme Weather Response Task Force, a top-level convening of senior leaders across City agencies, along with outside climate change and resiliency experts. This report directed the City to compile a new set of protocols and policies to protect New Yorkers from extreme weather events.

"A waterfront that allows the city's inhabitants to benefit from and enjoy all that it has to offer without sacrificing safety to people, buildings and the environment."



About the NYC Floodplain

NYC relies on flood risk maps managed by the U.S. Federal Emergency Management Agency (FEMA) to establish a baseline understanding of flood risk across the city. Urban planners, architects and engineers, flood insurance agents, emergency managers, banks and others rely on these maps to understand and manage flood risk in the built and natural environment. The maps can be viewed at the "**NYC Flood Hazard Mapper"**.

The Flood Insurance Rate Maps (FIRMs) and the Preliminary Flood Insurance Rate Maps (PFIRMs) show areas of flood risk including the 1% annual chance floodplain and 0.5% annual chance floodplain. These boundaries show the area that will be inundated by a flood event that has a one percent chance of happening or being exceeded in any given year.

Today, more than 400,000 New Yorkers live within the 1% annual chance floodplain. By 2050, the 1% annual chance floodplain is expected to cover almost 25% of NYC's land mass, where more than 800,000 residents (1 out of 10 New Yorkers) live today. Many strategies in this plan will help the City and New Yorkers to manage increasing climate risks in the floodplain.

A 10-Year Vision

Climate change is a risk magnifier, and its impacts will only increase in our lifetimes. The frequency and intensity of extreme weather conditions in NYC — such as coastal storms, high tide flooding, flash flooding and extreme heat — will increase over coming decades. Against a backdrop of systems that continue to marginalize communities of color and low-income communities, the City must design programs that focus on the health and well-being of all residents.

To help New Yorkers reduce their impact on climate change and to mitigate climate risks on people, buildings and infrastructure, the City is pursuing two courses of action:

Climate resiliency and adaptation policies and programs, led and coordinated by the Mayor's Office of Climate Resiliency (MOCR), ensure that City agencies manage unavoidable climate risks and impacts while also supporting New Yorkers to anticipate their own climate risks and to continue to pursue a better future.

Climate sustainability and mitigation policies and programs, led and coordinated by the Mayor's Office of Climate & Sustainability (MOC&S), reduce greenhouse gas emissions and help limit the severity of climate impacts by reducing the amount of carbon emissions released into the atmosphere.

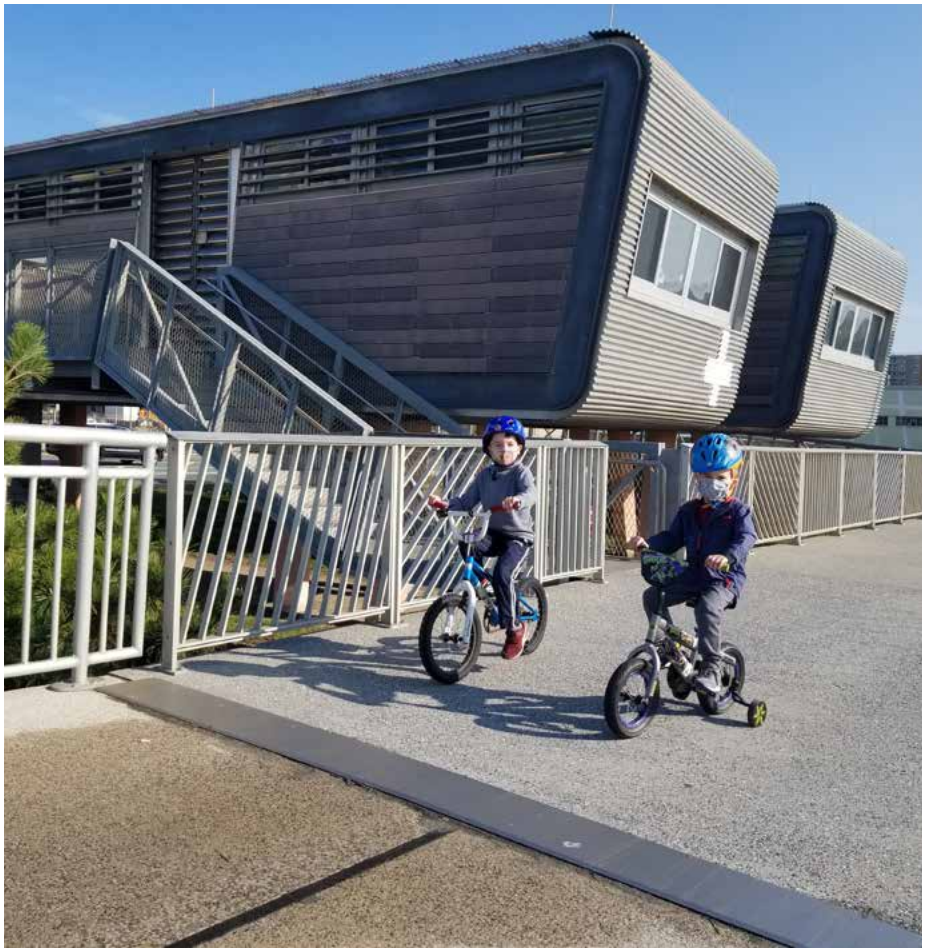
Climate Justice **— the principle that all residents should live, learn, work and play in safe, healthy, resilient and sustainable environments, even as the climate changes**

The critical goal of achieving climate justice and racial equity underlies NYC's climate response and planning. Centuries of racial discrimination and economic inequality have affected New Yorkers and NYC's built environment for generations. Planned for release in 2022, the ***Environmental Justice for All Report*** (EJ4All) aims to measure the current disparities across NYC in access to healthy, safe, resilient and sustainable environments. Undoing past harms — including decisions about planning, policy and large-scale investments in the built environment — will require a deep commitment to racial equity. The City is urgently doubling down to uphold equity, resiliency and health for all New Yorkers.

The Plan's "Goals and Strategies for Climate Resiliency and Adaptation" outline actions that can be taken over the next 10 years to address longer-term issues on the waterfront. In addition, the forthcoming ***NYC Climate Adaptation Roadmap*** will analyze long term climate impacts across the entire city and create a framework to prioritize future resiliency investments in the neighborhoods facing the greatest physical and social risks. The City's climate adaptation efforts will be underpinned by a holistic view that assesses multilayered impacts across systems that support day-to-day life over

the course of generations. Climate justice and environmental justice principles will be critical to implement future resiliency investments that both advance the health and well-being of historically marginalized populations and address citywide needs.

Thoughtful and well-coordinated planning, dialogue and action are needed. Climate justice sits at the intersection of climate change and the racial justice movement, the COVID-19 pandemic and the economic recession. The City has numerous roles to play in addressing climate justice, including providing science-based information and tools, making capital investments in neighborhoods, attracting new resources and developing and advancing new programs and projects. The City also collaborates with local leaders on climate resiliency and adaptation issues by balancing communities' needs with limited resources and the need to maintain critical infrastructure and by engaging diverse perspectives around difficult tradeoffs on the path to ongoing climate adaptation. To set the stage for inclusive and equitable outcomes, the City will promote the health and economic stability of all New Yorkers and invite partnerships to dismantle unjust structures along the way.



Riding bikes on the Rockaway Boardwalk, Queens.

NYC Climate Adaptation Roadmap

The ***NYC Climate Adaptation Roadmap*** is an initiative being developed by the Mayor's Office of Climate Resiliency (MOCR). The roadmap will consist of several components, including a citywide climate impact analysis and a framework for planning and sequencing NYC's next generation of climate adaptation investments. This framework will identify high-risk areas that will be prioritized for holistic, neighborhood-scale engagement and planning processes that will be undertaken in partnership with local stakeholders. In keeping with the City's multihazard approach, these neighborhood resiliency processes will consider all of the major climate hazards impacting NYC – coastal storms (such as hurricanes and Nor'easters), chronic high tide flooding, flooding caused by heavy rainfall and extreme heat.

The ***NYC Climate Adaptation Roadmap*** will refresh the City's climate resiliency strategy and build upon the City's foundational strategies for storm recovery and resiliency as articulated in ***PlaNYC: A Stronger, More Resilient New York*** and ***OneNYC***. Climate adaptation strategies will encompass improving data collection and analysis; fostering a growing pipeline of new projects and programs; strengthening partnerships with multi-sector partners, including community-based organizations, industry groups and utilities to improve preparedness and coordination; and advocating for funding and better coordination with Federal and state government agencies.

In October 2021, the City Council passed **Intro 1620**, requiring the development of a Citywide Adaptation Plan. MOCR will fulfill the objectives of this legislation through the release of the ***NYC Climate Adaptation Roadmap***, which will highlight climate impacts and related strategies to mitigate risk to Environmental Justice areas identified in the ***Environmental Justice for All Report***. Both reports are slated for release in 2022.

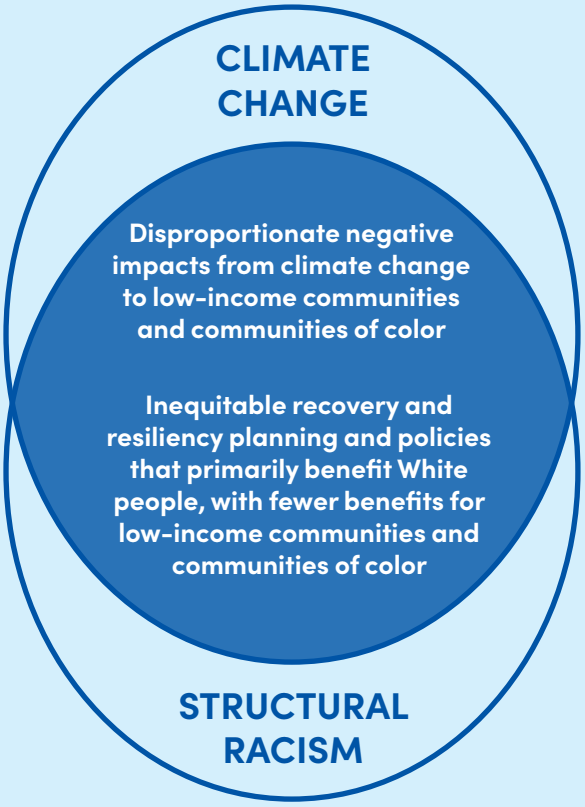
The ***NYC Climate Adaptation Roadmap*** will embody the following core concepts:

Climate Adaptation

Climate adaptation refers to programs, projects and processes that minimize risks to New Yorkers' health, safety and well-being, while also providing the basis to learn from and evolve the City's responses to the climate crisis. The City's response to the climate crisis is multifaceted and includes reinforcing infrastructure and buildings to protect New Yorkers from the impacts of climate change, while also changing the way we interact with NYC's built and natural environments to reduce the unavoidable and dangerous impacts of climate change.

Climate Justice

Climate change affects everyone, but it does not disrupt everyone's lives in the same way. Low-income communities and communities of color are frequently confronted with more challenges and barriers to adapting to living in a hotter, wetter



world than communities with more resources and greater economic or political power.

In a climate-just future, everyone lives, learns, works and plays in resilient and sustainable built, social and natural environments, even as the climate changes. To achieve this, it is important to recognize the advantages and disadvantages faced by people of different backgrounds, to understand the equity implications of public policy and resource decisions, and to equip all New Yorkers to meet their own needs in adapting to a changing climate. Climate adaptation measures can be one way to repair and restore communities whose greater vulnerability is due to decades of policy choices and disinvestment. The ***NYC Climate Adaptation Roadmap*** will outline steps toward a climate-just future that acknowledges the structural, root causes of vulnerability to climate change and is driven by community vision, planning and leadership.

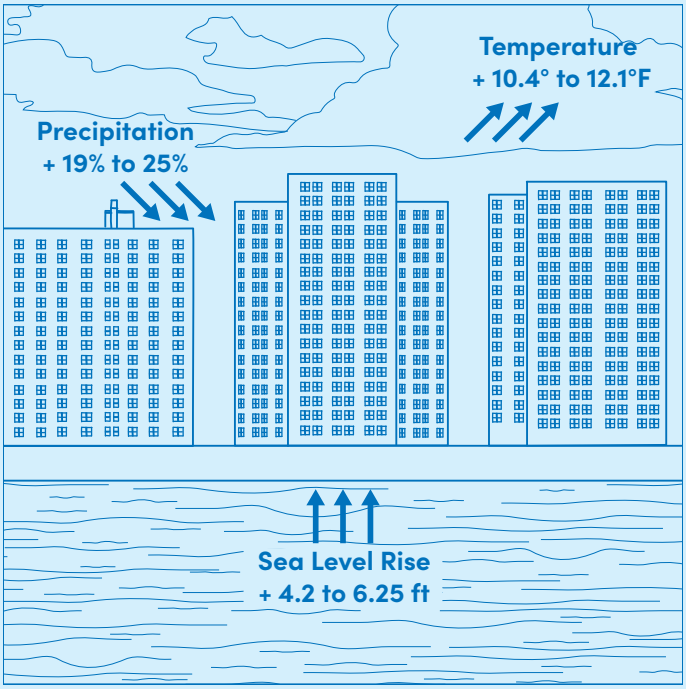
Multihazard Approach

Hurricane Sandy exposed the city's risk to coastal storms. New Yorkers also face a range of other climate risks, including chronic high tide flooding, intense precipitation and extreme heat. The City is taking a multihazard approach to address the full spectrum of climate impacts in a manner that is tailored to meet the greatest near-term climate risks. The ***NYC Climate Adaptation Roadmap*** aims to better communicate the relative impacts that NYC faces across all climate hazards and how these will increase over time.

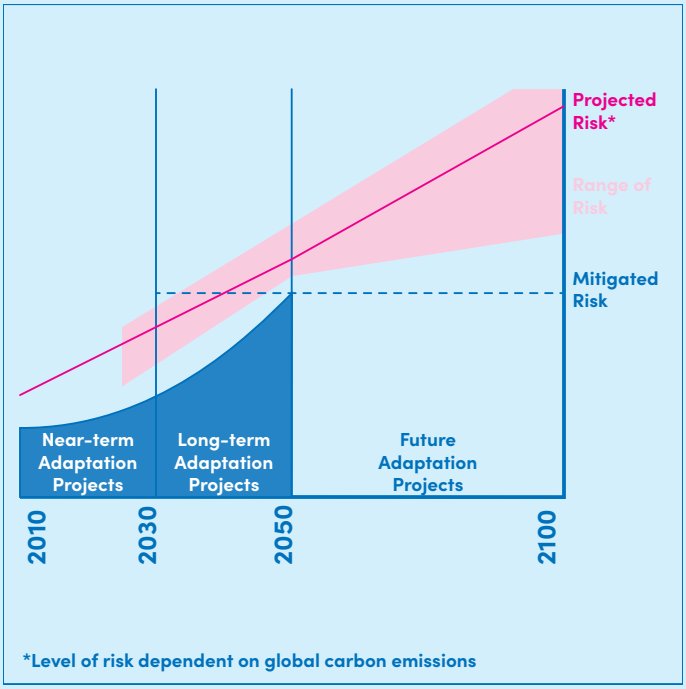
Generational Timescale

Climate adaptation measures will meet the needs of present-day New Yorkers while also anticipating the needs of future generations. The ***NYC Climate Adaptation Roadmap*** will outline practical risk mitigation strategies through 2050, and identify adaptation pathways through 2100. Climate adaptation will take a full view that addresses multiple timescales, incorporates feedback loops over time, and considers the carbon impact of NYC's climate adaptation measures to the greatest extent possible.

New York in 2100: Climate Projections



Source: New York City Panel on Climate Change



Source: MOCR


Chambers St
ARE YOU READY TO WEATHER THE NEXT BIG STORM?
FloodSmart.gov
FEMA
Chambers St

Goals and Strategies

Goal 1: Broaden awareness of climate risks and how New Yorkers living and working on the waterfront can take action to adapt to the impacts of climate change

Many New Yorkers are already experiencing climate impacts firsthand and have important perspectives to share about NYC's climate resiliency and adaptation needs. Residents are exploring answers to their own questions and making their voices heard. The City is using their contributions to improve climate risk information and to shape new climate adaptation programs and practices. In 2021, MOCR created new channels for New Yorkers to provide input through the Climate Knowledge Exchange. The Climate Knowledge Exchange encourages the formation of new learning networks that can support new community-driven opportunities to access, use and improve climate risk information and to identify ways New Yorkers can take action to address the impacts of climate change.

In April 2020, Mayor Bill de Blasio (the Mayor) appointed the fourth NYC Panel on Climate Change (NPCC). This independent group of climate experts advises policymakers on local climate projections and adaptation strategies. The new NPCC's expertise reflects the complexity of climate resilience issues across a city of 8.8 million residents. The Panel includes specialists in climate science, risk communications, social science, urban planning, affordable housing and economics. Together, the City, NPCC, and other partners will generate new and creative ways to communicate climate risk and improve climate change awareness, understanding and action.

It is also important to translate climate data into concrete actions by expanding **climate risk awareness** and help New Yorkers prepare for future threats. Partnerships among government agencies, academic entities and nongovernmental organizations can help refine climate research priorities and provide transparent, reliable, freely available climate risk information. The strategies below demonstrate how the City is continuing to refine climate resiliency and adaptation strategies based on the lived experiences and firsthand knowledge of frontline communities.

Opposite:
FEMA ad campaign at Chambers Street Subway Station, Manhattan.


WHAT'S IN YOUR GO BAG?
¿Que tienes en tu Baso de Emergencia?
OEM

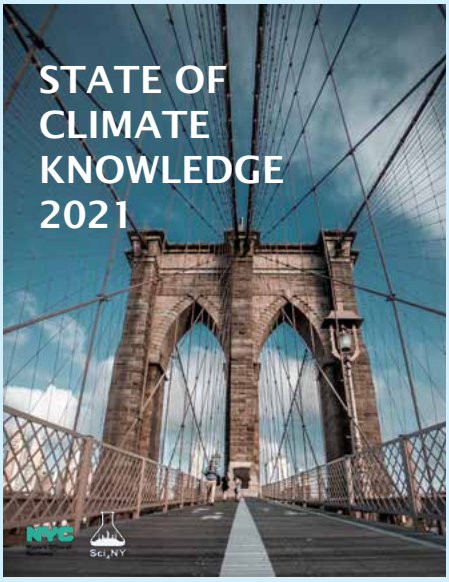
Strategy 1.1
Build a common understanding of local climate risks through sustained conversations between waterfront residents, community leaders, climate and social scientists, private practitioners and government agencies through various programs and platforms.

Strategy 1.2
Expand access to information and other resources for residents and small businesses about flood and heat risks, including timely, accessible information about flood insurance, flood preparedness, heat health and building retrofits.

Opposite:
NYCEM at Waterfront Planning Camp, Governors Island, 2019.

From Climate Research to Climate Action

Climate research is a critical part of being able to identify and address future threats. Through a wide variety of programs, NYC is actively cultivating a dialogue among frontline residents, community-based organizations, academic institutions and City agencies to share climate knowledge, provide advance learning and spark community-driven action on climate change.



Climate Knowledge Exchange

Launched in 2021, the Climate Knowledge Exchange creates a new channel for dialogue on what we know, do not know and need to know about climate change. Every year, the dialogue will be captured in the ***State of Climate Knowledge*** report series, creating a living climate research agenda and offering a platform for communities, academics and City government to identify where research can advance adaptation. Click here for the 2021 ***State of Climate Knowledge*** report.

Community Flood Watch

Flood Watch is a community science data collection effort led by the Science and Resiliency Institute of Jamaica Bay and New York Sea Grant in consultation with MOCR and City agencies. The project enables a growing network of residents and organizations to report local flooding, share experiences, and access resources related to flooding in NYC coastal communities. Researchers use these reports to visualize how "normal" high tides could look in the future due to sea level rise, and to improve forecasts of flooding and coastal hazards. Communities can use this shared database of images, reports and maps to communicate their neighborhood's needs and visions to city leaders.

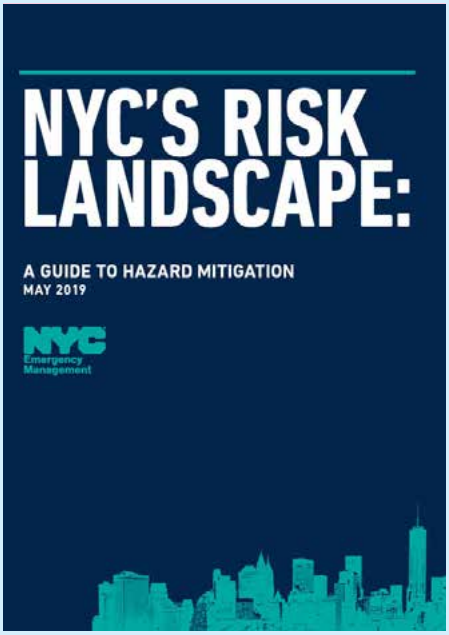
FloodNet NYC

FloodNet NYC is a pilot flood sensor network being implemented by MOCR in collaboration with academic and community partners in Hamilton Beach, Queens, and Gowanus, Brooklyn. The flood sensors collect real-time data on street flooding that can be used for better emergency preparedness, including more accurate notifications and improved physical interventions and to inform operational resiliency measures for first responders and service providers. The data can also be used by researchers to validate different current and future flooding models.

NYC Hazard Mitigation Plan and Risk Education Tools

NYC Hazard Mitigation Plan

In 2019, NYC Emergency Management launched an online **Hazard Mitigation Plan** — the first online plan by a local jurisdiction that uses an innovative platform to deliver up-to-date hazard risk information to the public. The website includes interactive tools for a variety of audiences. The "**Hazard History & Consequence (HHC)**" tool is a central repository of over 2,000 hazard events and associated consequences. An interactive mitigation actions map tracks existing and completed projects to document how the City is reducing risk. The "**Community Risk Assessment Dashboard**" provides localized risk assessments for all 59 community districts. Together, the Hazard Mitigation Plan, online resources and ongoing public education about emergency preparedness ensure that NYCEM and New Yorkers are implementing a culture of preparedness for an array of hazards.



FEMA Hurricane Season Outreach

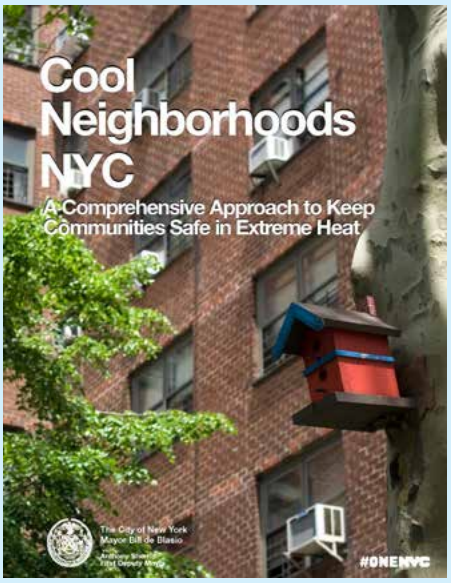
FEMA partnered with the City to launch a marketing campaign in 2021 to encourage flood insurance enrollment during hurricane season. The campaign displayed ads across the five boroughs through outlets including television, radio, the internet and subway posters. NYC and FEMA will continue to partner on flood risk and flood insurance outreach to build greater awareness about hazards and solutions among New Yorkers.

FloodHelpNY.org

FloodHelpNY.org, run by the Center for New York City Neighborhoods, in partnership with the MOCR and the Governor's Office of Storm Recovery, is a user-friendly website for residents and business owners that provides easy-to-read flood insurance and flood resiliency content. The website builds awareness of current and future flood risks and shares resources on ways New Yorkers can reduce their physical and financial risk. As part of a pilot program after Hurricane Sandy, **FloodHelpNY.org** also offers free resiliency audits, including flood insurance counseling, an elevation certificate showing a building's lowest elevation and flood zone and backwater valve installations in select neighborhoods.

Heat Health Trainings

Heat Health Trainings (an initiative of Cool Neighborhoods NYC) equip trusted messengers such as home health aides, community health workers and community-based organizations to understand heat health risks and to promote protective measures inside the home. ***Cool Neighborhoods NYC*** is NYC's comprehensive strategy to keep communities safe in extreme heat.



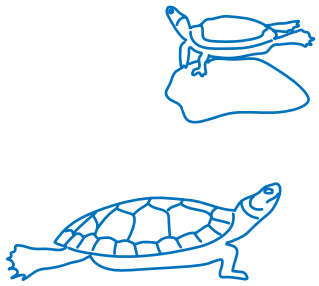

IKEA
IKEA

Goal 2: Apply an understanding of systemic climate vulnerabilities to guide land use policies and infrastructure investments in coastal areas

NYC is a coastal city with a diversity of densely settled neighborhoods lining an extensive, varied shoreline. The influence of climate change on sea level rise, storms and groundwater levels causes more frequent floods than in the past. Sea level rise appears as monthly or seasonal high tide flooding that is expected to reach further inland in coming decades. Some residents currently observe cyclical "sunny day" flooding in streets and yards from monthly high tides. Persistent inland ponding occurs in some areas due to a combination of geography, rainfall, high tides, a rising groundwater table and the limitations of street or sewer infrastructure that cannot drain adequately under conditions of increased rainfall and rising tides. Late summer, fall and winter storms present seasonal flooding risks, especially during hurricanes and nor'easters. During the most severe storms, some waterfront stretches are exposed to additional threats from the sheer physical force of wave action. Climate projections show that the frequency and intensity of each flooding source is increasing and will be exacerbated by rising global temperatures.

Neighborhoods and infrastructure systems across NYC were established decades and even centuries before the effects of human-induced climate change were first observed. How the waterfront looks and feels today was shaped by forces such as the shipping and manufacturing industries, the construction of buildings to house the population and workforce, and citywide public works including highways, parks and public housing campuses. Past actions within and beyond NYC have set in motion unavoidable and cascading impacts of climate change, even if global temperature rise remains below 1.5 degrees Celsius. Flooding impacts will be especially hard felt across low-lying stretches of the waterfront, and the human cost of climate change will be worse in neighborhoods that are already burdened with pollution, environmental contaminants, and health vulnerabilities due to chronic floods and extreme heat.

The City's approach to climate resiliency and adaptation recognizes the interrelationships between the natural and human systems necessary to support everyday life in a city of 8.8 million residents. For example, vulnerabilities in the stormwater drainage systems can affect housing, the transportation systems, and other types of infrastructure. There is no single adaptation strategy to simultaneously address all



"What does a resilient waterfront look like to you? One where coastal and lowlying communities are protected from flooding and rising water levels. But also one where underwater ecological communities are not negatively impacted by any human engineering."

Opposite:
Red Hook Terminal, Brooklyn.

Credit: MOCR

climate vulnerabilities, but a range of risk mitigations exist that can be applied at scale in dense urban neighborhoods.

Existing public infrastructure systems and neighborhoods are built, with some designed decades before the existence of modern codes and standards. The current state of repair of legacy assets, combined with the increasing stress of climate change, will present a major challenge to maintaining critical public services at adequate levels of service across the city. Under changing climate conditions, the infrastructure and facilities may no longer function as originally intended. A coordinated, systems-level planning approach is needed to inform future retrofits, repairs and system upgrades. Foundational decisions about system design, operations and maintenance must weigh existing capacity, cost and technical feasibility to maintain an acceptable level of system performance under different scenarios. City agencies will continue to prioritize connectivity and continuity of service, among other factors, while also inviting flexibility to promote passive and nature-based features.

Read more about the "Coastal Land Use Framework" on page 69.

To limit greater exposure from future climate risks, long-term plans will also consider changes in land use alongside public investments in infrastructure and housing. The **Coastal Land Use Framework**, introduced in this section, helps to mitigate risk by limiting additional residential density in areas of greatest projected coastal flood risk 30 years from now while promoting resilient construction and retrofits in other vulnerable areas. Although zoning changes do not directly affect existing buildings, they establish limitations on alterations and new development that can be realized over the long term. Residential density influences capital planning, including the siting of coastal flood protection, repairs and upgrades to street and sewer networks and agency operations, such as sanitation services and sewage treatment that maintain day-to-day resident health and safety. The Coastal Land Use Framework is used to align future development and public investments in housing and infrastructure with the City's understanding of growing flood risks linked to climate change.

Going forward, dense, well-connected areas will continue to contribute new housing and jobs to bolster the local and regional economy. In these areas, the Coastal Land Use Framework applies climate projections that have already been used to inform design standards for the built environment. Infrastructure resiliency retrofits, climate-resilient building codes and zoning updates will enable these waterfront neighborhoods to continue to support new residential development.

Over the next 30 years, it will not be feasible to keep the rising water out of some waterfront areas or to continue delivering the same level of public services. In areas where the magnitude and frequency of flood risks are exceptional, the City has taken steps to limit future residential development with a zoning designation known as a **Special Coastal Risk District (SCRD)**. This zoning designation allows continued investment in existing buildings but restricts growth in the most high-risk coastal neighborhoods and in sensitive natural areas. Residents in southern Brooklyn, the East Shore of Staten Island, and southern Queens have worked with the City to tailor SCRDs to the unique conditions in their neighborhoods.

Climate risk management policies connect the dots between people, places, and climate impacts and will be furthered in the forthcoming ***NYC Climate Adaptation Roadmap***. New programs and services led by the MOCR and City agencies will be needed to uplift and safeguard the self-determination of waterfront residents who are especially vulnerable to economic and social burdens of climate change. Some communities are collaborating with City agencies and researchers on community science initiatives and other research to expand climate risk awareness. Strategies described in Goal 3 are envisioned to support neighborhood housing stability through new programs and services for housing mobility, flood retrofits and community ownership. Meanwhile, the City is advocating aggressively for necessary federal and State funding to construct additional coastal flood protection projects, as described in Goal 4. Goal 5 describes how City agencies that are responsible for land use and infrastructure planning are incorporating climate risk information into capital investment, maintenance and operational decisions.

As the following strategies suggest, future policies and infrastructure investment strategies for high-risk areas along the waterfront will consider multiple factors, including the social vulnerability of current residents, density of existing development, scale of localized flood risks, connectivity to existing infrastructure and the feasibility and viability of infrastructure improvements.

Read on! Jump to:
"Climate Resiliency and Adaptation Goal 1" on page 59.

"Climate Resiliency and Adaptation Goal 3" on page 75.

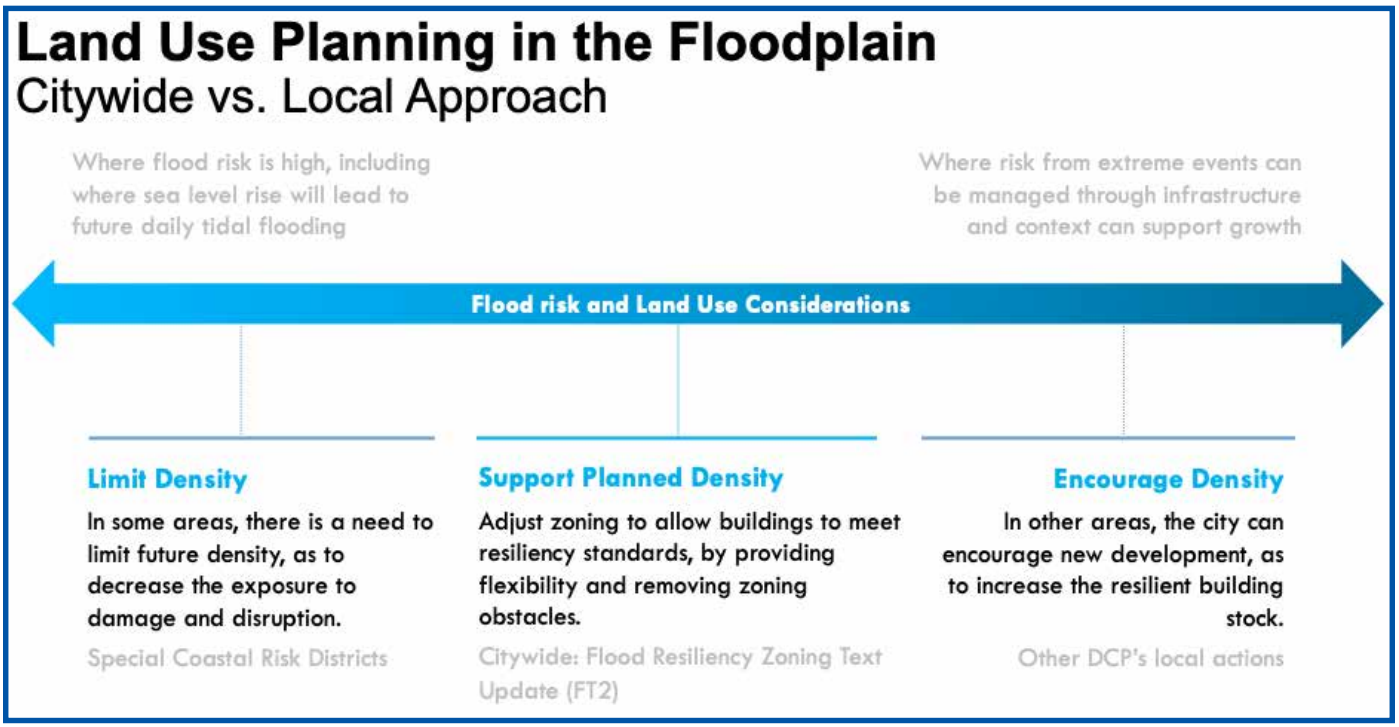
"Climate Resiliency and Adaptation Goal 4" on page 89.

"Climate Resiliency and Adaptation Goal 5" on page 95.

Strategy 2.1
Coordinate climate risk-informed land use policy with public investments in development and infrastructure.

Strategy 2.2
Employ the Coastal Land Use Framework to align development and public investments in housing and infrastructure in coastal neighborhoods with future flood risks. Regularly update the framework with the best available climate risk information and evolving understanding of systemic climate vulnerabilities.

Strategy 2.3
Identify adaptation needs, actions and resources for public infrastructure systems. Align target service levels and other adaptation actions to the Coastal Land Use Framework.



Source: NYCDCP

Coastal Land Use Framework

The Coastal Land Use Framework presents a way to align future development and public investments in housing and infrastructure with an evolving understanding of flood risks. Zoning is a key tool to effectuate land use policies that establish what activities or buildings are permissible on a piece of property, such as land use, density and the size and shape of structures. Zoning covers the entire city, and may be changed as part of a neighborhood plan or site-specific project. Zoning is often used to shape changes to development patterns over a long-term, foreseeable time frame. Although zoning changes do not necessarily affect existing buildings, over time zoning adjustments can reshape the way land is used and density in the City via public and private investment in new construction, rehabilitation or reuse.

The Coastal Land Use Framework will help to reduce exposure to future climate disasters. Based on projections of flood risk covering the next 30 years, zoning changes informed by this framework will support growth and increased resiliency in suitable areas while restricting growth where necessary to reduce neighborhood-scale exposure to risk. While the framework considers a range of uses, intensity of residential use in particular influences capital investment planning and City operational obligations, including the siting of coastal flood protections, repairs and upgrades to street and sewer networks, and agency operations such as sanitation services that maintain resident health and safety in everyday life.

There is no one silver bullet solution to managing risk in a coastal city where neighborhoods and infrastructure systems are already built out. It will be important to advance multiple climate adaptation strategies at the same time. These include new housing programs to support flood retrofits and housing mobility and infrastructure system investments to maintain resident safety and health, all while inviting community leadership to guide positive outcomes for coastal residents.

The framework includes three major strategies:

- Support investment at currently permitted residential densities in waterfront areas where buildings and public infrastructure systems can be adapted to withstand flooding through physical design improvements, flood retrofits, and sound waterfront asset management. This strategy applies to most of NYC's coastal areas.

- Consider increased residential densities and intensity of use in well-connected areas where new development would be appropriate to address the needs of NYC's population. New buildings built to high flood standards can achieve a higher standard of resiliency than many older structures. Prioritize coastal flood protection projects in waterfront areas where coastal flood risks through the 2050s can be practically managed and where land use factors are conducive to growth.

- Limit future residential densities in highly vulnerable or isolated waterfront areas where coastal flood risk through the 2050s presents neighborhood-scale risks that cannot be managed through building-scale improvements and anticipated public investments, including in areas where residential populations do not exist today and where support for a new population would require infrastructure to be extended and maintained at significant public cost.

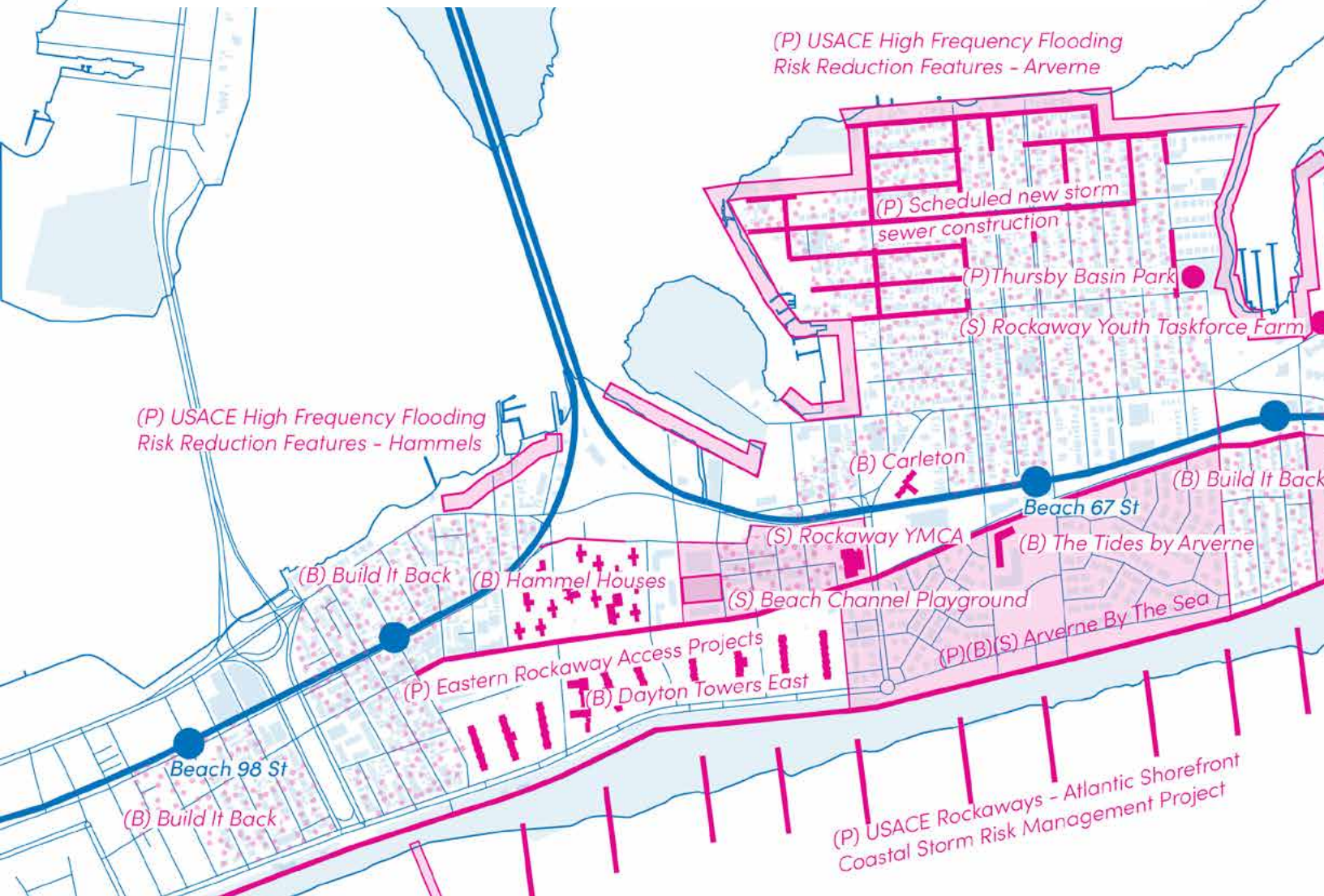
It is also important to recognize that over time, climate change and sea level rise will make some areas unsuitable for residential use, and will result in the loss of some existing housing. Accommodating new housing at locations outside the flood zone, as well as at suitable locations within coastal areas, will be necessary to support the city's long-term needs.

Supporting Thriving Neighborhoods Through Climate Adaptation

Eastern Rockaway, Queens

Eastern Rockaway comprises several coastal neighborhoods on the Rockaway Peninsula, a barrier island along the southern coast of Queens. The area's beaches and bayfront setting have long been a regional waterfront destination and are accessed via the A Train, the Long Island Railroad, and several Metropolitan Transportation Authority (MTA) bus routes. About 100,000 New Yorkers live here in mixed-income communities that present opportunities for resiliency, sustainability, and supporting thriving neighborhoods. Beginning in the mid-1900s, Eastern Rockaway residents lived through the trauma of urban renewal programs. Large stretches inhabited largely by low-income New Yorkers were cleared, some of which remains vacant today. In addition to this history of disinvestment, residents may face long commute times to work, shop and go to school.

Eastern Rockaway is highly exposed to coastal flood risk. Severe flooding and damage occurred during Hurricane Sandy in 2012, exacerbating deep-rooted inequities. High groundwater levels and a flat, level geography also put the area at risk of chronic flooding during heavy rains and high tides. Without interventions, sea level rise projections show that low-lying areas in Eastern Rockaway face a high risk of chronic flooding by the 2050s. The City is working with area residents and local elected officials to advance projects that will help manage increasing flood risks and improve quality of life. This spotlight illustrates a snapshot of climate actions in Eastern Rockaway and represents how a multi-layered approach to adaptation can support coastal neighborhoods across the city as climate impacts increase.



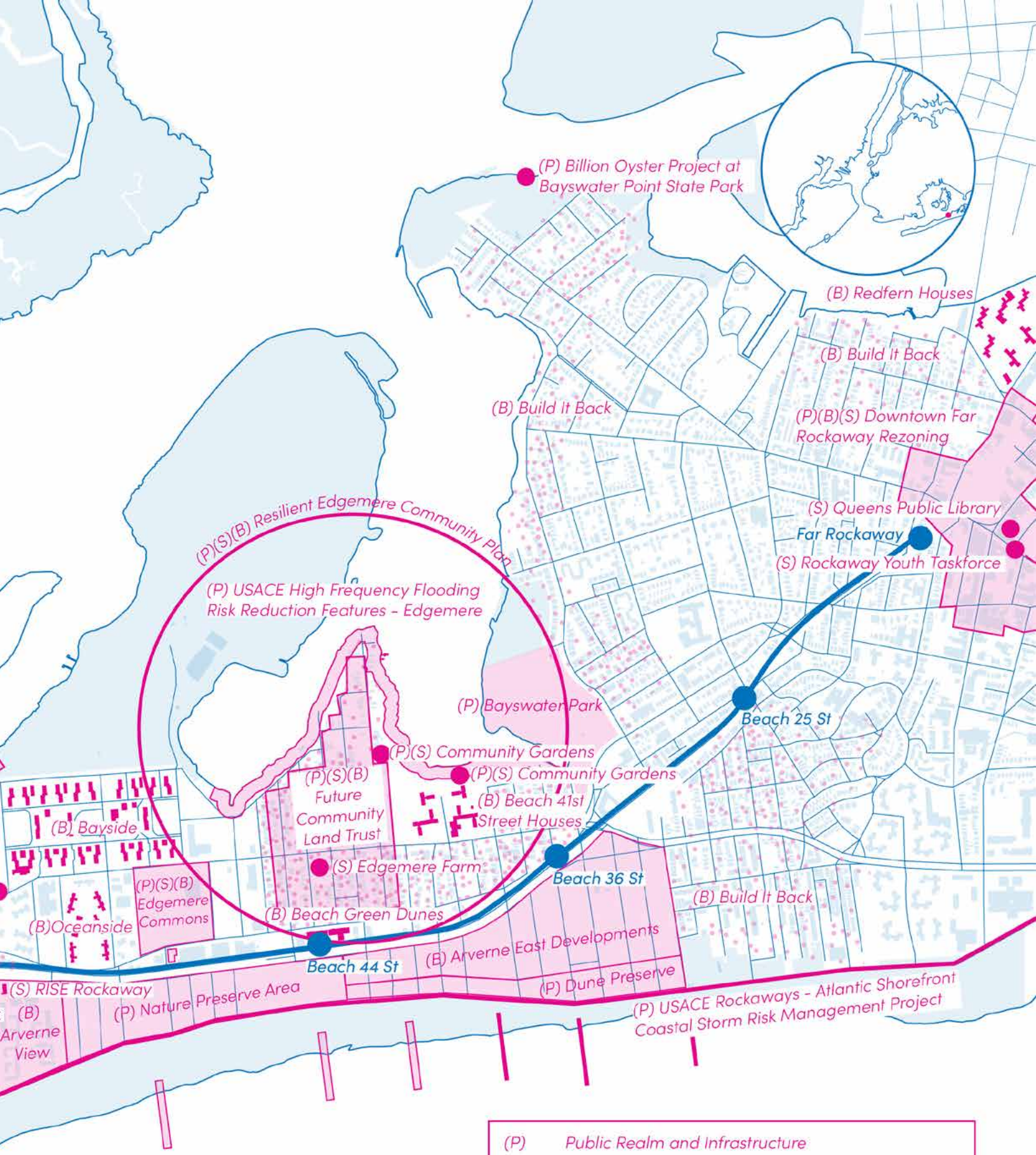


Figure is for illustrative purposes only.

Supporting Thriving Neighborhoods Through Climate Adaptation

Neighborhood Planning

Community engagement has been foundational to neighborhood planning initiatives that advance long-term climate adaptation. Planning processes organize stakeholders and align climate risks with adaptation needs and opportunities. Visioning plans like ***Resilient Edgemere*** apply knowledge of climate hazards like flooding and heat to inform adaptation investments. Post-disaster recovery planning like the ***NY Rising Community Reconstruction Plan - Rockaway East*** integrates hazard mitigation principles to support community resiliency and reduce disaster risk. Neighborhood plans are complemented by resiliency planning for citywide urban systems like transportation and sewer services, as well as natural ecosystems like urban forests and wetlands. These plans can advance climate risk management, increase quality and resilient affordable housing supply, promote local retail and community services, and cultivate a safe, healthy public realm.

Public Realm and Infrastructure

The public realm encompasses publicly accessible streets, roadways, sidewalks, parks, plazas and other open spaces where civic interaction occurs. Projects designed to reduce flood risk exposure in Eastern Rockaway are being constructed on public sites, facilities and rights of way that are managed by several agencies, including NYC Parks, New York City Department of Transportation (NYC DOT), and New York City Transit (NYCT). Funding for large-scale projects in the public realm comes from a mix of federal, state, and local sources. The ***Access to Opportunity*** study and recent transit improvements will make it safer and easier for New Yorkers to get around. USACE projects will mitigate flooding in the area while also improving waterfront public access and recreation opportunities. Continued investments in Bayswater Park, Thursby Basin Park, Rockaway Community Park, Rockaway Boardwalk and Beach, and a new nature preserve at Arverne East can enhance wetland ecosystems and support healthy active lifestyles.

Community Services and Social Infrastructure

Frontline communities are leading by example on climate justice. Strong social networks and community-based risk awareness programs underpin both responsive and equitable disaster recovery and long-term climate resiliency. Numerous organizations serve important roles in Eastern Rockaway's social infrastructure and provide essential services. Projects like the **Billion Oyster Project** are organizing and educating residents on how to boost ecosystem services in natural areas, including at Bayswater Point State Park. Grassroots organizations like the **Rockaway Youth Task Force** and **RISE** are powering a shift toward a culture of healthy food systems at local farms and community gardens while also deepening Eastern Rockaway residents' relationship with the environment.

Buildings and Landscape Features

Eastern Rockaway residents live and work in a range of building types. As climate impacts increase, climate resilient design for new and rehabilitated buildings can substantially reduce flood risk and heat exposure. While most buildings in Eastern Rockaway are privately owned, many buildings and campuses receive public funds through NYCHA and HPD. Numerous existing buildings have been retrofitted and rehabilitated to the latest flood resistant construction standards, though more retrofit needs remain. In accordance with NYC Building Code, all new construction situated in the floodplain must be designed to flood resilient standards. Landscape features such as plantings, soils and green infrastructure can help to absorb stormwater and cool the neighborhood.

Goal 3: Preserve and create new housing for a mix of incomes in appropriate locations and provide waterfront residents with new resources to manage flood impacts on their homes

NYC is a dense, interconnected, vibrant cultural center that has long celebrated and thrived on its connection to water. Waterfront populations are as diverse as those of the entire city — the elderly; low- and moderate-income (LMI) households; people with disabilities; immigrant households; Black, Indigenous, and people of color (BIPOC) residents and others who have been historically marginalized; residents who have weathered many floods; and newcomers. Climate change will continue to fundamentally alter NYC's housing market, neighborhoods and the daily lives of New Yorkers and further complicate the already formidable challenges of maintaining thriving neighborhoods and economies. Rising tides, increasing severity of rainfall and storms, urban heat, and the social and economic repercussions of these changes threaten the choice, agency, and physical and financial well-being of vulnerable populations regarding their housing options across the city.

Sea level rise will also change how the City provides services to residents and communities. In NYC's lowest-lying communities, chronic flooding will increasingly affect health, safety and quality of life for residents, including disruptions to everyday life and influencing displacement, accessibility and environmental health issues. Flooding will also increase the financial burden associated with homeownership in coastal areas due to the cost of flood recovery, diminished long-term value of property, and the impacts of neighborhood-wide transitions, especially for homeowners and renters who cannot afford to maintain flood insurance. Climate change, along with other economic factors, will lead to greater pressures on housing across the city in neighborhoods outside the flood zone. Without proactive approaches, the cumulative impacts of climate change will disproportionately affect BIPOC and LMI households who are already disadvantaged in the housing market. These impacts are already felt today in some communities, where exposure to chronic flooding is causing stress and isolation, travel delays, water damage and saltwater corrosion to cars and property.

Opposite:
Homes in Edgemere, Queens.

Credit: MOCR

The magnitude of climate impacts creates great challenges but also a unique opportunity to transition to more equitable practices and outcomes for NYC's housing and neighborhoods. ***Where We Live NYC*** (released in 2020) outlines a balanced approach to advancing fair housing and guides all City housing policy. This approach includes making substantial investments in housing, infrastructure and services in neighborhoods that historically have been disadvantaged by discrimination, disinvestment and exclusion, as well as strategies to provide affordable housing opportunities in neighborhoods already rich with amenities such as schools, shops and restaurants, public transportation, and healthcare facilities. It also advances support for renters' ability to maintain and preserve their homes, including through free legal representation to renters facing eviction, harassment, or disrepair. As referenced in ***Where We Live NYC***, fair housing laws protect residents in every home in NYC.

Housing stability: secure access to a safe and healthy home and neighborhood that meets a resident's needs.

Housing programs serve New Yorkers by expanding **housing stability**. Traditionally, housing stabilization programs have been oriented toward securing housing tenure and neighborhoods in place, through measures such as improving economic and living conditions for residents and supporting local economic development to prevent displacement in areas negatively impacted by market conditions. However, in areas that face increasing exposure to chronic high tide flooding, the ability to maintain uninterrupted access to a decent, safe and healthy home is likely to become compromised over time. Losing ground floor space poses significant financial risks to many building types, from single family homes to cooperative apartment buildings. New strategies and resources are needed to support residents in managing their climate risks and coping with impacts.

Housing mobility: the ability of residents to find and secure a home that improves their housing or neighborhood conditions.

Particularly in the context of increasing flood risk, housing stability can be reframed as supporting people's agency to meet their own housing needs, wherever they live. Consistent with the Coastal Land Use Framework, affordable housing investments along the waterfront are evaluated alongside climate risk information and are supported by flood risk management practices, such as coastal flood protection strategies and resilient design standards. In areas where existing buildings are likely to remain, this includes new programs that support flood retrofits so that homes can withstand the impacts of flooding, as well as programs to support **housing mobility**. These resources may include supportive services for individual households, as well as facilitating housing production in areas that are not facing similar risks from high tides and combined flood hazards.

Housing mobility and flood retrofit programs are categories of anti-displacement measures envisioned to support residents in the planning and financing of their long-term housing decisions. Housing mobility services can include a menu of options such as housing counseling, grants and low-interest loans, rental assistance, real estate brokerage services, estate planning, and moving assistance to serve both property owners and renters in flood-vulnerable areas. Under current federally funded models, some support for housing mobility exists through voluntary post-storm buyout and acquisition programs that can be made available after a declared disaster. FEMA grant programs also provide a degree of support for both housing mobility and flood retrofits. Recognizing the need for further proactive approaches, the City can continue to advocate for increasing the magnitude and range of resources available to offer housing mobility services and flood retrofits on an ongoing, long-term basis. Meaningful resident engagement would inform the planning, design and implementation of new housing programs. These programs would complement neighborhood planning and be intended to improve residents' ability to either stay in a neighborhood, even as it changes, or to move to a different neighborhood in the future.

Working in concert with housing mobility services, **land adaptation** can facilitate the transition of flood-vulnerable structures to climate resilient and sustainable land uses, reducing the exposure of residents to climate risk. Future land uses of these sites should be adapted to chronic flooding and where possible serve community and other public needs, whether as a natural area, neighborhood amenity, flood-resilient housing, or another use. As residents exercise their housing mobility options and move away from highly vulnerable areas, public or private land management entities need to take ownership of and maintain flood-vulnerable properties and facilitate new uses. Land adaptation may involve actions like acquiring title, demolishing flood-vulnerable structures, securing and maintaining vacant sites for a period of time, and working collaboratively to identify and steward new uses that reduce climate risk in the neighborhood. Today, responsibility for coastal land management lies primarily with private property owners and government agencies. Land adaptation in an era of climate change may require creative solutions for land management, such as land trusts, community land trusts, land banks, new financing tools, and the ongoing engagement of multiple stakeholders from residents to public agencies and community partners. As with housing mobility programs, land adaptation programs and site-specific projects would be informed by resident engagement and neighborhood planning.

Land adaptation: the transition of flood-vulnerable structures to a range of climate resilient and sustainable land uses that are adapted to chronic flooding and serve community needs.


SOARIN' EAGLE
Tom's Coney Island

Communities have good reason to approach new housing and land adaptation programs with caution. The history of redlining, disinvestment and urban renewal shows the harm that can occur to low-income communities and communities of color when affirmative efforts are not made to safeguard them from environmental hazards, pollution, displacement, dispossession and dislocation. Some New Yorkers experienced jarring injustices through urban renewal, a period of racist top-down planning in the 20th century that drove large-scale investments in the built environment and that frequently targeted communities of color. The legacy of racist and marginalizing practices and policies in real estate, the financial and banking sector, and land use planning has excluded generations of low-income New Yorkers, especially BIPOC New Yorkers, from opportunities for housing, financial stability and wealth-building. In creating new programs, it will be important for City agencies and State and federal partners to acknowledge history, repair mistrust and build meaningful relationships with historically marginalized and excluded groups.

The following strategies will help support all New Yorkers, especially BIPOC, LMI and historically marginalized populations, in their agency to design and follow their preferred housing pathways. Equipped with knowledge and tools, and supported by public policies and programs, New Yorkers would be equipped to navigate financial and logistical barriers and able to exercise choice in their housing options. Climate resiliency and adaptation initiatives can seek to yield equitable outcomes through solutions that continually adapt to meet the demands of a dynamic climate and city.

Opposite:
Coney Island from pier, Brooklyn.

Credit: City of New York

For more information, see "Climate Resiliency and Adaptation Goal 2" on page 65.

Strategy 3.1
Help meet NYC's need to preserve and create new housing for a mix of incomes in appropriate locations to encourage healthy, equitable and resilient waterfront neighborhoods.

Advance neighborhood planning initiatives to support the vitality and resiliency of waterfront neighborhoods, consistent with the Coastal Land Use Framework and through the *NYC Climate Adaptation Roadmap*.

Support the redevelopment of select underutilized City-owned properties for affordable housing in waterfront neighborhoods, consistent with the Coastal Land Use Framework.

Encourage affordable housing production and the production of a diversity of housing options citywide to enable housing mobility.

Strategy 3.2
Establish programs for renters and property owners in waterfront neighborhoods that are informed by meaningful engagement and neighborhood planning.

Support residents in improving their housing conditions through new or improved policies and programs that may offer financial, technical or counseling assistance, while seeking to affirmatively further fair housing, through the initiatives identified in *Where We Live NYC*.

Expand community ownership through shared equity housing and economic development models.

Identify new models for coastal land management that reduce long-term climate risks and offer pathways to acquire and manage land and steward community-oriented uses in partnership with the City, community partners and coastal residents, such as the proposed New York State Environmental Bond Act.

Strategy 3.3
Promote housing stability through flood retrofit and housing mobility services, prioritizing low- and moderate-income households that are affected by chronic high tide flooding and other compound flooding risks.

Pursue multiple funding sources to support flood retrofit and voluntary housing mobility assistance for homeowners and renters, including technical assistance, financial counseling, construction assistance, rehousing assistance and retrofits that reduce exposure to flooding risks. Prioritize assistance in areas with financial need and chronic flood risks.

Update the ***NYC Coastal Storm Activation Playbook*** to enhance interagency coordination for post-storm communication and to equip storm survivors with actionable information on housing reconstruction, flood retrofit and housing mobility options shortly after a federally declared disaster, when available.

Investigate the impacts of sea level rise and extreme weather on New York's diverse housing stock to accelerate new and augmented programs to reduce risk exposure; increase risk awareness; provide retrofit assistance; develop buyout assistance; explore climate migration opportunities; identify post-disaster housing recovery needs; and consider regional housing and transportation mobility needs from coastal neighborhoods.

From Post-Storm Buyouts to Housing Mobility Services and Land Adaptation

After Hurricane Sandy in 2012, the federal government allocated recovery funding for City, State, and federal agencies to pilot time-limited, voluntary post-storm buyout programs. The programs mitigated housing displacement by providing recovery grants to homeowners and renters in substantially damaged homes across Queens, Staten Island and Brooklyn. The programs also transitioned flood-vulnerable homes and property to safer, healthier uses, such as open space and elevated homes.

Because post-storm buyout programs have significant limitations, more equitable solutions are needed on an ongoing basis. Researchers studying these programs across the United States have documented that buyout programs reinforce existing patterns of housing inequality [1], especially for BIPOC and lower-income homeowners whose homes may receive lower valuations in the appraisal process [2] and who may experience housing discrimination in their search for a new home [3]. Additionally, buyout programs nationally have been found to leave behind vacant, underutilized parcels [4] that have a blighting impact in neighborhoods [5]. Redesigned buyout programs that produce equitable results will employ a broadened focus on residents' long-term goals and needs.

New Yorkers should not have to wait for a disaster to access government support to move away from flood risk. New, proactive climate adaptation services are needed to support well-being and financial security as residents weigh difficult decisions. After acquisitions are completed, public agencies, neighbors who stay, and community leaders will need to engage on questions of what happens with the land. The answers will depend on numerous interconnected decisions at the household, neighborhood and citywide level.

Today, no public agency or community partner is equipped with all the tools and resources needed to advance housing mobility and land adaptation initiatives. Meaningful dialogue, resources to adapt and integrated long-term planning will help to inform difficult tradeoffs to maintain safe, thriving communities. The City is in the process of exploring multiple opportunities to expand services and to identify resources to support this expansion. The City will continue to invite input and leadership from New Yorkers as this research evolves and as ongoing dialogues begin to inform policy, planning and programs.

[1] Daniel Cusick. "**Racial Inequalities in Housing Extend to Flood Buyout Programs.**" E&E News. *Scientific American*, February 19, 2020.

[2] Brentin Mock. "**Freddie Mac Finds 'Pervasive' Bias in Home Appraisal Industry.**" Bloomberg CityLab + Equality, September 28, 2021.

[3] NYC Human Rights Commission. "**Black New Yorkers on their Experiences with Anti-Black Racism.**" City of New York, June 9, 2020.

[4] Urban Land Institute. "**On Safer Ground: Floodplain Buyouts and Community Resilience.**" June 15, 2021.

[5] Erwin de Leon and Joseph Schilling. "**Urban Blight and Public Health: Addressing the Impact of Substandard Housing, Abandoned Buildings, and Vacant Lots.**" Urban Institute, April 2017.

Create housing mobility services to support New Yorkers to safely stay or move away from chronic flooding

Housing mobility is the ability of residents to find and secure a home that improves their housing or neighborhood conditions. Voluntary post-storm buyout programs have offered recovery grants that provide fair compensation based on property value minus mortgages and debts. When homes are destroyed or made uninhabitable by a major flood, these services are typically sought by homeowners who are at the highest risk of long-term housing displacement. Some programs also offer financial incentives to help storm survivors secure a new home and get back on their feet. Renters living in these homes may be able to access temporary housing benefits and are entitled to housing mobility services through the Uniform Relocation Act, including financial assistance for a rent differential and moving costs.

However, neither post-storm buyouts nor the NYC's housing system — which is already challenged by limited availability of affordable housing, the impacts of COVID-19, and patterns of displacement — are designed to address chronic flooding impacts on a proactive and ongoing basis.

Housing mobility services are envisioned to provide homeowners and renters with a variety of tools and programs that will allow them either to stay safely in their homes or move into a more stable housing condition. The services can encourage equitable outcomes and advance climate justice by focusing on people and their housing needs instead of their property value. Housing decisions are personal, and decisions about managing risk will inevitably vary from neighbor to neighbor. At what point in family planning, career planning or estate planning might a resident seek a new home to buy or rent? What decisions will they prioritize in their housing search? What financial, legal or social services support is needed to lower and remove barriers to housing choice? How can the City facilitate an adequate affordable housing supply to enable mobility?

As the City begins considering how to develop and resource these potential services, housing stability and resident engagement will rank among the most important priorities.

Examples of Housing Mobility Services

Housing counseling

Credit check and credit repair

Moving and closing costs

Housing search assistance

Mortgage payoff and down payment assistance

Rental assistance and Section 8 vouchers

In addition to a one-time recovery grant for down payment assistance, residents in the voluntary post-Hurricane Sandy programs also relied on a number of housing counseling services, loan programs and renter support to navigate complex real estate and legal circumstances.

What happens with the land after residential buyouts?

Housing mobility services involving buyouts will lead to sales of homes and properties, and some of those housing units will be retired to reduce flood risk. At the same time, residents will also continue to live and work in coastal neighborhoods. It will be important to respect residents' housing decisions and accommodate a range of scenarios over time.

Parcels that are suitable for buyout may have potential to serve community needs or to support critical infrastructure services. What new needs and opportunities might arise in wetter environmental conditions? What processes should facilitate the transition of flood-vulnerable lands to new adaptive uses? How can stewardship that prevents nuisance and blight be provided for land where suitable uses are limited?

Land adaptation facilitates the transition of flood-vulnerable structures to a range of climate resilient and sustainable land uses that are adapted to chronic flooding and serve community needs. This process requires both a public or private entity to act as steward of the land and requires revenues or other funding sources to support acquisition, maintenance and stewardship. In the post-Hurricane Sandy buyout programs, public agencies, nonprofit institutions and community stakeholders leveraged their collective experience to acquire, maintain and steward hundreds of small sites across more than 20 NYC neighborhoods on a time-limited basis. Some post-Sandy buyout parcels were appropriate for public agencies to manage and maintain as public assets.

For example, NYC Parks is taking up sites that preserve natural resources and create public recreation opportunities, while NYC Department of Environmental Protection (DEP) will manage a number of sites that can support stormwater management and water quality. Housing and open space sites will also be transferred to community ownership through an NYC HPD initiative to create a new community land trust in Edgemere. These pilots are built upon decades of partnership between City agencies and local, mission-driven organizations to identify and implement new uses for vacant parcels, such as the creation of community gardens and urban farmland through the Green Thumb program and transferring public sites to create new community hubs like The RISE Center in the Rockaways.

While there are not resources today, NYC can learn from precedents like New Jersey Blue Acres which relies on dedicated sales tax revenue to preserve open space and reduce disaster risk in floodways by purchasing land from willing sellers. Going forward, public agencies, neighbors and community leaders will need to develop new partnership models and identify sustainable funding sources to take up, transform and steward flood-vulnerable parcels into new public, private and community-oriented uses that are adapted to chronic flooding and improve everyday life in coastal neighborhoods.

In Oakwood Beach, Staten Island, where residents petitioned for a community-scale buyout option, the vacant, city-owned land will be used to build several components of the USACE South Shore of Staten Island Coastal Storm Risk Management Project (SSSI), including the buried seawall, tidal wetlands and required open space preservation.

Credit: MOCR

In Edgemere, Queens, sites will become resilient housing and open space as part of the Edgemere Community Land Trust.

Credit: MOCR

Some Midland Beach sites will be incorporated into Staten Island's Bluebelt system to help manage stormwater and reduce flooding while protecting natural areas.

Credit: NYC DEP

In Ramblersville, Queens, the City is prioritizing restoration of a number of sites in connection with the surrounding salt marsh.

Credit: NYC Parks

Supporting Community Ownership for Just Transition

Environmental justice and climate justice advocates, including the **NYC Environmental Justice Alliance**, are calling for a Just Transition, a unifying and place-based vision to shift from an extractive economy to a regenerative economy. A Just Transition relies on acknowledging past harms and traumas and creating new power relationships to facilitate a society-wide shift to a regenerative economy.

City agencies are currently partnering with community leaders on pilot projects that will create clean energy and affordable, resilient housing in the coming years. These projects aim to shift power and resources to environmental justice communities that have endured the lasting effects of urban renewal and fossil fuel-driven industrial pollution. Many of these same communities face growing threats from flooding and heat due to climate change.

Edgemere Community Land Trust

HPD is supporting the formation of a community land trust to facilitate long-term housing affordability and resilient land management in Edgemere, Queens. Through a competitive process, HPD will identify and work with a community partner to establish a community land trust in the Edgemere neighborhood to promote the stewardship and development of affordable housing and open spaces on vacant City-owned land. The initiative furthers the vision of the **Resilient Edgemere Community Plan**, released in 2017 after an 18-month community-based planning process, that seeks to pair the City's Hurricane Sandy recovery efforts with a long-term vision for a higher quality of life for Edgemere residents. The plan also builds on the City's commitment to expand community ownership and shared equity housing and economic development models citywide.

What is a Community Land Trust?

1. A community struggles with things like rising housing costs, overcrowding, and vacant buildings.

2. Community members work together to form a **Community Land Trust (CLT)**, a nonprofit, democratically governed organization that gets and keeps land in trust on behalf of the community.

3. The CLT facilitates community driven planning to address the community's immediate and long term needs. It works with resident groups, developers and other groups to preserve and enhance low income housing and develops unused spaces to meet community needs.

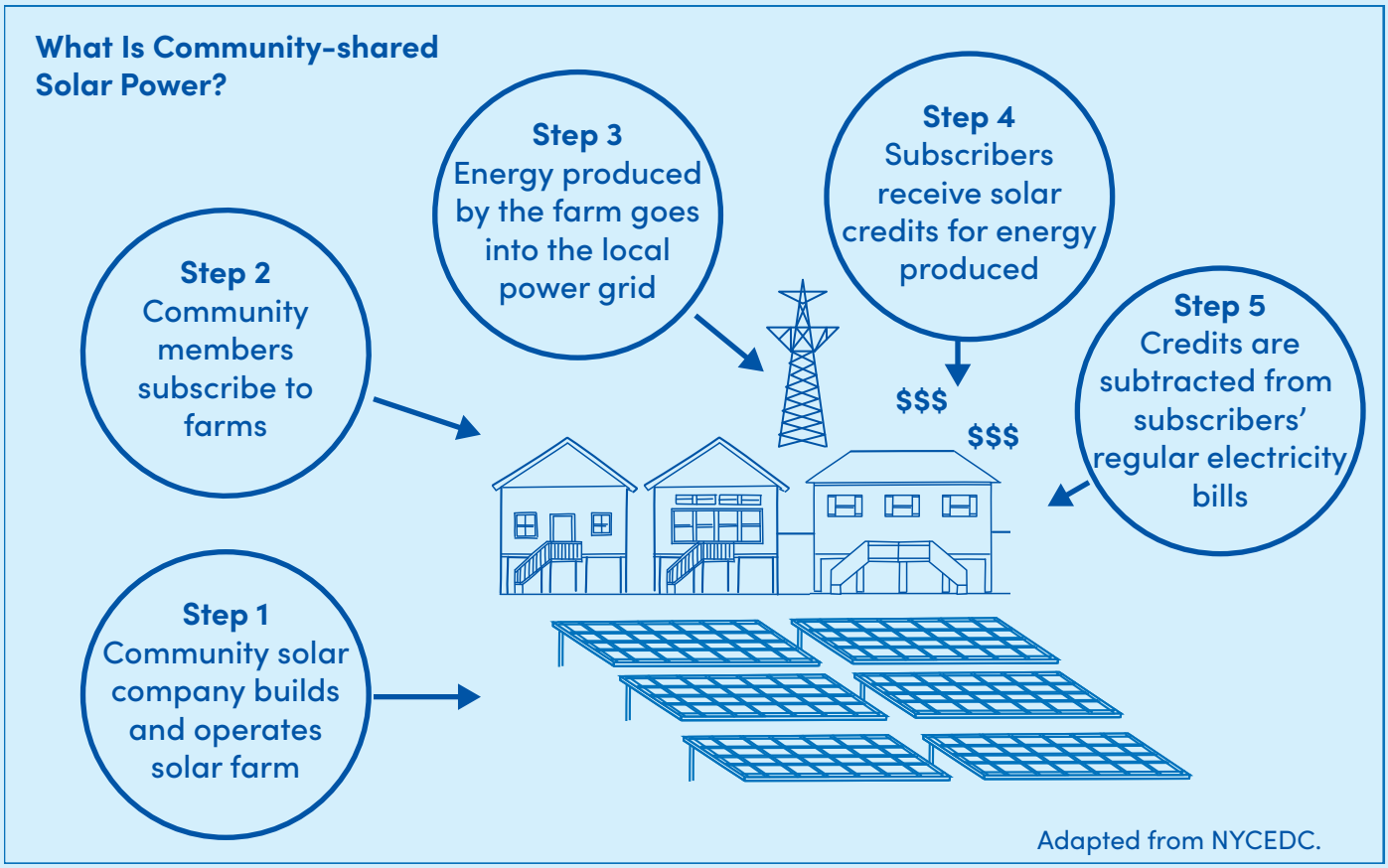
Homeowner
- Owns house
- Leases land from CLT
- Leases rental units to tenants

Community Land Trust
- Owns land
- Receives stewardship fee from land lease payments
- Maintains common infrastructure
- Supports housing stewardship

Adapted from HPD.

Sunset Park Solar

In 2018, NYCEDC selected a multi-stakeholder team, led by UPROSE, to develop the State's first community-owned solar project. Community solar allows community members to share the benefits of local solar projects, even if they rent or do not own a building that is appropriate for a rooftop solar installation. This model is intended to promote clean energy and represents an opportunity to support community ownership, in contrast to privately owned infrastructure systems. Sunset Park Solar ultimately will be owned and operated by a cooperative for the benefit of Sunset Park residents, businesses and not-for-profit organizations. Community-owned energy systems can complement traditional infrastructure services by supporting job training, leveraging energy savings to invest in heathier, more efficient homes, and giving communities more of a voice in the clean energy transition.



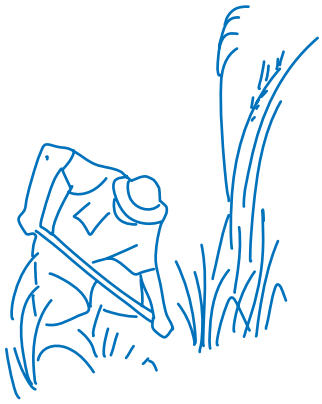
Goal 4: Identify opportunities for coastal flood protection, where feasible and practicable, to manage the impacts of coastal storm surge and high tide flooding

Through ***PlaNYC: A Stronger, More Resilient New York*** in 2013, the City identified a series of projects to strengthen areas of the coastline most devastated by Hurricane Sandy and protect against high tide flooding from sea level rise. This plan laid the successful foundation for NYC to pursue federal post-disaster recovery grants totaling approximately $15 billion. Since then, the City has used these funds to plan and design coastal flood protection across the five boroughs. These will comprise an entirely new class of infrastructure that reduces coastal flooding by seamlessly integrating flood barriers into waterfront neighborhoods.

Coastal protection projects can be large-scale, spanning miles of the coast. The projects are major investments whose scope is significantly greater than locally funded improvements. These are cross-jurisdictional projects that require extensive coordination and collaboration among City, State, and federal agencies. Coastal protection projects are designed to reduce flood risk from coastal storm surge across neighborhoods and to manage inland drainage issues. Through community-informed planning processes, they also provide or improve waterfront public access and open space. Although the City seized on an opportunity after a large-scale disaster to advance a significant coastal protection portfolio, continued advocacy is needed for federal resources to study and implement additional coastal protection projects.

NYC's planned coastal protection projects rely on a wide-ranging set of engineering and design strategies that depend on the local flood risk profile, visual impacts, waterfront public access, physical landscape, land uses and natural ecology. The City's overall coastal flood protection strategy achieves the following goals:

- Protect against storm surge with integrated flood protection systems, floodwalls, levees and floodgates.
- Raise coastal edge elevations to prevent high tide flooding through beach renourishment, revetments, bulkhead raisings, street raisings and the installation of tide gates.
- Minimize upland wave impacts through new dunes, jetties, wetlands and living shorelines.



"What does a resilient waterfront look like? It must be prepared to handle flooding and sea level rise, and must also be able to connect the city's economy to maritime uses."

Opposite:
The reconstructed Rockaway Boardwalk in Queens includes state-of-the-art amenities, a more resilient concrete boardwalk, coastal protection measures and dune plantings.

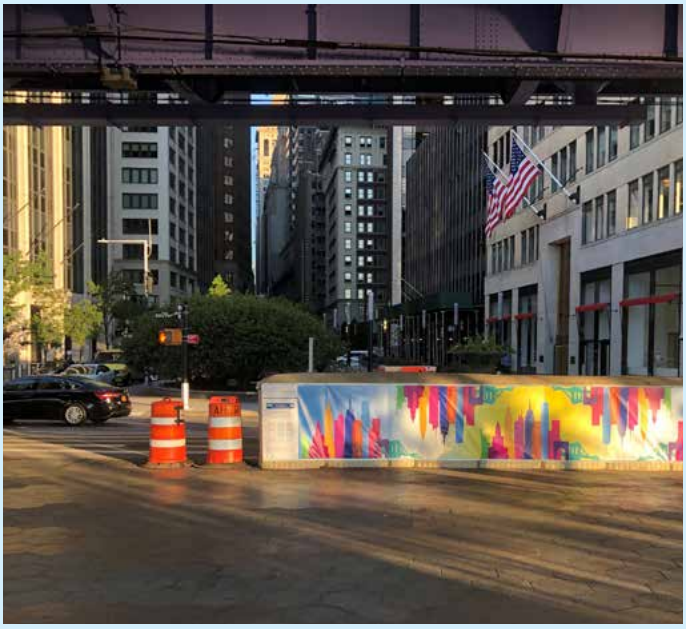
Credit: MOCR

During the planning and design phases of the post-Hurricane Sandy coastal protection portfolio, the City learned a great deal about strategies to reduce coastal flood risk along the waterfront. Every choice came with opportunities and tradeoffs at each stage of the engagement, planning and design process. For example, some projects may change elements that people love about their neighborhoods, including view corridors or the ability to access the water directly. Coastal flood protection projects also may affect maritime activities and commercial uses. Other considerations include the effect on local drainage patterns, limitations presented by existing infrastructure, and land use patterns. Sometimes coastal protection is not the best solution to address a neighborhood's coastal flood risk. Close review and assessment of each neighborhood is needed to understand each location's overall flood risk and social vulnerability. An ongoing partnership between City agencies and communities helps to elevate community priorities and concerns to key decision-makers throughout the planning and design process.

The post-Hurricane Sandy coastal protection portfolio has entered its construction phase. Given different funding sources and varying complexity, the new infrastructure will come online in different stages throughout the 2020s. When completed, neighborhood and citywide coastal protection strategies will be based on multiple lines of defense. Coastal flood protection projects work in tandem with engineering and design features for buildings and critical infrastructure that raise electrical equipment, livable space, offices and other uses higher than projected flood elevations. The built environment is complemented by the actions of infrastructure operators, building management staff and everyday residents through emergency plans for evacuation and the deployment and operation of certain flood barriers. Together with these important elements, coastal protection projects will form a system that integrates into neighborhoods to protect communities from major floods during high tides, severe rainfall events and hurricanes.

A Multilayered Approach to Coastal Flood Protection Systems

Since Hurricane Sandy, the City, in partnership with State and federal agencies, has completed several coastal flood protection projects. These collaborations include the reconstructed Rockaway Boardwalk; a T-groin project in Sea Gate, Brooklyn; a wetlands restoration project in Broad Channel, Queens; beach renourishments in the Rockaways between Beach 92nd and 103rd streets in Queens; street raisings in Broad Channel, Queens; 26 completed Bluebelt projects across three boroughs; and NYCEM's Interim Flood Protection Measures program, which now covers more than 55 sites citywide. The City also has started construction on two large-scale coastal flood protection projects—the East Side Coastal Resiliency Project and the Rockaways - Atlantic Shorefront—with more in the pipeline to begin construction in 2022.



Top Left:
Bluebelt and roadway reconstruction project—"Gateway to the Bluebelt."

Credit: NYC DEP

Top Right:
Interim flood protection measures at The Seaport, Manhattan.

Credit: MOCR

Left:
The Rockaways - Atlantic Shorefront Project being built in Queens in October 2020.

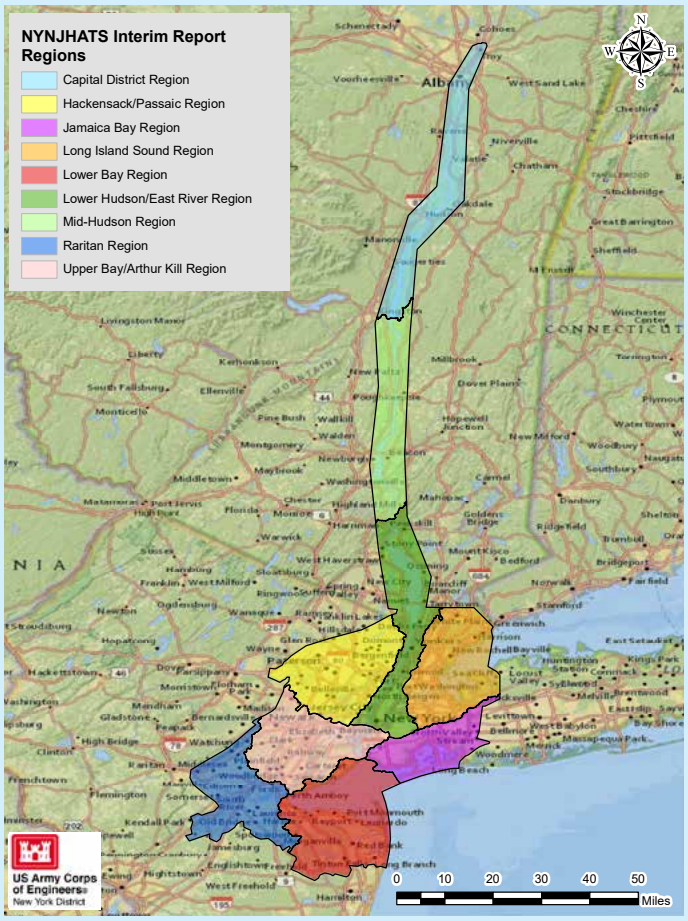
Credit: Michael Appleton/Mayoral Photography Office

Identifying Regional Coastal Flood Protection Solutions

The City is working with the United States Army Corps of Engineers (USACE) on the New York-New Jersey Harbor and Tributaries Coastal Storm Risk Management Study (NYNJHATS), which covers New York Harbor and tidally affected tributaries in NYC, and parts of Long Island, New Jersey and the Hudson Valley. This is incredibly important because the study will identify a regional coastal flood protection approach and provide a vital blueprint for the region's next generation of coastal resiliency.

Since initiating the study, USACE has identified five potential approaches based on elevation analyses, feasibility studies and environmental impact assessments. Most of these potential approaches would be implemented through dozens of individual land-based and water-based projects across NYC and the region. These include projects for which the City has long advocated, such as land-based protections for Long Island City, in-water storm surge barriers in Newtown Creek, the Gowanus Canal, Jamaica Bay and a Coney Island tie-off.

The study restarted in November 2021 after a 20-month pause during which funding had not been allocated by the previous federal administration. The study will enable USACE to select the best approach and publicly announce their choice, known as their "preferred alternative." From there, NYC can begin advocating for federal funding to plan, design and construct this next phase of the city's coastal flood protection.



The study area of the USACE Harbor and Tributaries Study includes 2,150+ square miles and covers more than 900 miles of shoreline. The population of the study area as of 2019 is approximately 16 million.

Credit: USACE

Strategy 4.1
Complete the remaining planned post-Hurricane Sandy coastal flood protection projects, including sites in Red Hook, the Rockaway Peninsula, Coney Island, Staten Island South Shore, the East Side of Manhattan and Lower Manhattan.

Strategy 4.2
Incorporate natural and nature-based features into coastal flood protection projects, where feasible and practicable.

Strategy 4.3
Improve interagency and jurisdictional coordination to encourage effective engagement, implementation, operations and maintenance of coastal flood protection projects.

Strategy 4.4
Work with City, State and Federal partners to identify opportunities for future coastal flood protection projects in the areas of all five boroughs where the greatest potential exists to reduce flood vulnerability.

Strategy 4.5
Explore funding sources for new coastal flood protection projects and their ongoing operations and maintenance.

Goal 5: Expand resilient design practices that allow waterfront buildings and infrastructure to withstand the impacts of coastal storms, increased precipitation, extreme heat and sea level rise

The emerging field of **resilient design** incorporates climate change projections into the design of buildings, landscapes and infrastructure so that structures constructed today are designed to withstand the climate risks they will experience in the future. Resilient design helps protect building occupants and their possessions, reduce wear and tear from increased loads caused by climate change, maintain continuity of service during a severe event, and reduce the magnitude of major damage that may result. NYC's waterfront neighborhoods are exposed to coastal flood risks like those experienced during Hurricane Sandy and other storms. Climate change will continue to exacerbate weather extremes citywide, including risks presented by heavy precipitation and extreme heat. Therefore, ensuring resilient design for new and substantially improved construction forms a cornerstone of climate adaptation strategies in coastal neighborhoods and beyond.

Resilient design: incorporating climate change projections into the design of buildings, landscapes, and infrastructure so that structures constructed today are designed to withstand the climate risks they will experience in the future.

Resilient design principles take into account current conditions and future risks, and will enable neighborhoods and many buildings to remain safe and desirable places to live even as flood risk increases. This includes building-specific design guidelines as well as urban design strategies to maintain active streetscapes in flood resilient areas. The experience of Hurricane Sandy, remnants of Hurricane Ida, and other natural disasters across the country demonstrate that resilient design helps to minimize damage to structures during an extreme weather event and enables them to come back online quickly after extreme weather. Resilient design principles are applied in concert with other tools, including the Coastal Land Use Framework described in Goal 2 and coastal flood protection strategies described in Goal 4. Together, these strategies wil l continue to support the economy and neighborhoods across much of NYC's coastal neighborhoods, including within the 1% annual chance floodplain.

For more information, see "Climate Resiliency and Adaptation Goal 2" on page 65.

"Climate Resiliency and Adaptation Goal 4" on page 89

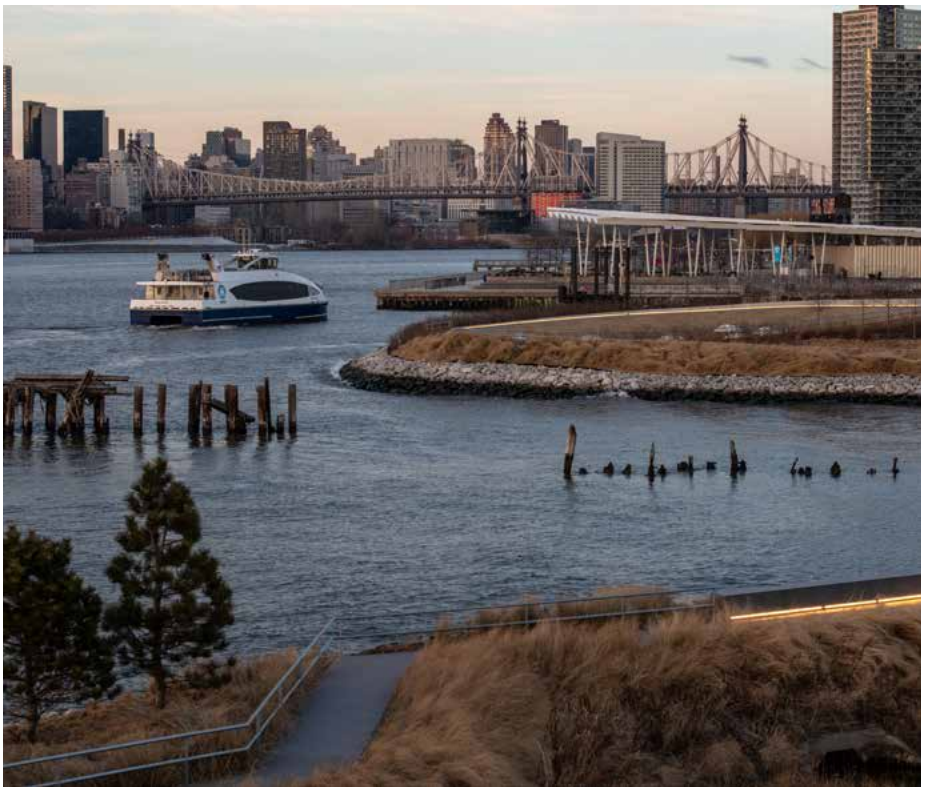
The City is advancing climate policies that will require buildings to be both climate resilient and energy efficient. As of 2014, buildings accounted for 68 percent of carbon emissions in NYC. The **Climate Mobilization Act**, a series of local laws passed in 2019, is designed to reduce carbon emissions and energy consumption within all buildings larger than 25,000 square feet in floor area. In 2021, the ***Climate Resiliency Design Guidelines (Version 4.0)*** were codified in **NYC**

Opposite:
Resilient infrastructure at NYCHA Coney Island Houses, Brooklyn.

Credit: NYCHA

Local Law 41, representing an important learning opportunity and milestone in the early stages of integrating climate risk information and resilient design principles into building codes. The City will collaborate with the private sector to identify the most feasible, cost-effective ways that new and existing buildings could deploy strategies that mitigate both climate risks and carbon emissions.

Expanding resilient design practices also requires planning for future drainage conditions. During heavy rains, higher sea levels may cause stormwater flows to back up through the sewer system and limit the ability of some wastewater resource recovery facilities to operate at full capacity, leading to CSO events that release partially treated sewage into area waterways. Designs for sewer infrastructure must include, whenever possible, projected sea level rise, increased precipitation and frequency of high-intensity storm events. The City will continue to consult with other cities facing similar challenges to exchange best practices for addressing issues related to managing intense rainfall and sea level rise. Efforts include identifying and developing innovative solutions to prepare for more extreme rain events (also known as cloudbursts), that will be exacerbated by climate change.



Hunter's Point Park, Queens.

Credit: Julienne Schaer/
NYC & Company

Strategy 5.1
Further incorporate resilient design principles into all public buildings and infrastructure on the waterfront to ensure that new and retrofitted assets withstand increasing climate risk exposure.

Strategy 5.2
Update local regulations to anticipate future flood risks based on the best available climate risk information from FEMA and the New York City Panel on Climate Change (NPCC).

Strategy 5.3
Accelerate the implementation of resilient design in private buildings by expanding technical, design and financing resources available to property owners and renters in high-heat areas and in areas with flood risk from rainfall and coastal storms.

Strategy 5.4
Identify at-risk neighborhoods for implementation of cloudburst design strategies to improve stormwater management in partnership with MOCR, NYCHA, NYC DOT, NYC Parks, and other City agencies.

Strategy 5.5
Incorporate future rainfall projections into drainage planning, where hydraulically feasible and with other considerations, to help manage future flood risks from increased precipitation.

"What does a resilient waterfront look like to you? For example, the development of the waterfront site for Hunters Point South Park was the reuse of the refuse. The landfill that was created from the excavated material from the Midtsown Tunnel filled the site to a substantial elevation. The park carves into the landfill to create a destination island; a bioswale filtration system was created using tidal sea grasses and planting meandering along the park edges; indirect lighting, eliminating the traditional light posts throughout represent a resilient waterfront."

NYCHA: Spearheading Resilient Design in NYC's Multifamily Public Housing Campuses

Many New Yorkers reside in large, multifamily apartment buildings. Hundreds of these buildings are in the floodplain, and many were affected by Hurricane Sandy. Large-scale investments in recovery and resiliency are underway to ensure that New Yorkers' homes are retrofitted to withstand flooding, maintain power and avoid other costly, dangerous climate impacts. These improvements embody Goal 5 and model how New Yorkers can live safely in the floodplain.

Released in October 2021, ***Climate Change at NYCHA: A Plan to Adapt*** outlines NYCHA's approach to mitigating climate-induced hazards that will impact NYCHA developments and their immediate surroundings. The plan is complemented by NYCHA's ***Urban Forest: A Vital Resource for New York City***, a report on NYCHA's trees and articulation of its commitments to preserve and enhance the benefits they bring to residents and ***Flood Resilience at NYCHA: Memorializing Lessons Learned from the Hurricane Sandy Disaster Recovery Program***, a reflection on NYCHA's Hurricane Sandy recovery work that informs future coastal protection at NYCHA and beyond. Together, these plans outline how NYCHA will adapt its buildings and infrastructure to changing climate conditions, ensure the longevity of current investments, and monitor emerging climate science to adjust and update plans over time.

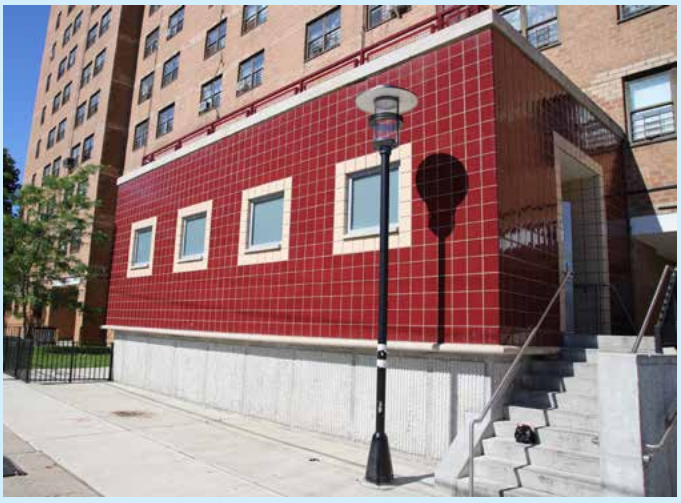
The examples here are from NYCHA, whose $3 billion recovery program is the largest investment in NYC's public housing since its inception. NYCHA's Recovery and Resilience Program represents a transformative case study in how to increase the resiliency of multifamily housing to withstand the impacts of coastal storms. NYCHA's work shows that resiliency measures can be integrated seamlessly into the built environment, help meet sustainability goals, and enhance amenities, all while protecting the buildings that thousands of New Yorkers call home.

Elevated boiler building, with shade structures, community space, green roofs and site improvements serving multiple buildings at Coney Island Houses in Brooklyn
Credit: NYCHA

Passive impermeable barriers below grade stop water infiltration and protect building foundations. This photo shows flexible liners being installed below grade at Wald Houses in Manhattan.
Credit: NYCHA

Generators and solar panels installed on the roof of each building of Ocean Bay Bayside Apartments in Arverne, Queens.
Credit: NYCHA

Structural reinforcement to reduce damage from water and infiltration at (from left to right) Coney Island Houses in Brooklyn, East River Houses in Manhattan, and Lower East Side V Houses in Manhattan.
Credit: NYCHA



Elevated utility annexes serving NYCHA developments at LaGuardia Houses in Manhattan and Coney Island Houses in Brooklyn.
Credit: NYCHA

Zoning for Coastal Flood Resiliency

Zoning for Coastal Flood Resiliency (ZCFR), adopted in 2021, demonstrates how zoning regulations can provide flexibility for existing and new buildings to be more flood resilient. ZCFR provides important new design tools that enable waterfront sites to support resilient shorelines and healthy coastal ecosystems.

Flood-Resilient Buildings and Attractive, Friendly Streetscapes

ZCFR allows neighborhoods to be adapted over time, as individual building owners make decisions based on long-term risks. It advances long-term resiliency by removing impediments that prevented buildings from exceeding minimum flood-resistant construction requirements.

These provisions extend more flexible zoning to all existing and new proposed buildings in the 1% annual chance floodplain to increase options available for designing attractive and flood-resilient buildings that are well integrated into neighborhoods. The zoning relief also allows property owners in the 0.2% annual chance floodplain – an area most likely to fall within the 1% annual chance floodplain by the 2050s – to elevate habitable spaces proactively in residential buildings, as well as mechanical systems and other important building features.

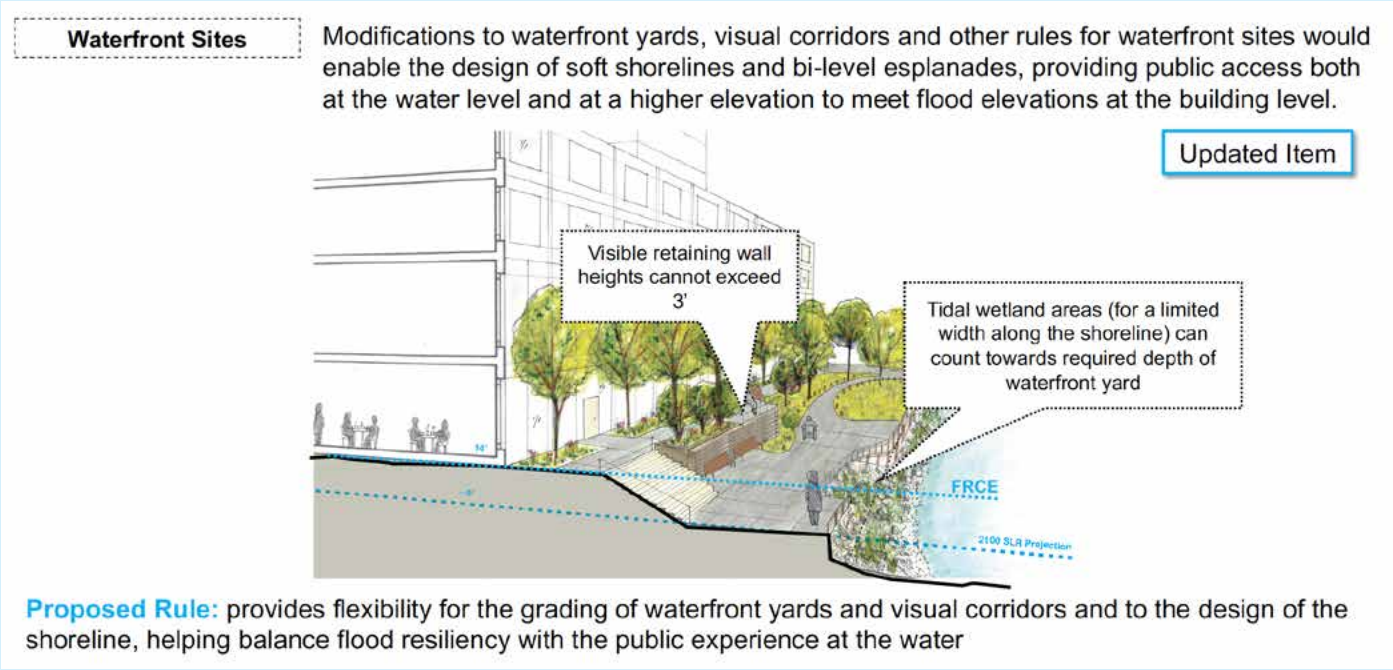
The regulations also enable an improved relationship between elevated buildings and the pedestrian experience at the street level. Ground-floor regulations now further encourage the floodproofing of ground floors so that active non-residential uses can be maintained at the street level, with vertical circulation located inside the building. These regulations are joined with requirements to soften the effect of elevated buildings to support a pedestrian-friendly streetscape.

Credit: NYCDCP

Flood-Resilient Shorelines, Nature-Based Features, and Public Access

ZCFR included modifications to rules requiring public access on developing waterfront sites to enable the design of living shorelines. It also enables the design of bi-level esplanades that provide public access both near the level of the water and at higher elevations. These provisions soften the transition from the streetscape to flood elevations at the building level and include greater flexibility for grading, planting, and locating visual sightlines throughout the site. Together, these provisions balance the need for long-term flood resilience and priorities for public access and circulation.

The regulations also promote the creation of intertidal wetland areas by allowing non-bulkhead treatments such as living shorelines, which can support intertidal habitat and gentler get-downs to the water while attenuating sea level rise and storm driven flooding. The new rules encourage designers to include nature-based shoreline features that bolster healthy ecosystems and can also protect properties and neighborhoods from chronic flooding.

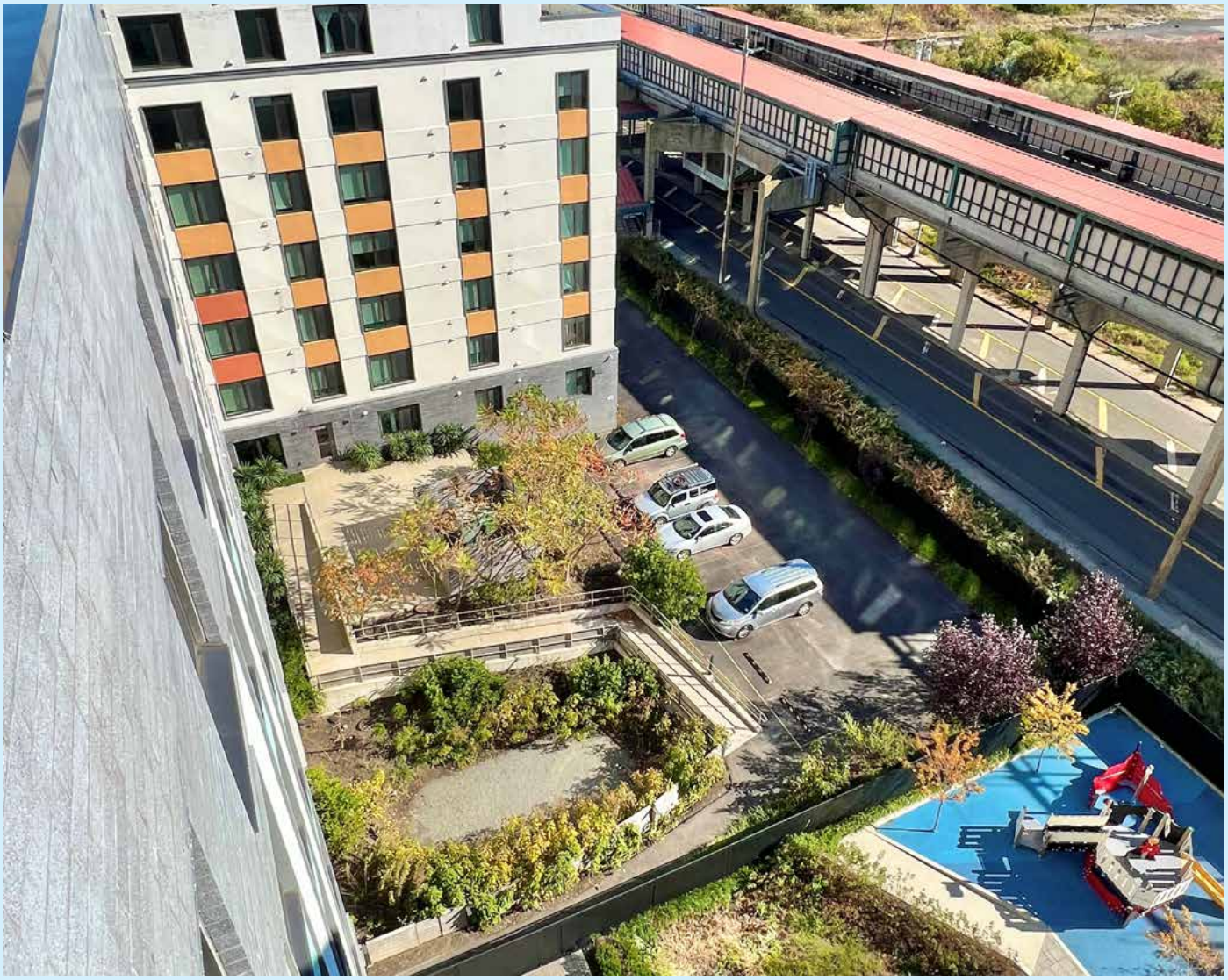


Excerpt from "Zoning for Coastal Flood Resiliency" presentation, NYCDCP

Creating Design Tools for Climate Resiliency

NYC has implemented some of the most progressive climate planning regulations in the nation by incorporating future climate change projections into building codes and zoning regulations. Code updates are on the critical path to ensuring that all new buildings and substantial improvements anticipate future climate hazards based upon their use and useful life, backed by science and experience.

To date, most local regulatory reforms have focused on minimizing exposure to coastal storm surge risk. For example, after Hurricane Sandy — and again in 2021—the New York City Department of Buildings (DOB) expanded minimum freeboard requirements. These requirements ensure a level of protection for different classes of buildings above the flood elevation. In parallel, the City is exploring how resilient design practices can be applied to other climate risks, including stormwater floods, high tide flooding and extreme heat. Based on its research, the City will continue to update its building code to make resilient design an integral part of design and construction.



Wetland plantings, porous paving, and structural soil at Beach Green Dunes in Queemns help to mitigate flooding by absorbing stormwater and lowering groundwater.
Credit: Local Office Landscape + Urban Design

Defining Resilient Design for NYC

The ***NYC Climate Resiliency Design Guidelines*** ("Guidelines") translate future climate change projections into technical guidelines to be used by engineers and architects in designing buildings, landscapes and infrastructure. These Guidelines go beyond existing code requirements and will encourage the design of new City facilities—like schools, libraries, bridges and affordable housing developments—that can withstand the climate threats of the future.

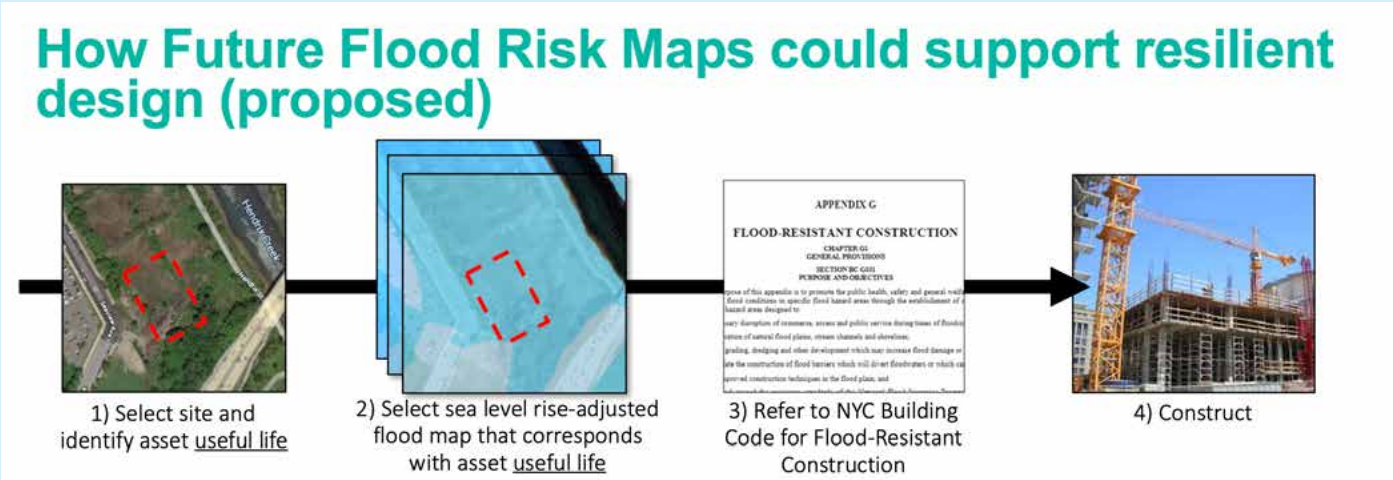
Following nearly five years of refinement and testing of the Guidelines, with active partnership and participation with more than fifteen City agencies, the de Blasio administration partnered with City Council to pass Local Law 41 of 2021. This Local Law mandates that all City capital projects will be built to the Guidelines' resilient design standard starting in 2026. A five-year pilot program featuring 40 projects across twenty agencies will allow MOCR to apply the Guidelines' resilient design criteria, develop a new resiliency scoring system, and test methods for determining the most cost-effective approaches to use in the future.

Local Law 41 of 2021 will ensure that public dollars will be spent on projects that are intentionally designed to withstand future climate risks. This mandate is also an important step towards broader implementation of resilient design. A staged rollout of the mandate for City projects offers an opportunity for the City engineers, planners and policy makers to learn by doing and identify how best to integrate climate risk information and resilient design principles into mandatory building codes for all public and private buildings and NYC infrastructure. This upfront resilient design investment is particularly valuable for City facilities that provide essential services to New Yorkers, and that are required to operate or return online quickly during and after extreme weather events.

Creating a New Kind of Design-Focused, Future Flood Risk Map

Like most cities in the United States, NYC currently relies on FEMA's FIRMs to define its floodplain for the purposes of construction codes. However, these maps are based on historical weather data and do not incorporate forward-looking climate projections. As the City continues to update its building and zoning regulations, it needs new design maps that account for future risk to regulate the design of buildings and infrastructure. This is important because buildings and infrastructure are typically designed to last for many decades and will experience more severe climate conditions as they advance through their useful life.

To account for increasing flood risk caused by climate change, the City is partnering with FEMA to develop Future Flood Risk Maps (FFRMs). Once finished, these maps will provide property-specific information on future flood risk and will replace the FIRMs as NYC's new flood reference maps for its building code. The FFRM maps will be a key part of making flood-resilient design a part of all new construction and substantial improvement and will complement existing resources like the "**Flood Hazard Mapper**" and **FloodHelpNY.org**.



Credit: MOCR

Goal 1: Broaden awareness of climate risks and how New Yorkers living and working on the waterfront can take action to adapt to the impacts of climate change

Strategy 1.1: Build a common understanding of local climate risks through sustained conversations between waterfront residents, community leaders, climate and social scientists, private practitioners and government agencies through various programs and platforms.

Strategy 1.2: Expand access to information and other resources for residents and small businesses about flood and heat risks, including timely, accessible information about flood insurance, flood preparedness, heat health and building retrofits.

Goal 2: Apply an understanding of systemic climate vulnerabilities to guide land use policies and infrastructure investments in coastal areas

Strategy 2.1: Coordinate climate risk-informed land use policy with public investments in development and infrastructure.

Strategy 2.2: Employ the Coastal Land Use Framework to align development and public investments in housing and infrastructure in coastal neighborhoods with future flood risks. Regularly update the framework with the best available climate risk information and evolving understanding of systemic climate vulnerabilities.

Strategy 2.3: Identify adaptation needs, actions and resources for public infrastructure systems. Align target service levels and other adaptation actions to the Coastal Land Use Framework.

Goal 3: Preserve and create new housing for a mix of incomes in appropriate locations and provide waterfront residents with new resources to manage flood impacts on their homes

Strategy 3.1: Help meet NYC's need to preserve and create new housing for a mix of incomes in appropriate locations to encourage healthy, equitable and resilient waterfront neighborhoods.

Strategy 3.2: Establish programs for renters and property owners in waterfront neighborhoods that are informed by meaningful engagement and neighborhood planning.

Strategy 3.3: Promote housing stability through flood retrofit and housing mobility services, prioritizing low- and moderate-income households that are affected by chronic high tide flooding and other compound flooding risks.

Goal 4: Identify opportunities for coastal flood protection, where feasible and practicable, to manage the impacts of coastal storm surge and high tide flooding

Strategy 4.1: Complete the remaining planned post-Hurricane Sandy coastal flood protection projects, including sites in Red Hook, the Rockaway Peninsula, Coney Island, Staten Island South Shore, the East Side of Manhattan and Lower Manhattan.

Strategy 4.2: Incorporate natural and nature-based features into coastal flood protection projects, where feasible and practicable.

Strategy 4.3: Improve interagency and jurisdictional coordination to encourage effective engagement, implementation, operations and maintenance of coastal flood protection projects.

Strategy 4.4: Work with City, State and Federal partners to identify opportunities for future coastal flood protection projects in the areas of all five boroughs where the greatest potential exists to reduce flood vulnerability.

Strategy 4.5: Explore funding sources for new coastal flood protection projects and their ongoing operations and maintenance.

Goal 5: Expand resilient design practices that allow waterfront buildings and infrastructure to withstand the impacts of coastal storms, increased precipitation, extreme heat and sea level rise

Strategy 5.1: Further incorporate resilient design principles into all public buildings and infrastructure on the waterfront to ensure that new and retrofitted assets withstand increasing climate risk exposure.

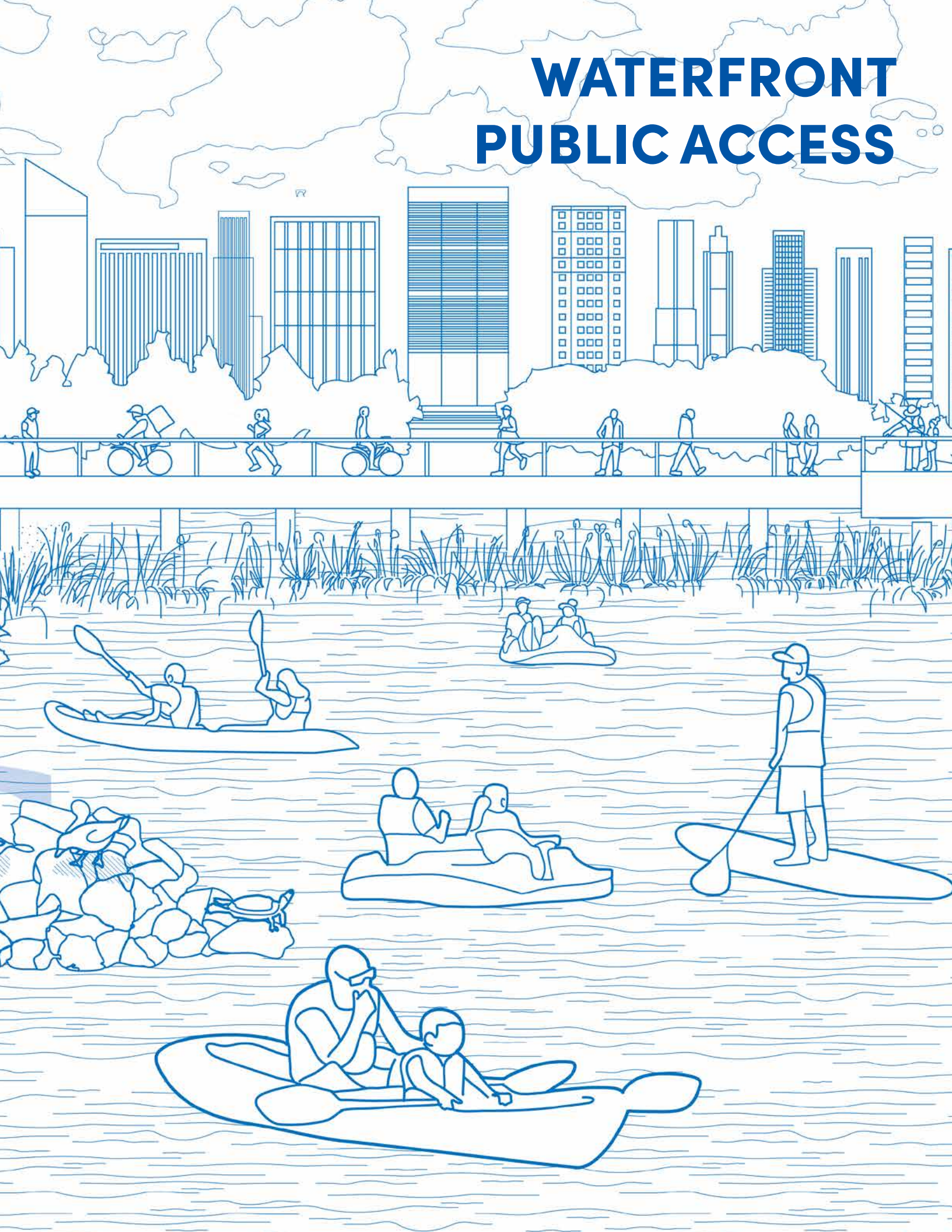
Strategy 5.2: Update local regulations to anticipate future flood risks based on the best available climate risk information from FEMA and the NPCC.

Strategy 5.3: Accelerate the implementation of resilient design in private buildings by expanding technical and design resources available to property owners and tenants in high-heat areas and in areas with flood risk from rainfall and coastal storms.

Strategy 5.4: Identify at-risk neighborhoods for implementation of cloudburst design strategies to improve stormwater management in partnership with MOCR, NYCHA, NYC DOT, NYC Parks, and other City agencies.

Strategy 5.5: Incorporate future rainfall projections into drainage planning, where hydraulically feasible and with other considerations, to help manage future flood risks from increased precipitation.

WATERFRONT PUBLIC ACCESS



NYC's hundreds of miles of waterfront parklands, public spaces and recreational in-water access sites are critical resources. They supply New Yorkers with valuable open space, recreational amenities and community gathering spots. These parks range from world-renowned destinations to discrete kayak launches. Ensuring that the City continues to improve and expand its network of parklands, greenways and public access areas is essential to connecting New Yorkers to the important economic, environmental and civic roles the waterfront plays in their daily lives.

Increased emphasis on inclusive design practices, expanded capacities for community-based waterfront stewardship and targeted strategies to link disconnected neighborhoods safely to their waterfronts can ensure that the benefits of open space and in-water access are more equitably distributed citywide.

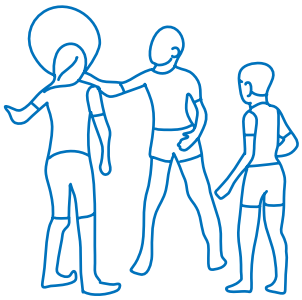
Goal 1: Expand public access to the waterfront with an emphasis on equity by bridging access gaps in historically underserved areas and supporting growing waterfront communities

Goal 2: Promote opportunities to get onto and into the water

Goal 3: Shape design and programming of public waterfront open spaces to reflect public use needs

Goal 4: Promote good stewardship of public spaces on the waterfront

Overview



NYC has experienced a waterfront renaissance over the last few decades driven by the waterfront's role in NYC's economic growth and New Yorkers' never-ending curiosity and desire to reconnect with forgotten waterways. Today, NYC's waterfront consists of a green network of parks and open spaces that spans all five boroughs and rivals that of any other global coastal city.

At the heart of this green network are dozens of public parks maintained on City-owned land, including 160 miles of shoreline parkland. These sites range from large destination parks that provide waterfront access for numerous communities to neighborhood "pocket" parks that provide space for quieter moments of reflection. Many of these smaller parks—like Richmond Terrace Park on Staten Island and Bridge Park South in the Bronx—are the products of reclaiming vacant or underutilized shoreline lots and turning them into vibrant new spaces.

This network of open spaces also includes State and national parks located within NYC. Roberto Clemente State Park in the Bronx, Shirley Chisholm State Park in Brooklyn and Gantry State Park in Queens are waterfront parks overseen by the New York State Office of Parks, Recreation and Historic Preservation (OPRHP). Much of Jamaica Bay and several adjacent parklands are part of the Gateway National Recreational Area, which is overseen by the National Park Service (NPS).

Interspersed throughout NYC's public parklands are open spaces on other City-owned sites and a growing mix of dynamic, publicly accessible open spaces on private waterfront sites. Together, these open space resources form a network that serves New Yorkers by providing access to an increasingly available waterfront. This wide range of passive and active amenities provides an increasing number of opportunities for people to get directly to the water's edge, put a boat in the water or learn more about the critical ecological and economic roles that NYC's waters play.

Over the last few decades, NYC has demonstrated its ability to take innovative approaches to building world-class waterfront parks that bring millions of residents and visitors to NYC's shoreline. Brooklyn Bridge Park and Hudson River Park have grown and thrived over the last decade and are now seen by the public as grand "porches" from which to experience the East and Hudson rivers, respectively. Groupings of parks and open space along the Brooklyn and Queens East River waterfronts—anchored by increasingly popular destinations such as Domino Park, Bushwick Inlet Park, Hunter's Point South Park and Gantry State Park—are now used as everyday

destinations for New Yorkers and tourists who want to play or picnic by the water. Some of the most important neighborhood waterfront parks (like Barretto Point Park in the Bronx and Valentino Pier Park in Brooklyn) connect area residents to their waterfronts. These parks may not be as well-known beyond their neighborhoods, but they serve as critical lifelines to the water for local residents. Many are the result of community-led initiatives to reestablish neighborhood waterfront connections that were severed long ago.

In addition to creating new parks, the City works hard to improve the health of NYC waterways located near those parks by restoring the ecology of nearby wetlands and natural shorelines. Hunter's Point South Park and Sunset Cove in Queens, Ecology Park in Brooklyn and Pier 26 in Manhattan's Hudson River Park are all located near restored wetlands and intertidal habitats that help NYC's marine ecosystems thrive. Because healthy waters make it safer for people to get onto the water, the City has also expanded infrastructure that supports recreational water access, such as floating docks, get-downs, boat ramps and boat tie-ups. This infrastructure, along with an increase in the number of boating clubs and youth-focused paddling initiatives, has made it easier and safer for New Yorkers to launch watercraft into NYC's rivers and bays today than at any other point in the last century.

Although there are still barriers that render stretches of NYC's waterfront inaccessible to adjacent communities, recent neighborhood and citywide strategies to improve connectivity continue to help the City rethink how best to use its publicly owned waterfront resources. The clean-up and revitalization of vacant and industrial waterfronts have contributed to filling many of NYC's historic access gaps, helping to advance the collective goal of equitable access to the waterfront.

Left:
Little Island at Pier 55, Manhattan.

Right:
Van Pelt Plaza at Richmond Terrace Park, Staten Island.

A 10-Year Vision

To guide decision-making as the City plans for the expansion of waterfront public access and open space over the next 10 years, this plan outlines three key considerations:

1. Ensuring that future investments and strategies to expand waterfront access continue to address inequities in community access and inclusive design.
2. Acknowledging the effects of climate change and the vital role NYC's waterfront parklands play in adapting to new realities.
3. Advancing recreational water access opportunities to redefine "waterfront access."

Equity and Inclusivity

Over 2 Million New Yorkers live within a half-mile walk of a waterfront park or open space access point.

Nearly 3 million New Yorkers live within a half-mile's walk to the waterfront, and more than 2 million of those residents can access at least one safe, formally designated waterfront park or other waterfront public open space. Often these waterfront spaces are the most significant open space options within walking distance — highlighting the importance of these crucial resources in coastal communities. But no walk-to-waterfront access exists for the remaining 800,000 residents who live within a half-mile's walk of the shoreline. Areas lacking access are often less wealthy and likelier to consist of relatively larger communities of color when compared to those communities with convenient waterfront access. These factors indicate that often a lack of waterfront open space parallels other societal inequities.

Waterfront accessibility in NYC varies widely by borough. More than 90% of Manhattan residents within a half-mile of the waterfront can walk to open spaces on the water, but fewer than half of Bronx residents and only about half of Staten Islanders living within that same distance have pedestrian-accessible public access options. Even within Manhattan, much of which is ringed by public parkland, economic disparities exist between neighborhoods with and without waterfront access.

More equitable waterfront access requires going beyond solely expanding physical access at the waterfront, ensuring that waterfront areas are responsive to the specific needs and priorities of underserved communities. Public and institutional support for community-based organizations can help to promote active community stewardship of public spaces. Increased educational programming for schools and local youth groups is essential to create long-lasting connections between communities and their waterfronts. Similarly, a holistic design and planning approach is needed to understand how upland neighborhood conditions support (or negatively affect) waterfront access.

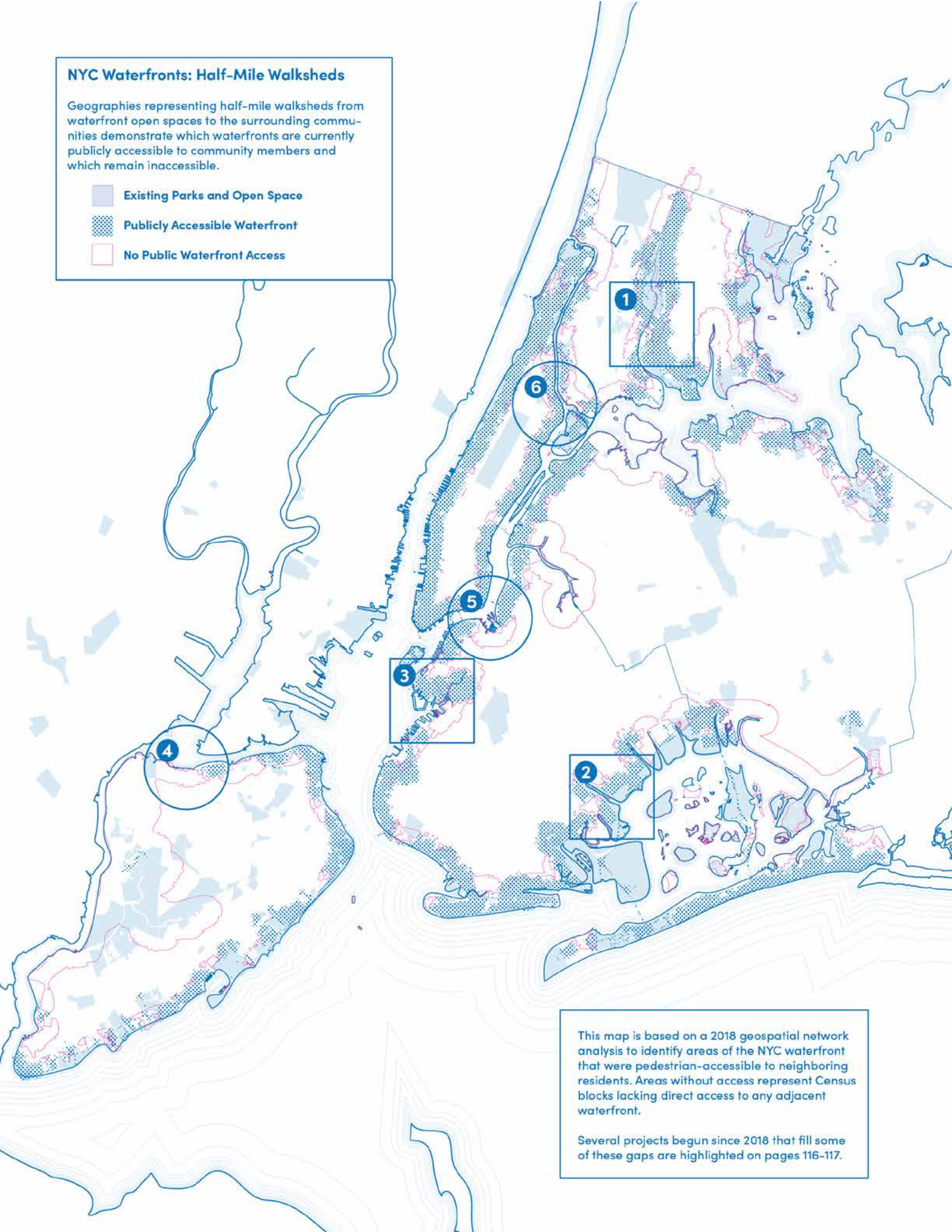
Connecting Communities to their Waterfronts

More than 1,200 formal waterfront park entrances and access points are available to New Yorkers across all five boroughs. Some larger parks, like Hudson River Park, have many entrances at cross streets, but most parks are accessible at only a few entry points. A lack of safe pedestrian upland street conditions or poor transit connectivity greatly affects park accessibility. Currently, many stretches of the waterfront remain entirely inaccessible to the public today because safe, formally designated public access points or open spaces are lacking.

Varying shoreline conditions and historical development patterns require a wide range of strategies to connect neighborhoods to their waterfronts. Active industrial waterfronts may need to leverage existing City-owned sites and flexible design guidelines. Former waterfront industrial areas undergoing redevelopment with commercial and residential uses are generally subject to zoning requirements that require providing public access.

Constructed or natural barriers along waterfronts like elevated highways or steep cliffs necessitate their own creative solutions to expanding public waterfront access. These conditions require rethinking how aging transportation infrastructure along NYC's waterfront is rebuilt in the future to incorporate safe pedestrian and bicycle access to the waterfront and how natural area protections are balanced with physical access. Ways to expand waterfront access in lower-density neighborhoods or areas with privately owned shorelines are comparatively limited, requiring more opportunistic strategies.

2019 Red Hook Regatta, Valentino Park and Pier, Brooklyn.


NYC Waterfronts: Half-Mile Walksheds
Geographies representing half-mile walksheds from waterfront open spaces to the surrounding communities demonstrate which waterfronts are currently publicly accessible to community members and which remain inaccessible.
Existing Parks and Open Space
Publicly Accessible Waterfront
No Public Waterfront Access
1
2
3
4
5
6
This map is based on a 2018 geospatial network analysis to identify areas of the NYC waterfront that were pedestrian-accessible to neighboring residents. Areas without access represent Census blocks lacking direct access to any adjacent waterfront.
Several projects begun since 2018 that fill some of these gaps are highlighted on pages 116-117.

Envisioning A More Equitable and Accessible Waterfront

A Half-Mile Waterfront for Many but Not All

Nearly 3 million New Yorkers live within a half-mile of their shoreline, but more than 800,000 of them still lack access to a waterfront park space to which they can walk.

Plugging these open space gaps will provide thousands of New Yorkers living in coastal communities with access to their waterfronts. Successfully doing so will require addressing historic community inequities and long-standing concerns around the safety and appropriateness of access along some waterfront areas. Strategic planning will be needed as the City reevaluates the future of our shoreline infrastructure, including aging elevated highways and other physical structures that create barriers between communities and their waterfronts. Success will require leveraging a variety of tools and strategies aimed at designing new and improved waterfront open spaces, while continuing to balance other important long-term waterfront planning priorities.

1 West Farms Rapids: Focused Parkland Improvements Connect New Communities

Recent improvements to West Farms Park in the Bronx included new access points and bikeway and pedestrian paths along the Bronx River that connect to other parklands. The project also included restoration of sections along the riverbank of the city's only freshwater river. This new park now connects an additional 18,600 people in West Farms and the surrounding neighborhoods to a public waterfront park space.

2 Canarsie West Trail Connector: Designing Around Coastal Barriers

This NYC Parks project constructed a pedestrian and bicycle greenway path to connect Canarsie residents and Canarsie Park users safely to the Shore Parkway Greenway and Jamaica Bay. This project, part of a larger ecological restoration and planting effort, provides a safe, multiuse path beneath the Belt Parkway, where no direct access for community residents existed previously.

3 Gowanus Waterfront Access Plan: Leveraging Redevelopment for New Public Access

The Gowanus Waterfront Access Plan creates tailored design and zoning requirements that ensure waterfront public access along a significant portion of the Gowanus Canal as it redevelops over time. The regulations are designed specifically to fit the unique character of this narrow waterbody, address climate impacts from sea level rise, support diverse shoreline treatments to help the Canal's ecological revitalization, and facilitate interconnectivity among a mix of uses, parklands and public facilities.

Connecting New Yorkers to Their Waterfront

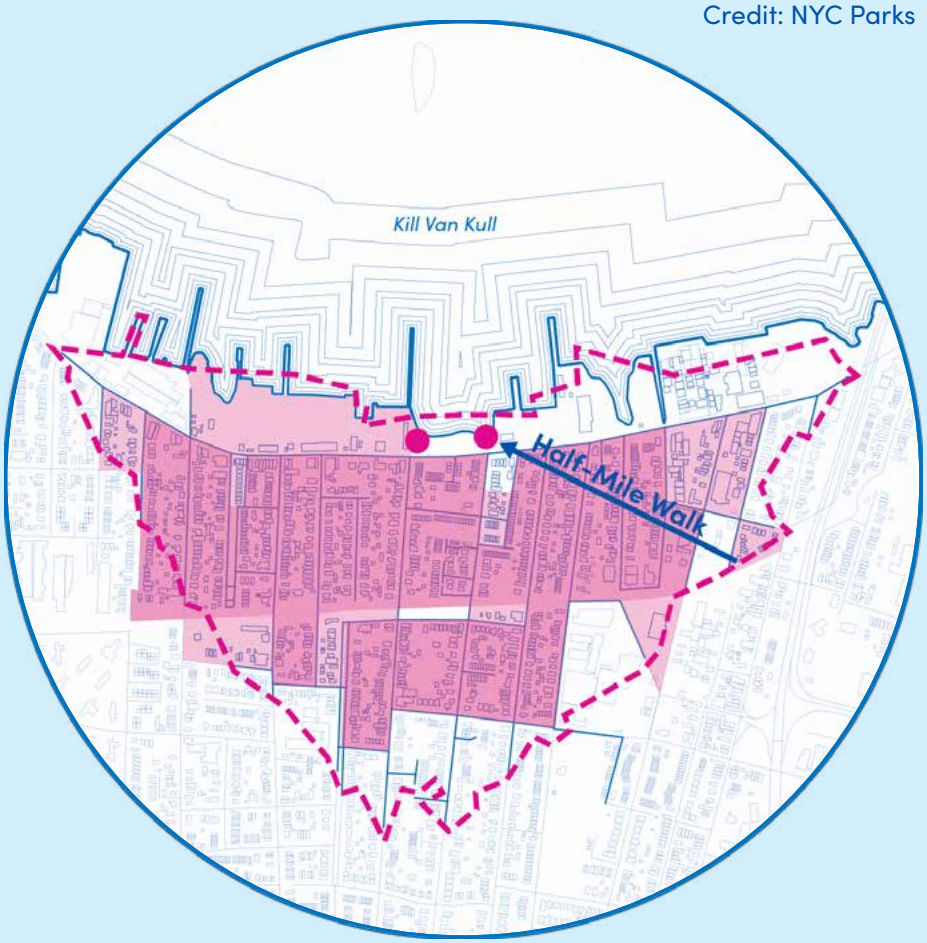
How can we measure communities' connectivity to their waterfront? Recent waterfront access projects demonstrate how targeted strategies can help plug existing gaps in waterfront access and create new waterfront parks and public open space within walking distance of thousands of New Yorkers who lacked access.

Disconnected Population with New Waterfront Access

- 1000+ Residents
- 101 - 1000 Residents
- 1 - 100 Residents
- Not Populated
- New Waterfront Public Access Entrance
- Half-mile Walkshed
- Beyond Walkshed or Has Other Waterfront Access

Richmond Terrace
Credit: NYC Parks

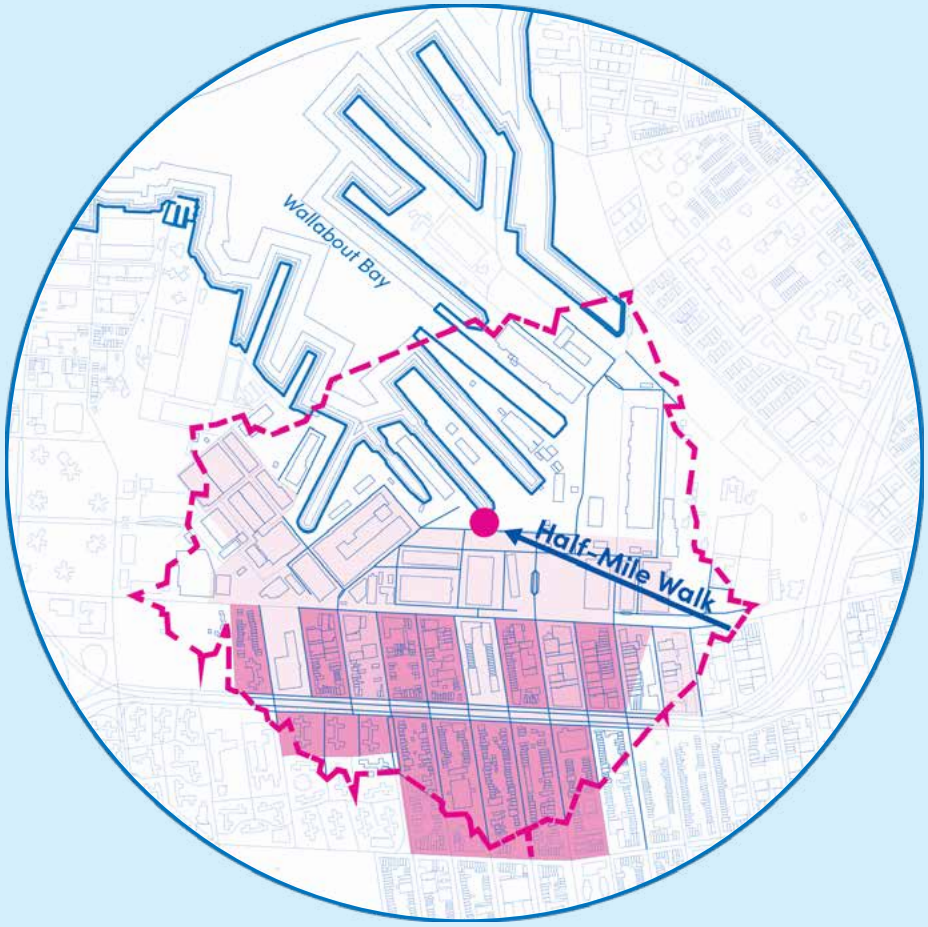
Capital Funding for Parks: Richmond Terrace Park Staten Island



Richmond Terrace Park was recently created out of existing woodlands on Staten Island's North Shore to serve the neighboring Mariners Harbor community along an industrial stretch of waterfront. This parkland and its scenic views of the harbor provide access to over 4,000 residents within a half-mile of its entrance who previously lacked access.

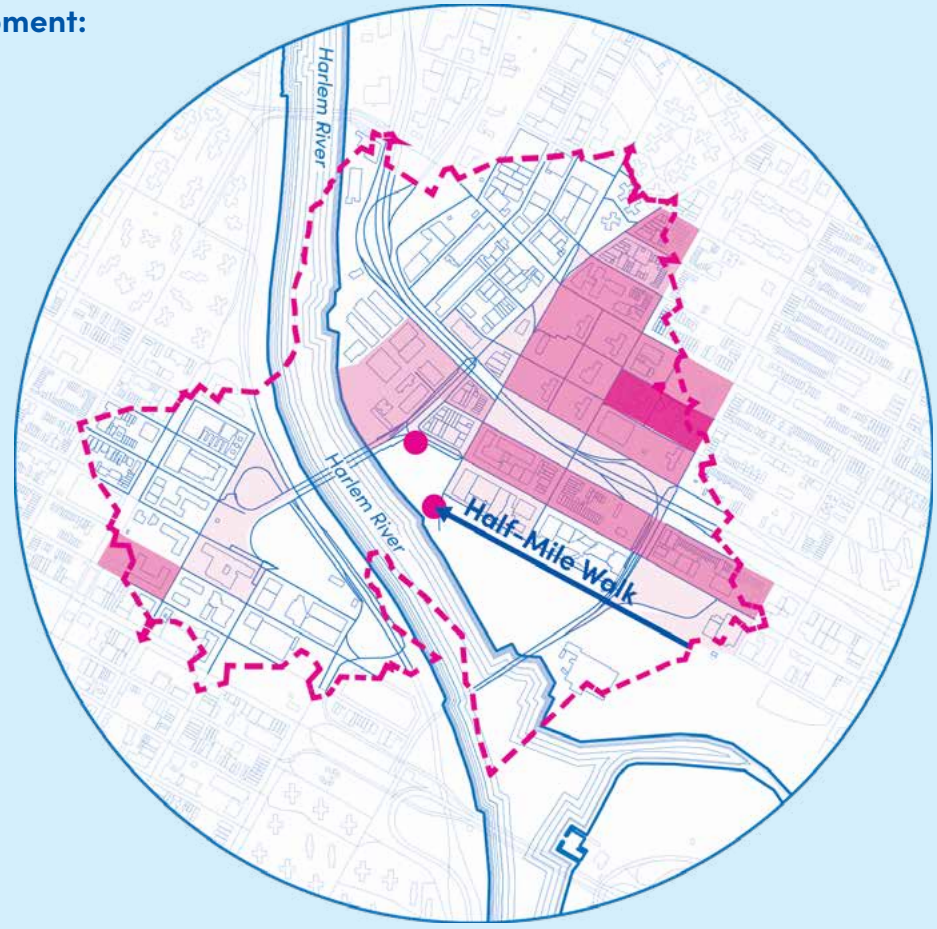
Partnering on City Owned Sites:
Dock 72, Brooklyn Navy Yard
Brooklyn

A new waterfront open space was completed in 2019 alongside the development of the Dock 72 mixed-use office building at the Brooklyn Navy Yard (BNY), a City-owned industrial and innovation campus. It provides open space for BNY's thousands of workers, surrounding residents and ferry commuters.



Leveraging Waterfront Development:
101 Lincoln Avenue
The Bronx

A Waterfront Public Access Area (WPAA) currently under construction as part of a new development will extend waterfront access to over 7,200 residents currently living within a half mile of its entrances who lack access today. The public walkway will continue northwards to neighboring sites as part of the Harlem River Waterfront Access Plan.



Parks in the Face of a Changing Climate

NYC's waterfront parklands are crucial recreational resources for New Yorkers that also play an important role in protecting NYC from future sea level rise and storm-driven flooding. While rising sea levels threaten New Yorkers' use of their parks, design practices and materials can be adapted to both manage flooding as well as to create better, more resilient parks. Parkland shoreline design can incorporate natural features such as wetland marshes, which at scale can help break and reduce wave action. Shorelines can be designed to accommodate and even thrive from rising sea levels. Selectively elevating circulation paths and active recreational use areas above floodable spaces can facilitate public access to parks even during high tides in the future.

Parks will continue to be a crucial component in developing and implementing effective coastal protection strategies. Reconstructing NYC's parks to support coastal flood protection could require regrading and elevating certain parkland features, incorporating more salt-tolerant plant species, and ensuring that flood events present minimal risk to electrical and recreational equipment. Preserving and improving public access to the maximum extent feasible will be a continued priority to keep waterfront parks resilient and accessible.

Maintenance, operations and regulations will also be adapted to support the long-term requirements of waterfront parks and public spaces. The materials and techniques used to construct park spaces in increasingly wetter and more volatile conditions will require updated engineered solutions. Nature-based ecological strategies will require all governmental and community-based land stewards to have increased resources and maintenance capacities.

Boardwalk and beach dunes at Rockaway Beach, Queens reconstructed after Hurricane Sandy.

Credit: NYC Parks

Pushing Beyond the Shoreline: Getting on the Water

As commercial and residential use of the waterfront and the popularity of NYC's waterfront park system continue to grow, New Yorkers will have increasing opportunities to connect to the water. Greater recreational water access, such as adding more locations to launch a kayak or touch the water, requires careful consideration. Traditional sheet-pile bulkheads (heavy materials, such as steel or concrete, driven deep into the ground along the shoreline to create a strong separation between the land and the water) will continue to be necessary in many areas. Elsewhere, riprap shorelines (human-placed stones or boulders to prevent soil erosion) may be used to provide coastal protection while maintaining access to the water. Intertidal marsh plantings and other natural materials may be needed to stabilize shorelines, accommodate get-downs to the water and promote marine habitat. Ecological opportunities must be balanced with growing climate challenges and the wide range of upland activities that must be supported.

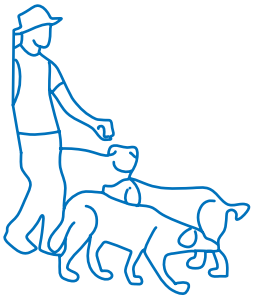
Pebble Beach at Brooklyn Bridge Park, Brooklyn.

Goals and Strategies

Goal 1: Expand public access to the waterfront with an emphasis on equity by bridging access gaps in historically underserved areas and supporting growing waterfront communities

Redefining Access

As NYC's relationship to its waterfront has evolved, so has New Yorkers' expectations of what "waterfront access" means. Historically, emphasis on vehicular movement, frequently parallel to the waterfront, has limited who could meaningfully reach the water. More recently, however, significant investments have been made to provide safe crossings and pathways for pedestrians, cyclists and transit users of all abilities. Through zoning updates, public improvements, and improved agency coordination, the City has pushed to integrate open space more closely with new waterfront development and to take a more holistic approach in designing NYC's parks and open spaces to maximize connectivity and accessibility.



Waterfront access is not simply a matter of providing pathways to the water's edge. New accessibility strategies can blur the distinction between a waterfront park space and the water itself by preserving or reintroducing intertidal shoreline habitats to connect visitors with a shoreline's ecology. To bring a sense of ownership and belonging to all New Yorkers — including those who live further away from the waterfront — the City will continue investing and partnering to improving upland linkages, wayfinding down to the water and transit infrastructure and service planning to waterfront destinations.

Using universal design guidelines, the City and other partners strive to make parks increasingly accessible to all New Yorkers regardless of physical ability. To strengthen the role of parks as community gathering areas and nodes of civic and educational engagement, the City and its partners are implementing inclusive programming, user amenities, and design features that reflect the needs of all residents.

Visual access — clear, unobstructed sightlines down to the waterfront — is another important layer that expands connectivity. Visual corridors typically overlap with streets and other upland connections to guide people safely to the water. Where physical access to the water cannot be achieved immediately — such as along active maritime industrial sites — visual connectivity can provide communities with an opportunity to see and engage with their waterfronts and form a meaningful connection.

Opposite:
"Fish Parade" event at Baretto Point Park, The Bronx.

An Evolving Waterfront Means New Opportunities for Public Spaces

NYC's major waterfront industrial campuses continue to be important in sustaining and growing manufacturing, maritime activities, and other industrial uses. As these job centers have grown, they have attracted innovative technology, creative, food and beverage, life science manufacturing and design companies. The mix and diversification of these workforces and their need for offices and services have reactivated adjacent waterfronts and sparked new opportunities for waterfront access.

The Sunset Park neighborhood of Brooklyn is one example. In the past, Sunset Park residents never had safe passive or active recreational waterfront access due to the neighborhood's legacy of heavy industry and the intensive use of the shoreline to transport and distribute bulk cargo from across the harbor. Recent investments by the City to expand and improve Bush Terminal (a historic hub of Sunset Park industry) — along with the launch of the Made in NY Campus — supported the rehabilitation of the former port complex into Bush Terminal Piers Park, which opened in 2014. Today, the park offers crucial neighborhood open space with views of tidal pools, the Bay Ridge shipping channel, vegetated areas for exploration and ballfields for active recreation.

Further north in Brooklyn, the Brooklyn Navy Yard has undergone unprecedented growth to establish itself as one of the most innovative industrial campuses in the nation, drawing both a diverse group of tenants and visitors. Among the first opportunities for targeted waterfront investment here was the new park space constructed

Bush Terminal Piers Park, Brooklyn.

behind the Dock 72 building, which was further linked by a new passenger ferry landing. More recently, redevelopment of the Barge Basin is planned, which will revitalize the northeast section of the Yard and create a publicly accessible esplanade. This project will connect to the Brooklyn Greenway and offer waterfront recreational amenities for the surrounding Wallabout and South Williamsburg neighborhoods and nearby Farragut Houses community, all historically cut off from the waterfront. To plug gaps in NYC's public access network, continuing to identify opportunities for targeted investments, particularly on publicly owned land, is an important strategy.

Film and television production is an example of a growing economic engine well suited to operating on sites that are no longer used for other legacy industrial activities. As new production facilities are established, the City is working with property owners to create new public waterfront spaces that open previously inaccessible stretches of waterfront while still accommodating these facilities' specific constraints and operational needs.

Waterfront parklands have also become important host sites for the growing NYC Ferry network. These sites integrate new ferry landings with much-needed pier and shoreline improvements. New connections between waterfront parks provide ferry passengers with easy access to Brooklyn, Manhattan, Queens and the Bronx without ever leaving NYC's vast waterfront park system.

"Prioritizing public access on city-owned sites is a great idea, even in areas that support the working waterfront. It shouldn't be a universally mandatory requirement but there are some creative ways to provide public access without impeding the working waterfront."

Soundview Ferry Terminal at Classon Point Park, The Bronx.

Waterfront Zoning: An Important Tool for Expanding Access

Zoning regulations are another way that the City expands waterfront public access for New Yorkers. Waterfront public access areas (WPAAs) are public waterfront open spaces that are required to be constructed as a condition of redevelopment of most commercial and higher-density residential waterfront sites. Over the last 20 years, dozens of WPAAs have been built across all five boroughs, comprising more than 1 million square feet of public open space and recreational amenities. WPAAs provide quality, publicly accessible open spaces primarily in communities experiencing new waterfront development. Together with NYC's public parklands, WPAAs have contributed significantly to expanded waterfront access.

Since their creation in 1993 in the NYC Zoning Resolution, Waterfront Public Access Areas (WPAAs) have added over 1 million square feet of public waterfront open space citywide.

The earliest WPAAs (built in the 1990s) consisted primarily of hardscaped, linear esplanades elevated above the water behind sheet-pile bulkheads. Linear physical access remains an important open space feature by connecting adjacent park spaces and ensuring accessible circulation along the entirety of a shoreline. However, in the last few decades, property owners, community groups and designers have made significant advances and innovations in WPAA design. Programmed to reflect diverse landscapes, topographies and marine habitats, many recent WPAAs are dynamic new spaces offering a great variety of multifunctional uses and amenities for a broad range of users.

Adjoining WPAAs can be developed individually or be planned as part of a larger Waterfront Access Plan (WAP), an important zoning tool that allows for public access requirements to be tailored across multiple waterfront sites. WAPs and zoning Special Districts have been used carefully to tailor public access design and bulk requirements to reflect unique waterfront conditions and community needs, which allows for more predictability regarding the location of future access points and public amenities.

Learn more about ZCFR at "Zoning for Coastal Flood Resiliency" on page 100 and at nyc.gov/zcfr

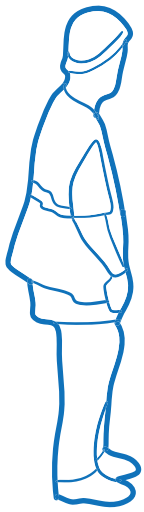
NYCDCP's Zoning for Coastal Flood Resiliency (ZCFR) project, a set of amendments to zoning regulations adopted by the City Council in May 2021, reshaped regulations to encourage waterfront property owners to design greener, more ecologically responsive shorelines by incorporating intertidal habitats and step-downs to bring the public closer to the water. The interweaving of marine ecology, flexible pedestrian circulation and ecologically oriented plantings all expand opportunities for physical access to the water.

Provisions in ZCFR also reflect how zoning can support implementation of waterfront public spaces that are better designed to mitigate the impact of sea level rise and manage tidal habitats.

Practical solutions include elevating lawns and circulation paths, grading sites to meet higher design elevations and incorporating intertidal habitats.

New waterfront zoning regulations were introduced in the 1993 Comprehensive Waterfront Plan for property owners developing waterfront sites. The regulations required publicly accessible waterfront open spaces to be incorporated alongside compatible developments. Subsequent 2009 updates to the Zoning Resolution enabled WPAA designs to be more flexible, dynamic and harmonious with the natural and built environments with which they meld. ZCFR further exemplifies how the City can use zoning to respond to changes in the design and use of waterfront sites. As the way we use our waterfront sites continues to evolve, the City's understanding of zoning's role in expanding waterfront public access and enhancing its design will continue to reflect these changes.

Waterfront Public Access Area (WPAA) located at The Edge Towers, Williamsburg, Brooklyn.



"Public access sometimes gets a bad rap, since it may be conflated with in-water access. There are some SMIAs that have diesel truck activity, but maybe not other heavy machinery or equipment. We should be able to get everyone close to the edge, near the waterfront, wherever possible. We have a place for safety, and working waterfronts. But there are overburdened and underserved communities that live on peninsulas but don't have waterfront access."

Compatibility and Flexibility: Public Access and Waterfront Industry

The businesses locating along commercial and industrial stretches of NYC's waterfront continue to change, reshaping opportunities to invest in compatible public waterfront open spaces. Although traditional water-dependent maritime industries — port and freight facilities, supportive maritime services and heavy marine operations —may not be compatible with public access, many current industrial waterfront operations are less intensive, present fewer environmental hazards to surrounding communities, and often need less direct shoreline access. These newer industrial or quasi-industrial sites along waterfronts often can support levels of public access in a way that is compatible and not disruptive with their operational needs.

Phased construction of the Newtown Creek Nature Walk, along the Newtown Creek Wastewater Resource Recovery Facility in Greenpoint, Brooklyn, was completed in 2021. Designed by environmental sculpture artist George Trakas, the Nature Walk is woven around several active industrial sites, including an asphalt plant and the largest of NYC's wastewater treatment centers. The landscape features indigenous trees, shrubs, grasses and wildflowers. Other design features include tributes to the site's historical past such as its use by the indigenous Lenape people and as a shipbuilding center in the 1800s. The Nature Walk demonstrates how dedicated public access can be constructed and maintained to complement active industrial waterfront uses, restore neglected ecosystems and incorporate design elements to highlight connections between NYC and its waterfront industry.

Public safety is a critical component of public access on or near industrial sites. Hazardous conditions for pedestrians and cyclists are more likely in these zones, especially along truck routes. Poor water quality is also more common in industrial neighborhoods. Neighborhood-level approaches may be necessary to incorporate public access effectively in industrial areas, with a combination of private redevelopment, use of City-owned assets and traffic calming strategies.

Establishing and managing partnerships to improve and manage waterfront access enable public and private entities to collaborate in designing and maintaining compatible publicly accessible space along industrial stretches of the waterfront. Global precedents have demonstrated that thoughtful, coordinated approaches to engage all stakeholders effectively can generate positive results in industrial waterfront communities.

Designing for Public Access and Industrial Uses

As economic, technological and environmental regulatory innovation continue to shape NYC's manufacturing and production sectors, the City will continue to identify opportunities to encourage or require public access to the waterfront where practical.

Public access must be balanced with ***operational constraints***, such as water dependency, freight and loading frequencies, mechanical equipment needs, and open storage and other yard utilization needs. Similarly, ***environmental constraints*** (environmental hazards, conformance to industrial performance standards, and evolving compatibility with commercial or residential uses) also need be considered.

In addition to sufficient consideration of public safety features such as signage, lighting, visibility and fencing requirements, design that incorporates public access alongside industrial uses can include:

- Materials and design approaches that reflect any unique maintenance and operational needs of these spaces.
- Point access or viewing areas where cross-access along the shoreline is not feasible.
- Pop-up activities and installation of moveable furniture instead of permanent fixtures.
- Hours of operation that balance public access with the loading and yard utilization needs of businesses.
- Surface treatments that enable spaces to be programmed and activated without interrupting business usage of spaces.
- Interpretive signage that educates and informs the public about the historic roots of maritime industry.
- New partnerships between property owners, local community groups, and City agencies to maintain and provide stewardship of spaces.

Top: Newtown Creek Nature Walk, Brooklyn
Credit: NYC DEP

Middle: Public access alongside an active cement terminal, Bronx
Credit: Votorantim Cimentos / St Marys Cement

Bottom: The Gowanus Waterfront Access Plan outlines access requirements for a range of uses and shoreline conditions.

City-Owned Waterfront Sites

The City maintains hundreds of waterfront sites and facilities throughout the five boroughs, including green spaces managed by NYC Parks and other agencies. Some of these waterfront facilities, although they are not designated parkland, may still be able to accommodate public access. Siting and design decisions related to locating various City-owned waterfront facilities can provide expanded waterfront access, particularly in areas where public waterfront parkland is limited or unavailable. The Newtown Creek Nature Walk demonstrates that even when situated alongside an active City-owned industrial facility, public open spaces can thrive and even benefit from such proximity under certain conditions. City-owned sites that are less use-intensive, like parking lots or office building sites, could be redesigned to allow full shoreline access while keeping public open space use separate from the ongoing business activity. Sites or facilities with more active uses, particularly where shoreline or pier access is required or where the primary function is more industrial, might be more appropriate for point access or viewing areas that provide open space without affecting other municipal uses.

For more on street ends, see "Street Ends: From Forgotten Pavement to Hyperlocal Havens" on page 134.

Street ends provide another unique opportunity to expand public access at City-owned locations. By promoting a network of resilient, activated street ends citywide, NYC can reimagine many of its waterfront street ends as open spaces that improve community quality of life.

See "Governance Goal 1" on page 261 for more information.

Determining where public access may be most appropriate on City property must be aligned with the City's overall management of its waterfront assets and its facility siting decisions. This alignment includes assessing agency operational needs for facilities to be located at specific locations, current and future climate risks and shoreline conditions and the potential for alternative upland locations.

Breaking Down Barriers and Creating Connectors

The current state of NYC's waterfront has changed dramatically following decades of decline and disinvestment. Still, those years — and related policy decisions — have left their mark on certain communities that still bear an unequal share of neglect. Although most of the harmful waterfront industrial businesses left long ago, contaminated waterfront sites remain. The elevated and at-grade waterfront highways constructed throughout the 20th century are also reminders of an era that harmed waterfront communities.

Beginning in the 1990s, replacing the dilapidated West Side Highway with an urban boulevard indicated a new way of thinking about shoreline transportation infrastructure. In recent years, a portion of the Sheridan Expressway in the Bronx was converted to a boulevard, with adjoining bicycle and at-grade pedestrian crossings connecting to the Bronx River. The new Canarsie West Trail Connector, created by NYC Parks, has provided a valuable community access point beneath the Belt Parkway to the Brooklyn Greenway and the Gateway Natural Recreational Area along Jamaica Bay. As the City plans for future transportation and infrastructure needs, expanding and improving safer pedestrian and bicycle pathways down to and along the waterfront will remain a priority.

At the center of the vision of a more interconnected waterfront is the ongoing development of NYC's network of waterfront greenways. Together, they provide dedicated, protected pedestrian and bicycle esplanades along NYC's waterfront and weave together waterfront parks and open spaces.

For more on the City's greenways programs, see "Advancing a Five-Borough Greenway Plan" on page 136

Bicyclists on Bay Ridge Promenade Greenway, Brooklyn.

Credit: NYCDOT

Strategy 1.1
Advance a citywide waterfront public access framework that addresses systemic access gaps and prioritizes investments in communities underserved by safe waterfront access.

Utilize available data and community perspectives to identify waterfront neighborhoods with long-standing, unmet access needs as well as rapidly growing communities lacking open space and waterfront access.

Where neighborhood rezoning and other City planning efforts encompass waterfronts, coordinate capital investments and zoning strategies to encourage publicly accessible open spaces that reflect the neighborhood and waterway's context.

Incorporate best practices, such as those described in NYCHA's *Connected Communities Guidebook* that strengthen passive and active open space connections to surrounding communities and utilize physical design solutions (such as recent access improvements across the Sheridan Expressway) to address historic physical impediments to waterfront open space access and connectivity.

Strategy 1.2
Identify City-owned waterfront sites and facilities that can support additional public access through investment and coordination among City agencies.

Capitalize on opportunities on City-owned waterfront sites, facilities and rights-of-way to provide linear or point waterfront public access on-site where compatible with co-located uses and other water-dependent priorities, particularly where communities have limited alternatives to waterfront public access.

Over 1 million New Yorkers live within a 10-minute walk of one of the hundreds of waterfront street ends.

Identify priority locations to promote use of underused waterfront street ends for a mix of publicly serving uses where feasible, including access improvements among adjacent public spaces, street end pocket parks, stormwater infrastructure and point access to the water.

Incorporate public access feasibility planning into existing waterfront facility-siting decision processes and interagency coordination.

Ensure that consideration of siting accounts for operations and maintenance strategies and expenses, including waterfront infrastructure inspections, necessary repair funding, and ongoing topside cleaning and upkeep.

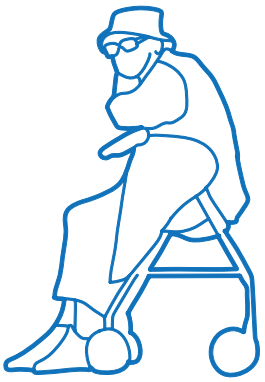
Strategy 1.3
Identify opportunities for expanding applicability of waterfront public access requirements in zoning as waterfront uses continue to evolve, and update requirements and design standards where compatible and appropriate.

Consider expanding waterfront public access requirements to a broader set of compatible uses and site conditions, such as self-storage or other light industrial uses, and in WAPs as appropriate to anticipated future land uses.

Where industrial uses do not trigger waterfront public access requirements, consider limiting construction for non-water dependent uses within the area adjacent to the shoreline to ensure that near-term improvements do not foreclose future opportunities for public access and support long-term flood resiliency planning.

Develop design guidance for expanding physical or visual access and connection across waterfront industrial sites and between the working waterfront and adjacent neighborhoods in a manner that reflects the varied design and operational characteristics of waterfront industrial sites.

"The water's edge should be activated and accessible to an many people as possible."



Strategy 1.4
Connect and unify public spaces along the water's edge and strengthen connections with upland communities.

Plan holistically for waterfront connectivity and promote safer connection to the water for a broader range of users by addressing community access paths extending beyond the first upland street.

Use landscaping and planting to signify routes that lead down to the water.

Consider updates to public waterfront wayfinding and signage to improve interconnectivity between waterfront parks and other public activity centers, and to incorporate information on ecology and resiliency.

Locate transit and other sustainable mobility infrastructure (including bike racks, bike share docking stations, ferry landings and bus stops) around waterfront park and open space entrances to maximize ease of access.

Strategy 1.5
Complete planned waterfront greenway improvements that leverage the unique opportunities and community needs available along the various stretches of waterfront.

Implement the "Closing the Loop" waterfront greenway plan to complete greenway segments along East Midtown, East Harlem and Inwood, and to upgrade other gaps and pinch points.

Develop community-supported greenway improvement plans for needed signage upgrades, safety enhancements and street-grid connectivity improvements down to existing greenways.

Invest in improved pedestrian and bicyclist mobility along bridges, particularly across the Harlem and East Rivers, to support safer connections between borough greenways.

80% of New Yorkers have access at at least one waterfront park or beach within a 30-minute public transit trip.

Opposite:
Public access pathway winding between wetland restorations, Hunter's Point South Park, Queens.

Street Ends: From Forgotten Pavement to Hyperlocal Havens

More than 1 million New Yorkers live within a 10-minute walk of one of the hundreds of waterfront street ends that intersect with NYC's shoreline. These street ends serve a variety of important public purposes. Many support active vehicular, pedestrian and emergency service circulation and turnaround functions. They also house crucial sewer and stormwater infrastructure connecting to nearby waterways. Some street ends serve as physical or visual links drawing visitors down to NYC's growing network of waterfront public access areas.

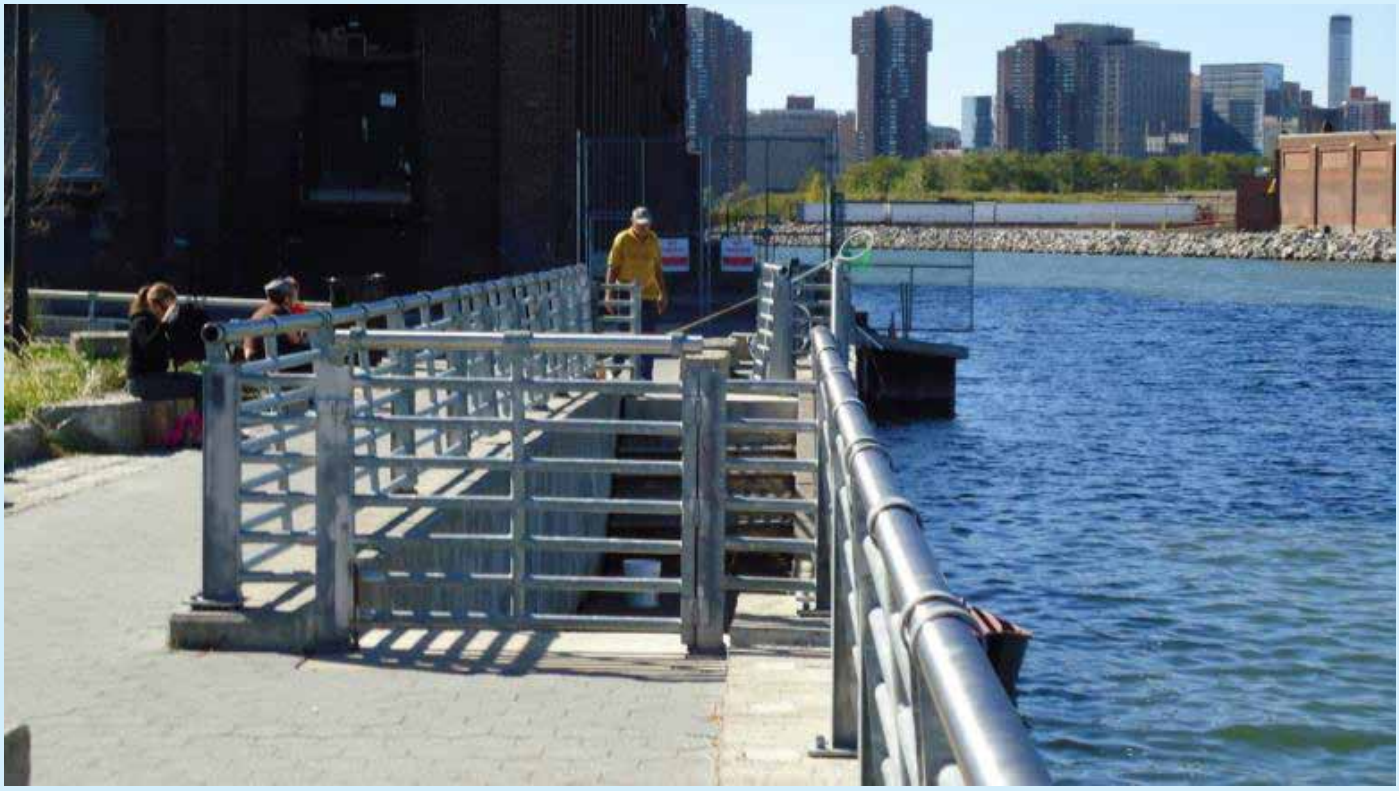
Despite their key role in the urban landscape, administrative complexity and other factors have frequently caused street ends to be overlooked, lacking the rigorous design standards that exist for other infrastructure. As such, most street ends remain underused even as COVID-19 has underscored the importance of expanding open space opportunities. Street ends often need structural repairs and lack amenities included in other public spaces across NYC. These forgotten dead ends can offer unique opportunities for public spaces as small parklets, waterfront viewing areas or in-water access points, particularly in areas having limited waterfront public space but strong community desire for access.

Street ends can be important places of respite for the diverse communities that live and work near the waterfront. Developing clear design guidelines and new concept plans can help create a network of active open spaces across waterfront communities. Because waterfront street ends fall under both public and private jurisdictions, coordination between City agencies and third parties (particularly for traffic and shoreline analysis) is crucial to identifying the best, most appropriate locations for activations.

Several street end activations provide good examples of the potential benefit of using NYC's street end network. At Sherman Creek Parks in Inwood — a neighborhood underserved by waterfront access — NYC Parks and NYCDOT created five street end parks with amenities to bring residents closer to the Harlem River. These street end parks also can be adapted to interconnect with potential future open spaces at the adjacent waterfront sites. In Greenpoint, Brooklyn, a street end was converted into Manhattan Avenue Street End Park and now provides a planted seating area and boat access onto Newtown Creek. Elsewhere, in the Greenpoint-Williamsburg WAP area, street end improvements are required to be designed as a continuation of the public access areas and have been incorporated into several WPAAs. These street end improvements have allowed for additional seating, safe pedestrian access to a ferry pier and improved connectivity between open spaces.

Street ends can also support climate resiliency and adaptation. Because these locations are frequently lower lying than surrounding properties or other rights-of-way, they may already be entry points for flooding from high tides that will only increase with rising sea levels. However, using more thoughtful design for many street end projects presents opportunities to adapt these areas to mitigate risks from increased flooding, heat and heavy rains and to improve public waterfront access. Over time, street ends may be raised or otherwise reconstructed to mitigate these climate risks. Projects could also present opportunities to improve functional roadways and use for emergency response. Street ends can serve as shoreline connectors between adjacent open spaces, or become sites for beneficial vegetated land cover or other critical shoreline infrastructure.

Sherman Creek Park, Manhattan
Credit: NYC Parks



Manhattan Avenue Street End Park, Brooklyn.
Credit: NYC Parks

Advancing a Five-Borough Greenway Plan

Years of advocacy and planning have expanded sections of NYC's waterfront greenways across all five boroughs. Some recent highlights include new improvements along the Brooklyn and Queens Jamaica Bay Greenway that better connect cyclists and pedestrians to an expansive waterfront greenway, parklands and restored wetlands. In Manhattan, new park spaces and investments along the East River Esplanade will tie into ongoing phased park and greenway improvements and future segments of the Lower Manhattan and East Side Coastal Resiliency projects. Staten Island, too, has seen early constructed phases of the Stapleton Waterfront extending waterfront access along the North Shore.

Greenway at Atlantic Avenue, Brooklyn.
Credit: NYCDOT

On the Bronx side of the Harlem River, combined investments in City and State parkland have advanced greenway connectivity along the river. NYCDOT's ongoing Harlem River Bridge crossings initiative and planned Depot Place bridge improvements will make connections to the river safer and more available to Bronx residents. Along the Bronx River, park construction and improvement projects over the last decade (including the Hunt's Point Riverside, Soundview, Concrete Plant, Starlight, Shoestring and West Farms Rapids parks) have provided valuable green spaces. The conversion of the former Sheridan Expressway to an at-grade boulevard with improved bikeways, crosswalks and river crossings enables the Bronx River waterfront to be more interconnected and accessible to residents than ever before.

Randall's Island Connector.
Credit: NYCDOT

Continuing to advance the vision for a truly five-borough waterfront greenway plan will require sustained community engagement, committed capital resources and continuous strategic planning. Initiatives that highlight several approaches currently underway include:

Closing the Loop

Closing the Loop will complete the Manhattan Waterfront Greenway by connecting remaining gaps and upgrading key pinch points. When complete, the 32.5-mile greenway loop will connect more than 1,000 acres of greenspace around the entire island. Closing the Loop will add 15 acres of open space that integrates the greenway into Inwood, East Harlem, Harlem and East Midtown — mostly low-income neighborhoods historically cut off from the waterfront. The improvements will include safety enhancements and new recreational amenities for cyclists and joggers. The project also integrates climate change considerations and improves connectivity to and along the waterfront for New Yorkers with limited waterfront access.

Credit: NYCEDC

Destination Greenways!

Destination Greenways! is an NYC Parks and NYCDOT initiative to develop community-supported greenway improvement plans that connect park greenways to a broader, publicly accessible network. The initiative will focus on safety enhancements and street-grid connectivity improvements. The current project focus is on Shore Parkway and establishing connections to Coney Island in Brooklyn, as well as a Queens route that connects several parks to the waterfront at Joe Michael's Mile along Little Neck Bay.

Credit: NYCDOT

Harlem River Bridges Access Plan

The **Harlem River Bridges Access Plan** will support ongoing waterfront access investments along both the Upper Manhattan and South Bronx Harlem River waterfronts to create a safe, continuous experience for New Yorkers crossing between the two boroughs. This project identifies a series of community preferences for capital improvements to City-owned Harlem River bridges and on-street approaches that enhance safety and pedestrian and bicycle mobility. The plan also will identify public and private property strategic partnerships to maximize improvements.


OCEAN

Goal 2: Promote opportunities to get onto and into the water

Nothing compares to the tranquility of experiencing NYC from the water. NYC's waterways combined represent 156 square miles of public open space, and yet relatively few New Yorkers have safe, regular access to paddling, sailing or general on-water access. Boat launches and landings are the crucial touchpoints that enable human-powered boats to enter the water. Whether launching a canoe, kayak or some other human-powered watercraft, NYC's network of launches connects boaters with the extensive "blue network" of trails charted throughout NYC's waterways. NYC Parks and a dedicated team of advocacy groups manage and update the **NYC Water Trail map**. Although most boat launches are located in City parks, State and federal parks (along with a growing number of privately owned waterfront open spaces) provide important in-water access sites with floating piers, landings and waterfront sites graded to enable boats to be transported and launched safely.

Boathouses serve as important hubs for boat storage, education and guided instruction that anchor community access to the waterfront. New boathouses planned at Sherman Creek in Manhattan and Bay Breeze Park in Queens demonstrate how the City can partner with local boating and paddling advocacy groups to construct new multipurpose boathouses on revitalized waterfront parkland.

Ensuring growth in the popularity and accessibility of human-powered boating requires continued investment in the traditional infrastructure (such as floating docks, ramps and gang ways) that help put boats and other human-powered watercraft onto the water. Growth in these activities will also require safer and more accessible public space designs that help people and their equipment get into and out of the water easily. Amenities like boat storage, tie-ups and comfort stations will make boating more accessible to communities and residents less likely to have their own boats or the ability to transport crafts to waterfront sites.

Opposite:
Kayaking in Astoria, Queens.

Water Recreation Beyond Our Beaches

Decades of regulatory oversight and capital investments in water quality improvements have enabled NYC to achieve its cleanest water in a century, sparking growing public interest in getting onto and into the water. Many New Yorkers have expressed a desire for expanded access to new waterfront areas, improvements in the existing waterfront open spaces, and expanded access to specific recreational activities such as human-powered boating, wading and swimming.

NYC's beaches are popular summertime destinations for millions of New Yorkers. Many recent, ongoing improvements continue to enable NYC's beaches to thrive as prime waterfront destinations where swimming is permitted today, including:

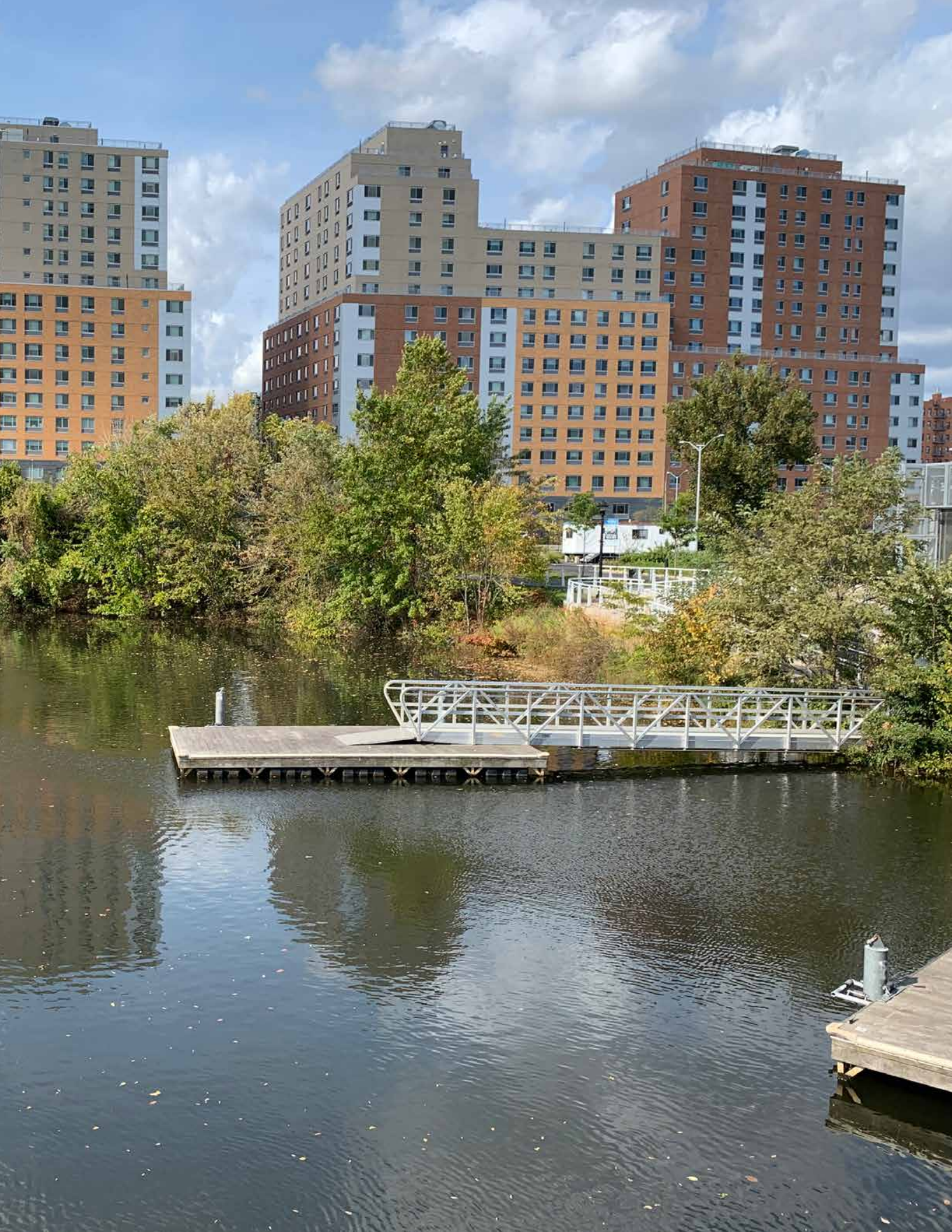
- Post-Hurricane Sandy investments in the New York Aquarium and Luna Park at Coney Island Beach.
- A resiliently reconstructed Rockaway Beach boardwalk with new playgrounds and room for local restaurants.
- Major renovations of the Orchard Beach Pavilion in the Bronx and Manhattan Beach's promenade and ballfields in Brooklyn that are getting underway.

While there is always a reason to visit NYC's miles of public swimming beaches, the possibility of introducing swimming to new areas is a compelling prospect for the city's many waterfront users. However, these aspirations must be balanced with a thorough public health and safety assessment to identify suitable conditions and locations. Ultimately, the goal is not to have swimming everywhere, but to identify near- and long-term thoughtful steps that the City can take to increase appropriate recreational access where suitable conditions exist.

Despite the improvements in water quality, much of NYC's near-shore waterfront is unsuitable for swimming (including all of the East River and Harlem River, and most of the Hudson River) due to a combination of dangerous tidal conditions and currents, conflicting marine traffic, other incompatible waterfront uses, and water quality that is not consistent with in-water access. Additionally, opportunities for in-water access are further limited by erosion hazards and climate-driven stressors such as sea level rise and storm surge. These challenges are compounded in NYC's smaller, more constrained tributaries — many of which were significantly reconfigured in the past to support manufacturing and shipping. Although the City has made considerable strides in improving its water quality, these challenges remain.

Opposite:
Learning to surf at Rockaway Beach, Queens.

Credit: Ryan Struck/ NYC & Company



Decades of Investment in Improved Water Quality

Since the 1970s, the City has invested over $40 billion in projects to upgrade and expand wastewater treatment and reduce CSOs, which are key determinants of water quality near the city's shoreline. More recently the City has invested over $1.2 billion to upgrade seven Wastewater Resource Recovery Facilities (WRRFs) to reduce nitrogen discharges and expects to complete work on an eighth WRRF by the end of 2022. Reducing nitrogen discharges increases dissolved oxygen levels and improves the overall health of waterways. To reduce CSOs that affect water quality during heavy rainfall events, the City has spent nearly $2.7 billion in grey infrastructure projects since 2010. In 2012, the City kicked off the Long-Term Control Plan (LTCP) process. Through the LTCP process, the City has actively engaged local stakeholders in the development of 11 LTCPs and committed approximately $6 billion in future projects to reduce further the frequency and volume of CSOs.

See **"Water Quality + Natural Resources" on page 205** for more on what the City will be doing to improve water quality.

The City has also committed $1.6 billion to its Green Infrastructure Program (the nation's largest). By end of 2021, the Green Infrastructure Program will achieve a reduction of 507 million gallons per year of CSO. As this program continues, the reduction of CSO will continue to increase. The overall stormwater management and water quality in the city's waterways will be further enhanced by new stormwater regulations that are expected to come into place during 2022. The City plans to continue making significant investments in CSO reduction, although diminishing returns are expected regarding the degree of sustained water quality improvement that additional funding can achieve.

See **"Unified Stormwater Rule" on page 216** for more information.

Assessing Opportunities for Water Recreation

Local, state, and federal regulations protect NYC's waters and set water quality standards for safe public recreational water use. The Department of Health and Mental Hygiene (NYC DOHMH) regulates permitted NYC bathing beaches, pools and the associated waterfront area and facilities. Furthermore, provisions of the NYC Health Code require all bathing beaches be located within the boundary delineated for primary contact recreation as defined by the New York State Department of Environmental Conservation (NYS DEC). To reduce the risk of waterborne illness from untreated wastewater, City law prohibits the location of bathing beaches within 750 feet of any discharge from wastewater treatments plants, combined sewer outfalls, or other pollution sources. To allow swimming, specific bacteriological water quality standards from the federal and state level must also be monitored and attained on an ongoing basis. Because water bodies are influenced by numerous coastal jurisdictions across

Opposite:
Boat launch at Starlight Park, The Bronx.

multiple states, local water quality must be understood in the context of the much larger regional watershed and its interstate tributaries.

To identify areas safe for recreational access, the NYC Health Code requires site assessments of prevailing wind direction during the bathing season, rainfall, topography, or environmental factors including current measurements that must be conducted. The assessments must also include the location and level of boat traffic, number of vessels with marine sanitation devices, marinas or boat dockage areas, and any current recreational activity, including canoeing or fishing. The assessments must also consider long-term water quality trends, which must be analyzed over a minimum of eight weeks including daily bacteriological samples five days after heavy rain and water clarity tests at non-ocean beaches. Other potential impacts on water quality such as watershed features, land use characteristics and potential sources of contamination must be included in any assessment.

"Love the goal of having swimming. Would love for you to add the goal of boating and teaching people boating whether it's paddling or kayaking. It would be great to add that into the goal, because it's a little hard to jump from nothing to swimming in the rivers and an additional incentive to help people learn how to swim would be the segway of boating, and so we just encourage you to consider that."

The City is exploring potential opportunities and strategies that can be implemented over time to expand New Yorkers' recreational access to the city's open water. Because of the nature of these challenges, progress will require near-term strategies that can be implemented relatively quickly and within City purview such as funding and developing waterfront infrastructure that include bathing features such as floating pools. A longer-term process is needed that involves City agencies working across jurisdictional lines and more cross-regional collaboration on capital and operational improvements. An important starting point would include a formal feasibility study or assessment to investigate a range of practical alternatives or options. Considerations that should be incorporated relate to transportation and marine traffic, open space and marine resources, flooding and erosion hazards, water classifications, and critical water quality determinants such as water treatment discharge points and major outfalls. Assessment should also consider opportunities for various water recreational uses that may present themselves through redevelopment along the waterfront.

Over time, long-term planning and continued investment in infrastructure and best management practices to improve water quality in NYC water bodies could allow swimming at sites that comply with the conditions necessary to support in-water access.

Promoting Water Safety and Education

Increasing access to swimming education and lifeguard training programs is crucial to getting more New Yorkers safely into the water, particularly for communities that lack ready access to safe swimming areas or pools, and communities that suffer from a disproportionate number of drownings. Swimming education programs run by NYC DOHMH and NYC Parks (such as "Making Waves" and "Swim for Life") are examples of existing programs that are engaged in communities with varying needs to teach swimming and in-water safety.

Additional Opportunities for Water Recreation

Other opportunities for water recreation include floating pools or other swimming facilities that can be safely stationed within the waterbody and connected to adjacent parkland or elsewhere along the shore. The Floating Pool Lady, a barge retrofitted with an 80,000 gallon seven-lane pool docked off Barretto Point Park in the Bronx, demonstrates that when properly sited, designed, and operated, floating pools can create safe, accessible swimming resources in communities lacking in-water access or sufficient public pool access elsewhere in the neighborhood. The last decade has also seen an explosion of interest in a range of other recreational water activities, such as surfing and kayaking, that have drawn new users to the waterfront. Holistically planning for the range of water recreation, including growing enthusiasm for human-powered boating, will help broaden the reach and appeal of recreational use of NYC's waterways while ensuring public safety and compatibility with the many other important needs along NYC's waterfront.

Floating Pool Lady at Baretto Point Park, The Bronx.

Credit: NYC Parks

"It's very important that the plan explicitly refer to the social and cultural ways that diverse groups of people use the waterfronts and perceive waterways and water quality. How will existing uses and values of waterfront areas be assessed to make sure that some values and visions aren't privileged over others?"

Strategy 2.1
Expand physical in-water access across NYC's waterfront parks and open spaces to promote recreational boating and opportunities to touch the water where appropriate and feasible.

Continue to expand and improve the NYC Water Trail for human-powered boating, with emphasis on areas lacking formal or secure in-water access points or launches.

Incorporate safe exits, emergency landings and other infrastructure intended to support human-powered watercraft, improve egress from the water, and meet the growing public interest in use of the water when planning for in-water access.

Provide space, awareness of grant opportunities, and expanded partnerships that link educational and ecological initiatives with community boathouses and marinas.

Strategy 2.2
Expand swimming opportunities where appropriate safety, ambient water quality, and routine monitoring and reporting can be demonstrated.

Examine the feasibility of a range of practicable alternatives or options for water recreation that incorporate land use and transportation issues, open space and marine resources, coastal erosion and floodplain conditions, water body classifications, and critical water quality determinants such as waste treatment discharge points and major outfalls.

Continue to develop innovative approaches to pilot safe swimming solutions that complement traditional beaches, including floating pools and engineered coves, where appropriate safety and water-quality monitoring can be demonstrated.

Study existing global precedents and innovative solutions for seasonal in-water pools or other swimming facilities that can safely and sustainably expand swimming opportunities in revitalized urban waterways.

Coordinate public safety with the City's on-water emergency response teams, including the New York Police Department's (NYPD) Harbor Patrol and the Fire Department of the City of New York's (FDNY) Marine Unit, in addition to ensuring that adequate lifeguard services are provided on site.

Target initiatives to areas lacking direct in-water or pool access and those facing greater heat vulnerability while ensuring that locations meet tidal, water quality and vessel traffic limitations or standards.

Study more frequent "special event" swimming days in waterways where designated uses and physical conditions support safe swimming and where lifeguards and demarcated swimming areas can be provided.

Expand outreach and logistical accommodations to broaden community participation and geographic distribution of organized swimming events.

Strategy 2.3
Develop in-water safety and swimming education programs to get more New Yorkers into the water.

Provide free learn-to-swim and water safety instruction to schools and educational groups to promote swimming and to build youth connections to the water by expanding "Making Waves" and other swimming education programs, particularly in communities with disproportionately high incidences of drowning.

Target water safety education through direct delivery to students and by incorporating safety swimming curriculum into ecological and boating enrichment programs.

Expand and focus lifeguard recruitment and training to underrepresented and underserved communities.

Identify strategic partnerships with State and federal partners managing in-water access and programs across parks and other public lands to expand outreach, engagement and best practices.

Work with the State to expand collaboration with DOHMH in licensing and permitting for summer camp swimming and Aquatic Instructor and Director programs.

Goal 3: Shape design and programming of public waterfront open spaces to reflect public use needs

As NYC's waterfront parks and open spaces continue to evolve as important community gathering spaces, they need to reflect the cultural diversity and needs of the communities they serve. Community engagement at an early stage of design and programming, both by government in planning public open spaces as well as by private property owners where developing public access areas, is important to ensuring places are welcoming and inclusive of the community. NYC Parks has demonstrated its commitment to engaging communities through its long-term efforts to ensure that future park spaces reflect community needs. As neighborhood planning, coastal protection and large-scale waterfront property redevelopment initiatives advance, great mutual benefit occurs when public and private property owners work with residents and neighborhood groups. Community input must be solicited and incorporated into any design and long-term operations of future waterfront open spaces.

Guided by community perspectives, urban design can be a powerful tool to improve the quality of life in NYC and even adapt to unprecedented challenges, from pandemics to climate change. NYCDCP has articulated a set of overarching **Principles of Good Urban Design** to create a positive experience for every New Yorker. Under these principles, good design can reinforce the sense of place and the character of a neighborhood. Design can ensure that NYC's public realm is accessible and inclusive, while supporting the ease of movement and access around NYC through attention to quality and detail. Ultimately, a commitment to good design encourages public spaces that feel comfortable, welcoming and safe to all. These principles are meant to guide anyone who is willing to improve the livability of NYC's neighborhoods and who shares the commitment to expand, protect and promote good urban design for everyone.

Community input plays an important role in designing spaces that will be long-term community resources. City agencies can ensure that local communities are sufficiently equipped and supported to participate in a public design process by providing timely, user-friendly information and resources about public meetings, as well as location, ownership and management responsibilities of waterfront open spaces. Developers of waterfront properties are also encouraged to engage with the public at an early stage in the design process by having discussions with residents on how spaces can be designed

Opposite:
Hunter's Point South Park, Queens.

"When considering public access, please remember to center disabled folks needs to participate in programs and recreation at the waterfront. There should be access points for all bodies to be able to get into the water, travel by water, kayak, and fish. The appropriate universally designed facilities and management of these facilities should be considered. Hire disabled people to consult in the design of these features and don't assume that you can design for disabled bodies without their lived expertise. By disabled people I mean those in wheelchairs, limited mobility, neurodiverse folks, older people. All of the above."

and programmed, with an emphasis on representative and inclusive engagement for all future users.

Design workshops are an effective tool for creative community engagement, particularly if they include small-group exercises and conversations to help participants imagine and inform these future spaces. Discussions can leverage individual and shared life experiences to express community needs and can identify contextual planning considerations for the neighborhood. Using a variety of linguistic and scheduling accommodations can encourage diverse participation. The ***NYCHA Connected Communities Guidebook*** recognizes the importance of engaging NYCHA community residents to shape the environment in which they live. It highlights a multigenerational, community-informed approach to designing public spaces that emphasizes community experiences, civic engagement and stewardship.

For the many communities that historically have not been engaged directly in design processes — particularly in neighborhoods with longstanding concerns about safety or suitability of waterfront access — additional attention can ensure open, transparent discussion that makes time to address historic, linguistic and cultural barriers to participation. Engagement needs to extend its awareness beyond a particular site to understand the experiential relationships people have with their waterfronts. Obstacles to safe access often go beyond a park or parcel boundary. Rather, they may encompass safety or accessibility challenges along the upland streets or surrounding neighborhoods or concerns over legacy waterfront industrial uses. To that end, community preferences and input can inform designing for a mix of amenities, gathering spaces, and recreational or community programming, as appropriate to the nature of individual spaces.

Designers of waterfront spaces are also taking note of the public's interest in greater access to natural shorelines and marine habitat by incorporating graduated shorelines and creative intertidal spaces alongside rivers and coves. Pebble Beach in Brooklyn Bridge Park and Valentino Pier Park in Red Hook are examples of waterfront spaces that incorporate smaller sandy areas that are not safe for swimming but do allow New Yorkers to approach and interact with the water's edge. Other examples include the future East River Esplanade span beneath the Brooklyn Bridge, which will allow controlled access to a beach-like area to be stewarded with a local community partner and will formalize a unique waterfront open space in Lower Manhattan.

Elsewhere, intertidal shorelines with graded riprap and sandy gathering areas (such as those along the proposed Gansevoort

Peninsula in Manhattan's Hudson River Park and Marsha Johnson State Park along the East River in Brooklyn) will bring New Yorkers nearer to the water on stretches of waterfront that had been cut off from human contact. These areas utilize natural and constructed features that demarcate boundaries between land and water without severing community connections with the waterfront. In spaces like these, clear and standardized signage and messaging at access points communicates risk and promotes safe behavior, providing the public with clarity about the appropriate boundaries for acceptable waterfront recreational uses.

Reconstructing natural shoreline conditions and removing hardened barriers between waterfront parks and the water itself can help foster biodiversity and control erosion. Equally important, these steps provide engagement and educational opportunities so that communities can better understand the complex relationships and connections between the land and water.

Domino Park, Brooklyn.

Strategy 3.1
Promote flexible and inclusive processes for designing waterfront open spaces to address community needs across different shoreline and water quality conditions.

Encourage community engagement that incorporates a diversity of voices and community open space needs in the design and activation of public spaces undertaken by the City as well as other waterfront property owners.

Continue incorporating universal design principles into design practice and guidance and improve interagency coordination to ensure greater accessibility for all waterfront open space users.

Within WPAAs, build on design principles that encourage varied treatments, activities and uses reflective of local conditions at the waterfront's edge.

Strategy 3.2
Ensure that waterfront parks and other public open spaces are designed and operated in a manner that addresses climate resiliency challenges.

Use and promote new flexibility provided under recent waterfront zoning amendments to ensure that public waterfront open spaces remain accessible and in good repair as sea level rise increases tidal flood risks.

Using best practice guidance (such as NYC Parks' *Design and Planning for Flood Resiliency*, MOCR's *Climate Resiliency Design Guidelines* and the New York City Waterfront Revitalization Program's (WRP) Climate Change Adaptation Guidance), encourage waterfront property owners to design public open spaces along the waterfront to withstand both storm events and increasing high tide elevations caused by sea level rise.

Develop design guidelines for street ends that support coordination with adjacent waterfront property improvements to address flooding from rising sea levels and tidal inundation while maintaining accessibility.

Strategy 3.3
Expand access to key public facilities and user infrastructure within waterfront open spaces.

Identify strategies on-site and off-site that facilitate ready access to important public amenities (such as restrooms, drinking fountains, and boat storage or rental) to make open spaces more accommodating and practical for a wider range of users.

Study community partnerships and pilot opportunities for deploying "off the grid" solutions, such as composting toilets, to resolve common utility issues.

Sherman Creek Boathouse conceptual rendering, Manhattan.

Credit: NYC Parks

Universal Accessibility

Beyond improving accessibility for all users, inclusive design practices at the waterfront are essential to ensuring that everyone has equal access to everything the waterfront has to offer. Building on the Mayor's Office of Persons with Disabilities' Inclusive Design Guidelines, City agencies tasked with managing waterfront open spaces and maritime infrastructure — including NYCDCP, NYC Parks and the Department of Small Business Services (NYCSBS) — have been incorporating inclusive design practices into City capital project design. These efforts also have resulted in guidance for private property owners constructing new public open spaces.

Best Practices for Designing Accessible Waterfront Public Access Areas

- Provide companion seating spaces adjacent to a bench where a wheelchair user can sit alongside companions and enjoy the same view.
- Ensure accessible and multigenerational seating opportunities, including benches with backs and arms.
- Design grading and dimensions of ramps as an integral part of the design of the open space to promote equal experience for all users.
- Design circulation path widths to reflect expected pedestrian volumes and comfortable ADA accessibility.
- Ensure that get-down areas with in-water access, viewing platforms or other shoreline designs are accessible to all.
- Differentiate pedestrian circulation from vehicular flow.
- Incorporate ground surface material for seating and circulation areas that facilitate wheelchair access and design tactile warning at edges in hazardous areas.
- Align access between multiple, adjacent public open spaces or connectivity to public rights-of-way and other public parks; coordinate grades for seamless public connection.
- Address potential safety challenges, including dead-end walkways, grade or step changes lacking proper design cues, and obstructed lines of sight.
- Incorporate and incentivize publicly accessible restrooms for maintenance and operational staff and visitors within new adjacent developments, particularly where these are distant from other existing public facilities.

Opposite:
Pier 25 at Hudson River Park in Manhattan. An ADA-accessible walkway will connect New Yorkers with a unique opportunity to explore the tidal ecology of the Hudson River.

Goal 4: Promote good stewardship of public spaces on the waterfront

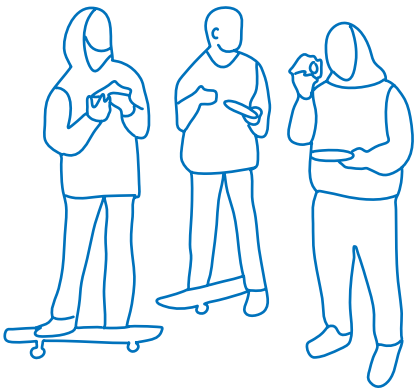
Strengthening Waterfront Stewardship

Government agencies and private property owners that manage public open space have the primary responsibility of ensuring that these spaces are well-maintained and accessible during hours of operation. Stewardship can supplement standard maintenance and operations through activating waterfront spaces and providing community-centered recreational and educational programming. While many stewardship programs exist within public agencies, community-based groups are important partners in ensuring open spaces become nodes for community engagement, strengthening connections to NYC's harbor and waterways, and engaging youth on ecology, resilience and in-water safety.

Although there have long been dedicated waterfront advocates, the last few decades have seen the emergence of new community groups in many waterfront areas and a strong interest in supporting their formation in others. Stewardship groups can either be higher-capacity organizations with full-time staff that offer a range of events, or they can be smaller, less formal groups more reliant on volunteers. The City has taken steps (including with the launch of Partnership for Parks in 1995) to connect and support community groups with park spaces throughout NYC; however, advocates can face significant challenges in sustaining a high level of involvement over an extended period of time. Some organizations may lack sustained financial resources to support grant writing and administrative costs. Other obstacles may include a lack of models for collaboration, whether between local government and community groups or between property owners and community groups, and unmet workforce needs to equip community groups to maintain or program spaces.

The City has an opportunity to support the formation of stewardship organizations to connect across waterfronts and to share resources and best practices. Although a range of resources is needed to support these groups, City agencies can assist groups and support their organizational and administrative needs in several ways. For example, the City can facilitate connections between stewardship groups that are interested in maintaining or activating public spaces and waterfront property owners that manage the open space. As the vision for these public spaces continues to evolve, additional opportunities could emerge to engage local stewardship groups in designing, programming or maintaining these spaces. Workforce development opportunities could also emerge to maintain and activate waterfront public open space to complement the ongoing work undertaken by City capital agencies, such as supporting maintenance along wetland restoration sites or operating spaces created to host community vendors or events.

"Public access opportunities should be available for smaller, all-volunteer organizations to run community-based programs such as East River CREW has been doing successfully and affordably since 2006."

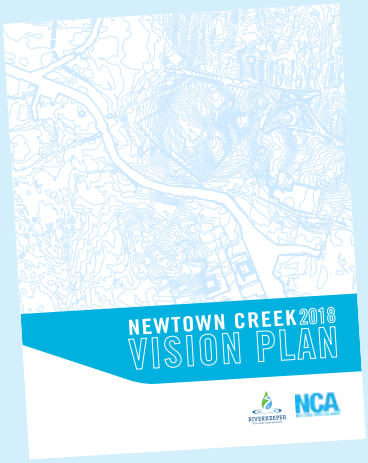


Opposite:
Volunteer cleanup at Plumb Beach, Brooklyn.

Credit: Daniel Avila, NYC Parks

Reactivating Waterfronts Through Community-Led Visioning Processes

Across NYC's 520 miles of waterfront, not-for-profit and community-based organizations have demonstrated how community-led, grassroots efforts can effectively engage local stakeholders and articulate long-term visions for the restoration and activation of community shorelines.

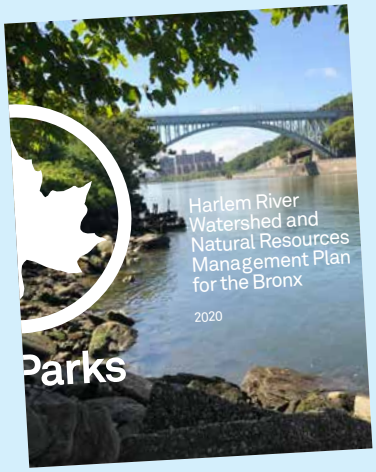


Riverkeeper / Newtown Creek Alliance: Newtown Creek Vision Plan

The **Newtown Creek Alliance Vision Plan** represents a participatory process shaped by the voices of many Newtown Creek advocates and stakeholders. The plan suggests a roadmap for remediating historic pollution and degradation; restoring and revitalizing lost and damaged ecosystems; providing safe and accessible opportunities for recreation and education on the waterfront, between communities, and on the water; and ensuring climate and economic resilience of the industries, businesses, communities, and ecosystems around the Creek.

Gowanus Canal Conservancy: Lowlands Study

The **Gowanus Lowlands Master Plan** is a community-based vision for a public realm centered on the Gowanus Canal. The plan envisions a realm formed from a network of parks, privately owned public waterfront esplanades and greened corridors. The Gowanus Lowlands will provide the community with accessible green space, cultural resources and recreational amenities, while serving other functions related to increasing flood resilience, mitigating impacts associated with the urban heat island effect, creating habitats, managing stormwater and reducing pressure on the sewer system.



Bronx and Harlem River Watersheds Urban Waters Federal Partnership (UWFP) and NYC Parks: Natural Resources Management Plan

The **Harlem River Watershed and Natural Resources Management Plan for the Bronx** is a community-informed planning effort intended to serve as a road map for agencies, community partners, and other stakeholders pursuing coordinated resource protection and restoration in the Bronx portion of the Harlem River watershed. This plan provides a vision and goals for the watershed and introduces strategies and recommendations to achieve the stated goals. This plan builds upon past planning efforts by integrating recommendations and priorities, as appropriate, in a watershed context.

Strategy 4.1
Encourage formation of community-based organizations, particularly in underserved areas, that help to plan, activate and sustain inclusive community connections to waterfront open spaces.

Engage with community-based organizations and other stakeholders to design and activate waterfront open spaces on City-controlled sites.

Identify organizational and administrative support that the City can provide to create and provide resources for community groups that can serve as partners, advocates and local ambassadors for waterfront open space.

Encourage collaboration between community-based organizations and waterfront property owners that maintain open space to improve the programming, accessibility and maintenance of public spaces.

Explore workforce development and training opportunities linked to waterfront open spaces that can connect people to jobs in ecology, resilience and in-water safety.

Strategy 4.2
Improve publicly available resources and information that connect communities with their waterfronts.

Continue to update and expand NYCDCP's Waterfront Access Map as an interactive, digital public portal with information and resources about waterfront parks and open spaces.

West Harlem Piers, Manhattan.

Credit: NYC Parks

Goal 1: Expand public access to the waterfront with an emphasis on equity by bridging access gaps in historically underserved areas and supporting growing waterfront communities

Strategy 1.1
Advance a citywide waterfront public access framework that addresses systemic access gaps and prioritizes investments in communities underserved by safe waterfront access.

Strategy 1.2
Identify City-owned waterfront sites and facilities that can support additional public access through investment and coordination among City agencies.

Strategy 1.3
Identify opportunities for expanding applicability of waterfront public access requirements in zoning as waterfront uses continue to evolve, and update requirements and design standards where compatible and appropriate.

Strategy 1.4
Connect and unify public spaces along the water's edge and strengthen connections with upland communities.

Strategy 1.5
Complete planned waterfront greenway improvements that link unique opportunities with community needs along individual stretches of waterfront.

Goal 2: Promote opportunities to get onto and into the water

Strategy 2.1
Expand physical in-water access across NYC's waterfront parks and open spaces to promote recreational boating and opportunities to touch the water where appropriate and feasible.

Strategy 2.2
Expand swimming opportunities where appropriate safety, ambient water quality, and routine monitoring and reporting can be demonstrated.

Strategy 2.3
Develop in-water safety and swimming education programs to get more New Yorkers into the water.

Goal 3: Shape design and programming of public waterfront open spaces to reflect public use needs

Strategy 3.1
Promote flexible and inclusive processes for designing waterfront open spaces to address community needs across different shoreline and water quality conditions.

Strategy 3.2
Ensure that waterfront parks and other public open spaces are designed and operated in a manner that addresses climate resiliency challenges.

Strategy 3.3
Expand access to key public facilities and user infrastructure within waterfront open spaces.

Goal 4: Promote good stewardship of public spaces on the waterfront

Strategy 4.1
Encourage formation of community-based organizations, particularly in underserved areas, that help to plan, activate and sustain inclusive community connections to waterfront open spaces.

Strategy 4.2
Improve publicly available resources and information that connect communities with their waterfronts.

ECONOMIC OPPORTUNITY

NYC's waterfront and waterways present exciting opportunities to build a green economy, sustain and create a diverse mix of jobs for New Yorkers, improve key infrastructure and support tourism in the next 10 years and beyond.

The City can help generate economic opportunity for New Yorkers by expanding access to well-paying jobs as part of its climate mitigation strategies. These strategies include transforming how energy is produced and distributed in NYC, retrofitting buildings to be more efficient, and promoting greener forms of production and distribution. In addition, the City can help equip New Yorkers with the skills they need to find jobs in established and emerging industries that provide the potential for careers. These efforts, combined with enhancements to infrastructure and cleaning up contaminated sites, help drive economic growth and upward mobility in economically disadvantaged communities and improve their quality of life.

Goal 1: Advocate for a 21st century working waterfront by pivoting to green technology and environmentally sustainable practices.

Goal 2: Harness NYC's waterfront setting to help diversify the economy and drive equitable economic recovery.

Goal 3: Connect investments on the waterfront to employment and career advancement opportunities for New Yorkers.

Goal 4: Advance categories of investments in waterfront areas that broadly support economic activity locally and throughout the region.

Goal 5: Promote the use of our waterways for entertainment, hospitality, and education to provide jobs and drive tourism, including ecotourism.

Overview

Throughout its history, the New York Harbor has played a vital role in creating economic opportunity for New Yorkers. NYC grew into a domestic and international center of trade and commerce partly due to the presence of its deep harbor and connection to the Erie Canal.

Although NYC's waterfront and waterways have transformed through the evolution or departure of various maritime industries, they remain a critical component of the economic engine for NYC and the region. They connect NYC to domestic and international supply chains, support industries that provide well-paying jobs to New Yorkers and attract international visitors to NYC for entertainment and recreation.

Going into 2020, NYC employment was at an all-time high. However, while economic gains during this period accrued to a wide portion of the population, significant inequity remained, and was exacerbated by the COVID-19 pandemic. Although economic activity associated with NYC's waterfront and waterways represent only a portion of NYC's economic challenges and opportunities, they will play an important role in regaining and sustaining NYC's pre-COVI-19 prosperity and building a more inclusive economy.

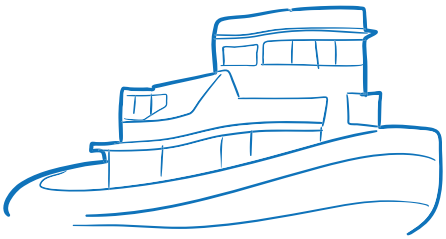
Looking forward, the City can continue to advance projects and policies that sustain and create jobs, particularly in parts of the economy that are either growing or support well-paying jobs that do not necessarily require high educational attainment. To increase economic opportunity, it is important to foster an environment in which small businesses can succeed and ensure that critical infrastructure investments create job opportunities for New Yorkers, especially those that have historically experienced high rates of unemployment and disinvestment. Achieving this type of broad-based economic recovery requires overcoming the pandemic, securing meaningful federal stimulus, and focusing resources to promote and support economic opportunities for all New Yorkers.

"New York Harbor is central to American supply chains, but this relationship is totally walled-off to the average New Yorker. If people better understood the central role the harbor plays, I believe it could be a source of civic pride and a great way to promote engagement with the waterfront."

Opposite:
Container ship at Red Hook Terminal, Brooklyn.

Credit: Courtesy of The Port Authority of New York and New Jersey

A 10-Year Vision



"New York has been a seaport for its entire history. The working waterfront needs to be preserved and expanded, but in such a way that does not result in pollution or late-night noise nuisances. Development of new affordable housing in working-waterfront neighborhoods would help revive the city's labor tradition and its intrinsic relationship with the rest of the world."

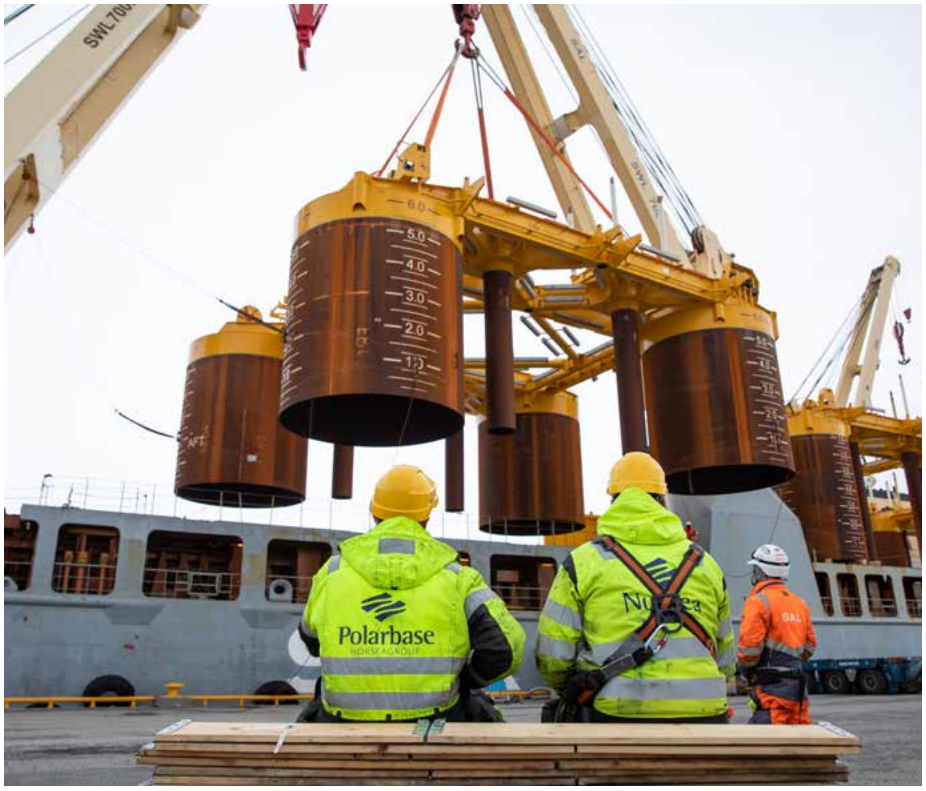
Since the last Comprehensive Waterfront Plan was released in 2011, public and private investment in the waterfront has spurred job growth at all income levels. As NYC emerges from the COVID-19 pandemic and seeks to reattain and exceed previous employment levels in an evolving environment, opportunities exist to build on these investments to support NYC's economic recovery and to improve NYC's affordability and equity. The City can help sustain and strengthen the economy by activating waterfront sites under its control to provide jobs in a range of sectors and skill levels and connecting New Yorkers to training and job opportunities. The City can also advocate for and advance its own crucial infrastructure investments in infrastructure, support the clean up of contaminated sites and promote the waterfront an as attraction drawing tourists to NYC.

Over the next 10 years, NYC's shoreline will be important to the growth of green power and mobilization of the green economy. In particular, NYC's waterfront and waterways are poised to play a significant role in offshore wind development and energy storage. Making investments in key sites such as the South Brooklyn Marine Terminal (SBMT) and speeding up deployment of large-scale energy storage will help transition NYC to a clean energy future and create well-paying jobs. By continuing to work with the State, offshore wind developers and power utilities, the City can ensure that residents of waterfront communities — especially those living near site that will host this emerging industry — are aware of and positioned for jobs that will be generated by it.

As part of the award by the New York State Energy Research and Development Authority (NYSERDA), the companies will partner with the State and City to transform the SBMT in Sunset Park into an assembly, operations and maintenance site for wind turbines. Creation of large-scale offshore wind industrial facilities will position NYC to emerge as an offshore wind industry hub. The Arthur Kill Terminal in Staten Island is also well-positioned as a site to support developing the offshore wind industry. In 2021, the New York State Empire State Development applied for financial support from the United States Department of Transportation's Port Infrastructure Development Grant Program to develop the Arthur Kill Terminal (AKT) in Staten Island as an offshore wind terminal.

In addition to being a place where people live and work, NYC's waterfront also features infrastructure of local, regional and global significance. NYC sits at the center of an interconnected regional ecosystem that relies upon a dynamic exchange of workers, goods, and shared infrastructure, much of which is located at or near the waterfront. Upgrading this infrastructure will help improve the reliability and resiliency of our transportation network, link millions of people to jobs, and support NYC's long-term economic health. The City can leverage these investments to create employment and career opportunities for New Yorkers through targeted training programs and direct these opportunities toward communities that historically have experienced high rates of unemployment.

The following section outlines goals and strategies for the City to realize the waterfront's potential for increasing economic opportunity for all New Yorkers over the next 10 years.



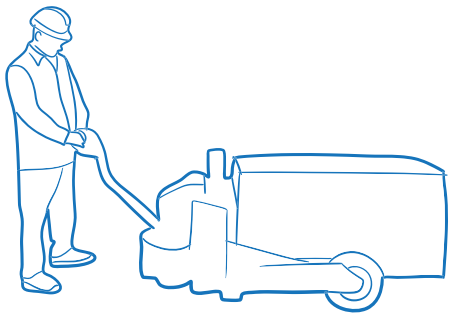
SAL Trina offloading subsea equipment at Polarbase, Hammerfest 4. May 2020.

Credit: Øyvind Gravås and Even Kleppa - Copyright - Equinor - Johan Castberg


TRAINING CENTER

Goals and Strategies

Goal 1: Advocate for a 21st century working waterfront by pivoting to green technology and environmentally sustainable practices



NYC currently generates most of its electricity by burning fossil fuels. NYC relies on 24 in-city power plants — many of which are located on the waterfront — that run on fuel oil or natural gas and generate about a quarter of NYC's total greenhouse gas emissions. Most of these plants were built decades ago. In addition to releasing greenhouse gas emissions that contribute to climate change, these plants release air pollutants that cause air quality and health issues for NYC communities. The City is committed to transforming NYC's fossil fuel-dependent electricity grid into one powered 100% by clean electricity resources by 2040.

To achieve this goal, the City will maximize renewables in NYC increase transmission from clean energy resources outside NYC, pursue energy efficient and sustainable energy solutions on City-owned property and actively participate in New York State and federal climate initiatives.

In 2019, the State passed the Climate Leadership and Community Protection Act to position New York at the forefront of ambitious and equitable transition to green energy. This effort intends to develop 9,000 megawatts of offshore wind energy by 2035 — enough renewable energy to power six million homes. In June 2021, the U.S. Department of the Interior's Bureau of Ocean Energy Management (BOEM) announced that it created a Wind Energy Area in the New York Bight off New York's coast, a new priority that will greatly expand opportunities for wind energy development. Besides reducing NYC's reliance on fossil fuel-burning plants, offshore wind and other climate actions are expected to create thousands of well-paying jobs in trades such as manufacturing, construction, installation and maintenance.

Another way the City aims to reduce greenhouse gas emissions is by promoting use of reduced-emission and emission-free vehicles. Trucks can have a significant effect on communities and the environment. Fine particulate matter can cause or exacerbate health issues and degrade environmental conditions. Although continued federal leadership is vital to control vehicle emissions, the City can continue to take steps within its authority to reduce the effects of truck

"A healthy waterfront is a working waterfront—that supports the movement of goods with clean freight and industry—and one that sets back urban development with continuous, connected open space for recreation and a diversity of habitats."

Opposite:
Port NYC South Brooklyn Marine Terminal (SBMT).

Credit: Sustainable South Brooklyn Marine Terminal

emissions on air quality. NYCDOT's Clean Trucks Program, which began in Hunts Point and has since expanded across the city, promotes sustainable transportation and a cleaner environment in Industrial Business Zones (IBZs) by offering incentives to trucks owners. These incentives support the purchase of advanced transportation technologies and alternative fuels trucks, as well as exhaust retrofit technologies. To date, the program has successfully replaced, retrofitted or removed 600 heavy-polluting diesel trucks, with the goal of improving air quality in the South Bronx.

NYC DOT Clean Truck Program.

Strategy 1.1
Position NYC to become a regional hub for the manufacturing, assembly, installation, and operation of offshore wind components by upgrading key waterfront facilities.

Strategy 1.2
Study the potential for renewable energy generation and storage on Rikers Island.

Strategy 1.3
Streamline permitting processes to unlock the safe and rapid deployment of battery energy storage.

Strategy 1.4
Continue to work with energy stakeholders to reduce reliance on old, inefficient fossil fuel-based generators located along the waterfront.

Strategy 1.5
Pursue energy efficiency and sustainable energy solutions on City-owned waterfront property including school sites, housing campuses and wastewater treatment facilities.

Strategy 1.6
Increase the availability of shore power whereby cruise ships can plug into the local electricity grid and turn off auxiliary engines while at dock to reduce or eliminate on-site emissions.

Strategy 1.7
Support the research and implementation of alternative fuels and other clean technology in the maritime industry to reduce carbon and particulate emissions from vessels.

Strategy 1.8
Promote low- and zero-emission vehicles that provide last-mile delivery to businesses and consumers.

Strategy 1.9
Leverage the City's procurement power to drive increased safety, efficiency and sustainability in freight.

Strategy 1.10
Improve the efficiency and sustainability of air travel by expanding capacity at airports and working with airlines and other stakeholders to reduce noise and greenhouse gas emissions.

Next Page:
Block Island Wind Farm.
Credit: Chris Bentley

Offshore Wind

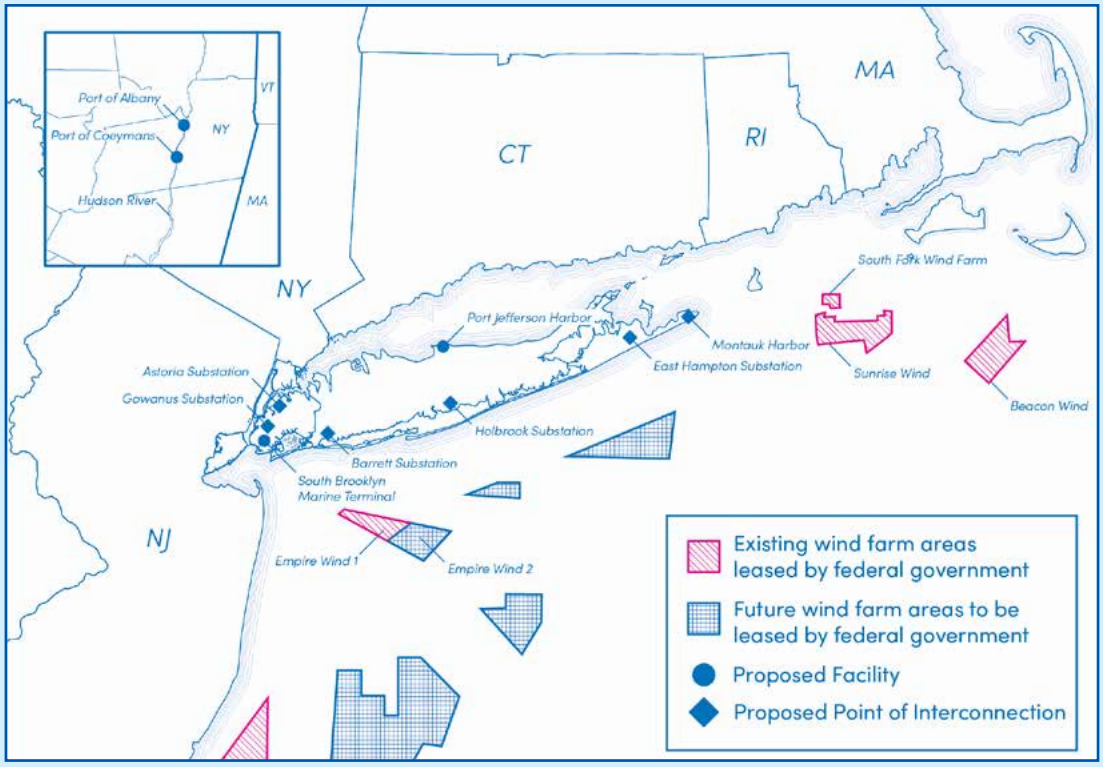
Under the Climate Leadership and Community Protection Act, the State aims to reach 70% renewable energy by 2030 and reduce greenhouse gas emissions by 85% by 2050 on the path towards carbon neutrality. The legislation also requires 35% of green energy funds to be invested in low-income communities.

In early 2021, the energy company Equinor was selected to provide the State with offshore wind power in one of the largest renewable energy procurements in the U.S. to date. Under the award, Equinor and partner BP will provide generation capacity of 1,260 megawatts (MW) of renewable offshore wind power from the Empire Wind 2 offshore wind farm and another 1,230 MW of power from the Beacon Wind 1 farm. This generation capacity is in addition to an existing commitment to provide New York with 816 MW of renewable power from Empire Wind 1 — for a total of 3.3 gigawatts (GW) of power to the State. The Empire Wind 1 project is planned to provide electricity directly to NYC.

Through the ***Offshore Wind NYC*** plan, the City began laying the groundwork to support offshore wind projects in three core areas: sites and infrastructure, business and workforce, and research and innovation. Continuing these efforts will create opportunities to develop the best-in-class infrastructure to support the construction and operation of offshore wind farms.

The plan also commits the City to developing public-private partnerships with communities to create well-paying, green jobs in disadvantaged neighborhoods historically affected by climate injustice. To deliver on this goal, the City will focus on targeted investments to develop workforce trainings and support businesses that seek to create a diverse talent pool in offshore wind. The plan further aims to support MWBEs and other local companies in accessing over $70 billion in economic opportunity expected to be created by the offshore wind industry.

Lastly, the plan outlines how the City will work to promote research and innovation in offshore wind so new technologies and approaches are created in NYC. The City will work with the offshore wind industry and partners to launch an accelerator that will allow New York-based startups to build out the next generation of offshore wind technologies to support worldwide growth and advancement in the field.



Goal 2: Harness NYC's waterfront setting to help diversify the economy and drive equitable economic recovery

NYC's economy benefits from increased activity in the sectors in which it is a global leader (such as finance, insurance and business services) and also from the diversity of its economy. A diverse economy is a more competitive and inclusive economy. The creative and cultural sectors make key contributions to the city's tourism industry and broader economy and increase its vitality as a place to live. As with many other sectors, this sector's growth is increasingly significant outside the Manhattan core. It can be seen along the waterfront — primarily in Brooklyn — where the City has reactivated legacy industrial sites that provide substantial space for the needs of the 21st century economy.

Although the number of production-oriented positions has declined over the last several decades because of automation, off-shoring and competing uses for land, industrial jobs remain crucial to a 21st century economy. Industrial and manufacturing jobs provide good wages and offer the potential for career growth, especially for New Yorkers without college degrees. Many of NYC's industrial businesses are connected to fashion, television and theater. Others are leaders in technology and product development.

The film and television production sectors are some of the fastest growing, higher-wage industries in NYC, leaving many firms struggling to find new space for production. Garment manufacturing has faced decades of global economic pressures that have led companies to take production overseas; yet this sector still comprises 30% of NYC's manufacturing jobs. This production activity in NYC continues to drive demand for commercial spaces in all these industries.

The City activates City-owned sites to meet the needs of industries requiring space to operate and grow. The waterfront is one of the few places in the City's dense urban environment where large, flexible sites can meet a wide range of business needs. The City's ongoing work to revitalize City-owned sites at or near the waterfront for suitable uses, and the economic results, are highlighted below in project callouts. The City's other tools used to sustain and create a diverse mix of well-paying jobs include financing, tax incentives and land use regulations. The City offers several financing tools through the NYC Industrial Development Agency (IDA) to support business growth, relocation and expansion. Land use regulations, such as zoning, set limits on the

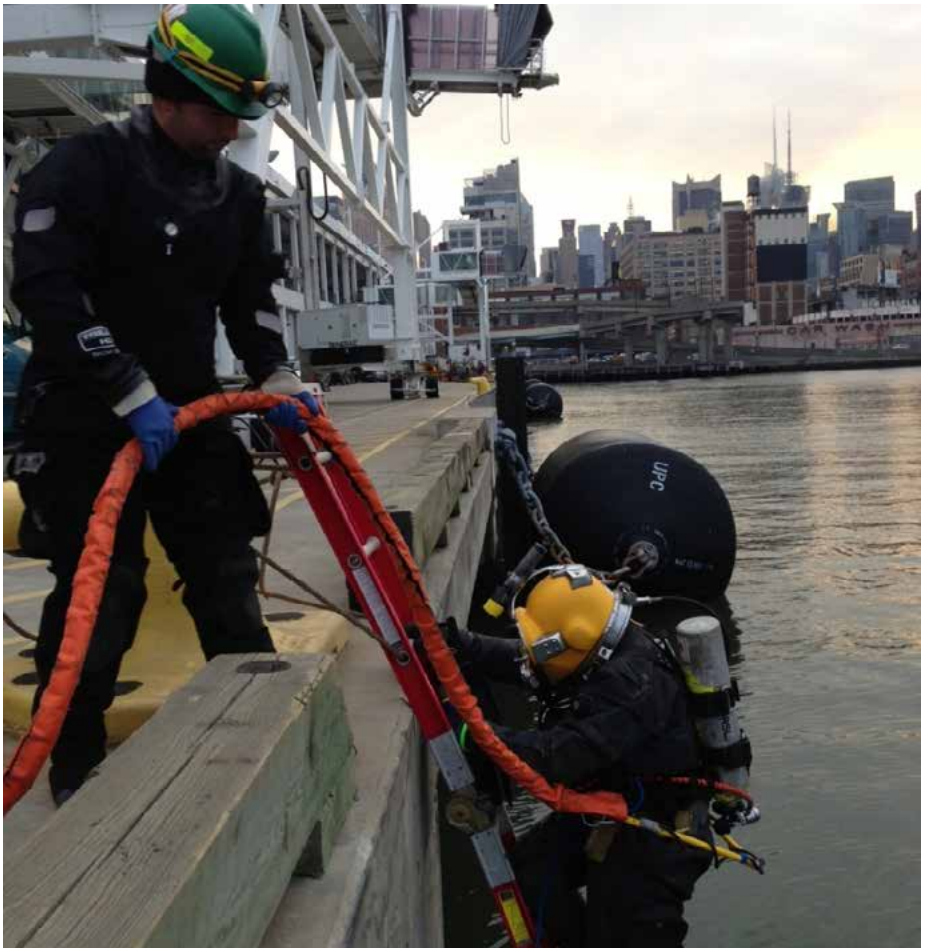
Opposite:
Processing oysters at SUNY Maritime.

Credit: Billion Oyster Project

permitted use of land and density of development in locations across the city. The City can unlock space for jobs and help businesses adapt to evolving economic conditions by providing capacity for commercial growth in appropriate areas and by ensuring that regulations are flexible enough to meet a range of workspace needs.

Increasing economic opportunity within NYC also involves addressing the specific needs of small businesses and minority and women-owned business enterprises (M/WBEs). For small businesses, the City continues to advance policy and procedural changes that save businesses money. To increase participation in the economy from underrepresented groups and companies, the City has certified a record number of M/WBEs and awarded them more than $10 billion in contracts since 2015.

M/WBEs have been awarded more than $10 billion in contracts since 2015.



Manhattan Cruise Terminal inspection.

Credite: COWI

Strategy 2.1
Activate and modernize publicly controlled waterfront sites with business activity that grows and diversifies the city's economy, including industrial, tech, creative, and cultural uses.

Continue investing in the reactivation of the Brooklyn Army Terminal to attract both large and small manufacturers that offer well-paying jobs.

Continue to modernize the Hunts Point Food Distribution Center by enhancing resiliency measures, promoting more variety in freight transportation and implementing workforce development strategies.

Support the creation of a creative campus at Bush Terminal to encourage the continued growth of the fashion and film industries by offering affordable industrial space for garment manufacturing, film and media production, and related services.

Position Governors Island to become a center for climate solutions and a lively, year-round destination with academic, commercial, non-profit and cultural uses that support expanded public access.

Grow the Brooklyn Navy Yard as a major employment center by implementing a campus-wide plan.

Strategy 2.2
Help businesses acquire property, construct and renovate facilities, and invest in equipment.

Utilize the IDA's benefits to grow companies that create well-paying jobs for New Yorkers.

Provide seed funding, business management education and branding assistance to support business development.

Advocate to fund programs such as Business PREP, to support resiliency planning by small businesses to prepare business interruptions and other negative effects from climate change.


HYSTER
9921
HYSTER
SM LU 3 12 07 06
SEABOARD
HUNTER
HOOK

Strategy 2.3
Address the need for additional workspace for a wide variety of activities, flexibility to accommodate evolving business needs, as well as the building, site, and logistical needs of waterfront commercial and industrial uses.

Identify opportunities to implement new zoning tools (such as those proposed by NYCDCP for the Gowanus Neighborhood Plan) to allow more space for a wider and more flexible variety of business activities in industrial and commercial waterfront areas.

Continue to support opportunities for mixed-use growth in waterfront communities, including transit-accessible clusters of office and other workspaces.

Support the availability of space and real estate stability that industrial businesses require for their operation by discouraging residential rezonings in IBZs.

Strategy 2.4
Help small businesses and M/W/DBEs sustain and expand their businesses.

Work with partners in government, business, and the nonprofit sector to provide financial resources and expertise to small businesses to help them reopen and recover from the COVID-19 pandemic.

Provide free legal services through the Commercial Lease Assistance Program to help businesses with lease-related issues.

Continue to address barriers that make it difficult for M/W/DBEs to win contracts on public projects.

Identify and work with an operator to establish a program to assist M/W/DBEs with opportunities in waterfront construction, including offshore wind infrastructure development.

Maritime and Freight Career Awareness Fair 2018, Brooklyn.

Activating City-Owned Sites for Economic Development

As waterfront neighborhoods grow and evolve, opportunities are being pursued to activate City-owned waterfront land to promote the growth and diversity of the city's economy by creating industrial space, community facilities and parks. The City can work with private and nonprofit developers to activate these sites or choose to develop the sites itself and find tenants.

Brooklyn Army Terminal

In 2018, the City completed its $115 million redevelopment of the Brooklyn Army Terminal in Sunset Park. The redevelopment has attracted small businesses to lease space and is expected to result in 1,000 well-paying jobs. Of the well-paying jobs created to date at this location, 45% have gone to workers with less than a college degree. The Brooklyn Army Terminal supports workforce development through its onsite Workforce1 Industrial and Transportation Career Center, which connects local workers to on-campus job opportunities. In addition, the City facilitates the Brooklyn Army Terminal's use for training and education opportunities (such as programs operated by the Fashion Institute of Technology) to equip local residents and employees with modern skills.

Brooklyn Navy Yard

Development at the Brooklyn Navy Yard has generated economic opportunities for industrial and creative businesses and employees. Building 77, which opened in late 2017, is home to a variety of companies ranging from food manufacturing to 3D printing. Building 77 has created 900 well-paying jobs to date and is projected to create 2,250 well-paying jobs overall. The expansion of Steiner Studios' soundstages at the Brooklyn Navy Yard has also had a positive effect on economic opportunity there. The expansion has created 690 well-paying jobs to date and is projected to generate 925 well-paying jobs overall.

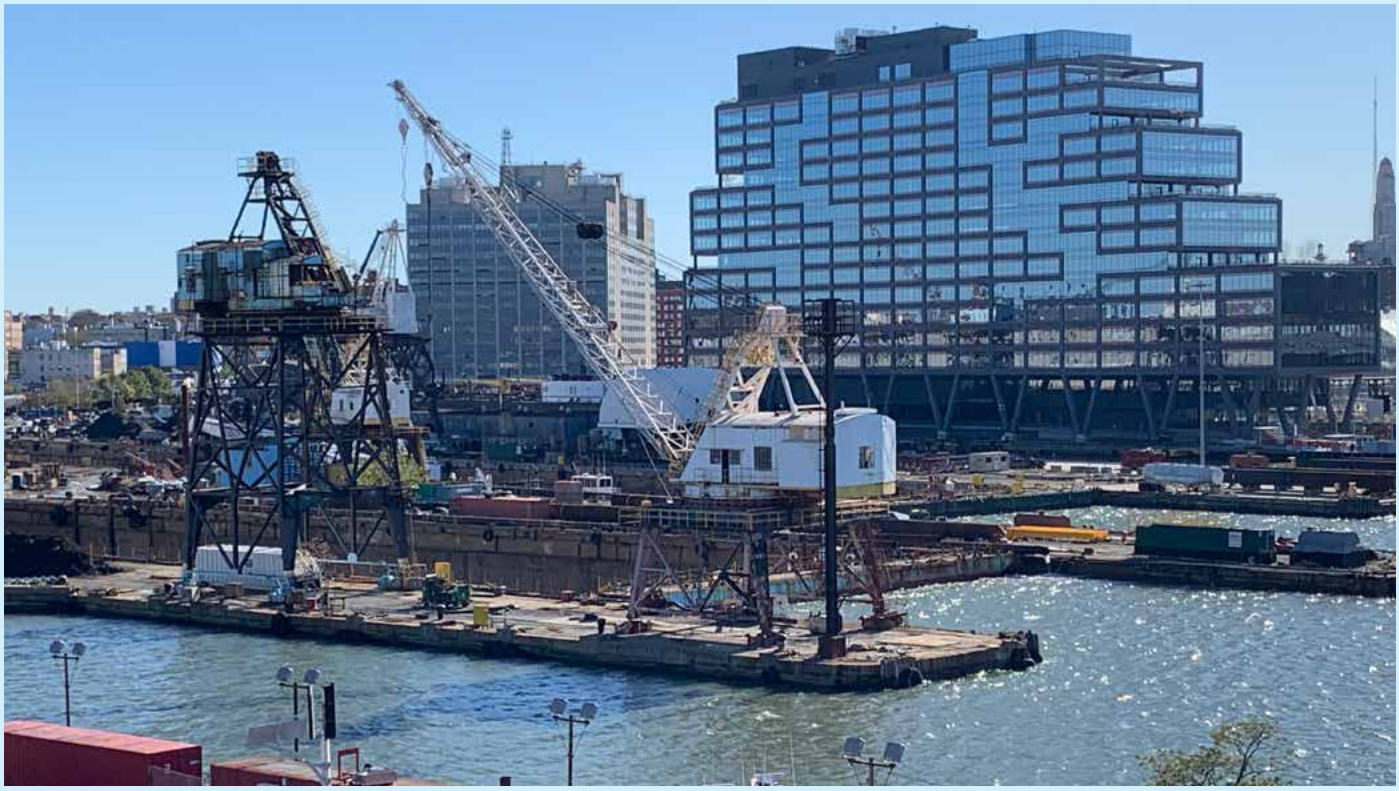
More than 50% of the well-paying jobs created at Building 77 and 21% of jobs at Steiner Studios have gone to workers with qualifications below the college degree level. In addition, 44% of jobs at Building 77 and 41% of the jobs at Steiner Studio are filled by women. Brooklyn Navy Yard also is home to the Albert C. Wiltshire Employment Center, which helps tenants fill existing positions and develop a talent pipeline. From 2018 to 2019, the center made 459 job placements. Of these placements, more than 85% were at Brooklyn Navy Yard businesses, and 34% percent were filled by NYCHA residents.

Made in New York Campus at Bush Terminal

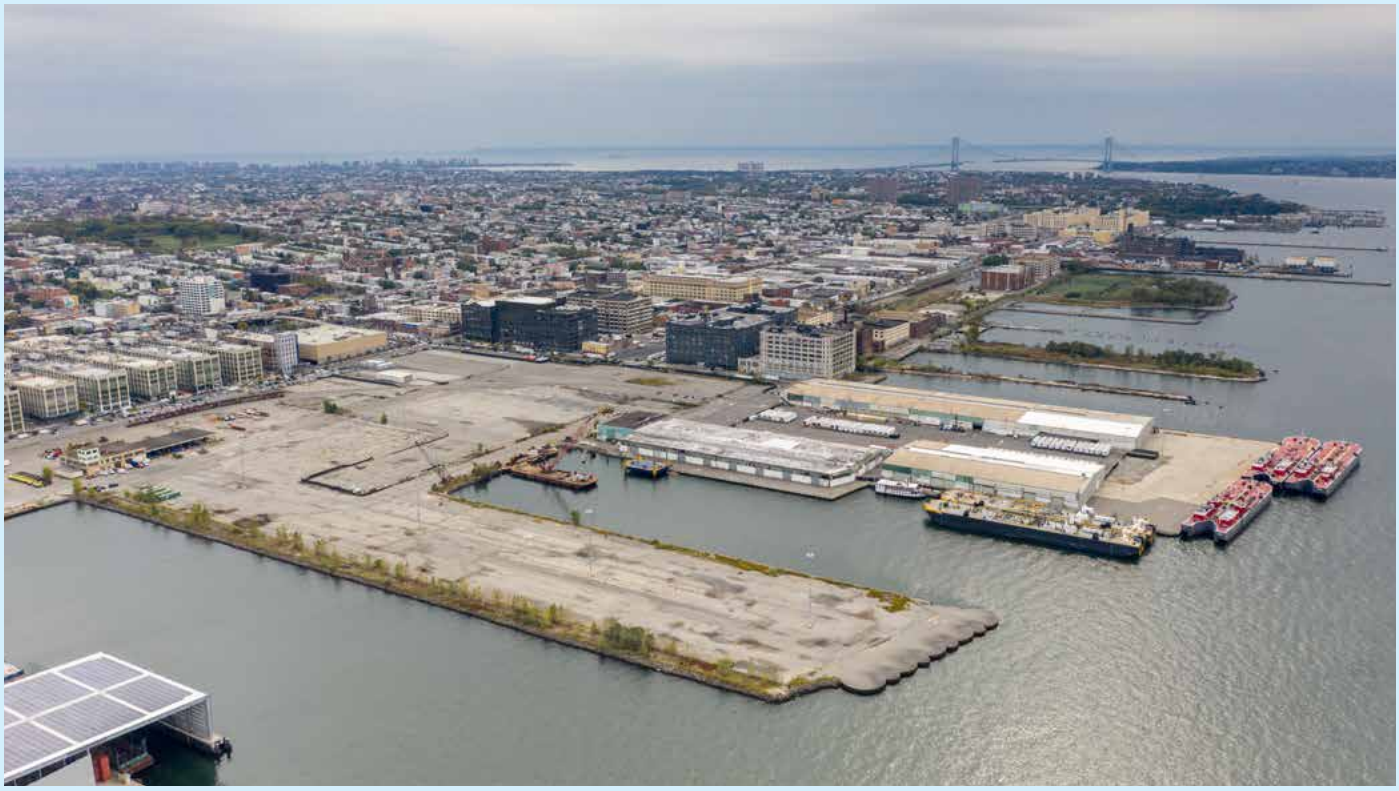
The City's $136 million investment to create a center for fashion, film and television in Sunset Park's Bush Terminal is scheduled to open in 2022. Renovations are expected to create a 200,000-square-foot garment manufacturing hub, upgrade industrial space in a 160,000-square-foot building, and improve the overall site plan. The City's investment also includes construction of a 100,000 square foot of state-of-the-art film and television production facility and a pedestrian-friendly streetscape to improve visitor access to Bush Terminal Piers Park. Once complete, the Made in NY Campus will bring together creative manufacturing uses and affordable industrial facilities for garment manufacturing, film and media production, and related services and industries. The City anticipates 1,500 new jobs will be generated at the Bush Terminal Campus.

South Brooklyn Marine Terminal

The City's $115 million investment in the 2018 reactivation of SBMT as a major shipping hub is expected to create more than 250 jobs in the near term, with potential for significant growth due to the terminal's development to host operations for offshore wind staging, assembly and maintenance.



Brooklyn Navy Yard.



South Brooklyn Marine Terminal.
Credit: Sustainable South Brooklyn Marine Terminal

Goal 3. Connect investments on the waterfront to employment and career advancement opportunities for New Yorkers

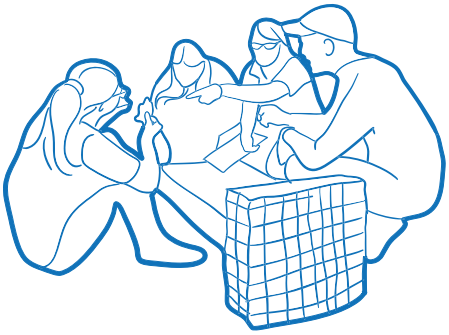
In 2019, more than 2 million New Yorkers lacked the basic education and skills to access jobs paying middle-class wages because they had neither a high school diploma nor a high school equivalency. The unemployment rate was higher for people of color — twice as high for Black New Yorkers than White New Yorkers. This crisis of housing affordability put tremendous strain on New Yorkers who were struggling even prior to the COVID-19 pandemic.

To address this inequity and help workers secure well-paying jobs in the 21st century economy, the City started in 2014 to shift its workforce system toward Career Pathways and Industry Partnership initiatives. Career Pathways targets specific economic sectors (such as manufacturing and construction) for workforce training because they offer significant potential for careers and worker benefits. Partnerships convene public and private stakeholders to develop training programs that match industry needs. The New York City Department of Education (NYCDOE) and the City University of New York (CUNY) then adjust curricula and policies to improve workforce outcomes for students. Taken together, these approaches increase economic opportunity by matching job seekers to the right workforce training to obtain in-demand jobs.

Opposite:
"Hudson River Snapshot Day" event.

Credit: NYC DEP

Strategy 3.1
Help job seekers and incumbent workers develop high-demand skills in existing and emerging industries on the waterfront, as outlined in New York Works.



Use Workforce1 Career Centers at the Brooklyn Navy Yard, the Brooklyn Army Terminal and other business zone clusters to help New Yorkers access industrial jobs.

Work with CUNY colleges, industry stakeholders and unions to prepare students and faculty for in-demand jobs, including those in industries along the waterfront such as offshore wind.

Provide NYC residents aged 21 and over that have not obtained a high school diploma with technical, trade, construction, or entrepreneurial skills to pursue meaningful employment or post-secondary education through career and technical education (CTE) courses.

Continue to develop connections between CTE schools and the maritime industry through internships, apprenticeships and maritime career awareness opportunities.

Develop curriculum in CTE programs and universities, including CUNY, that provide students with the ability to graduate into careers or continue to higher education in maritime commerce, supply chain management, operations research and other related fields.

Train young adults aged 18 to 24 who reside in NYCHA buildings in environmental stewardship, building green infrastructure, urban farming, and resident education through the AmeriCorps Green City Force program.

Train and pay workers to clean and green NYC's parks, playgrounds, and other facilities while also providing skills training and career coaching to find permanent work through NYC Parks' Parks Opportunity Program (POP).

Push for State legislation to drive economic recovery in economically disadvantaged communities by requiring contractors and businesses working with the City to hire low-income New Yorkers.

Expand access to construction and building service jobs by prioritizing low-income New Yorkers and NYCHA residents for such positions.

Through the Department of Youth and Community Development, promote internships and job shadow initiatives with public agencies and private companies to introduce NYC public school students to waterfront careers, including offshore wind.

Below:
Maritime and Freight Career Awareness Fair 2018, Brooklyn.

Next Page:
Wallabout Nursery monitoring.

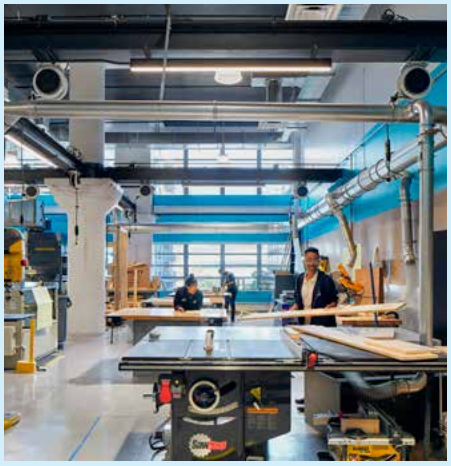
Credit: Billion Oyster Project

Positioning the Next Generation for Career and Technical Education on the Waterfront

Partnerships between public and private stakeholders have spurred the creation of the next generation of CTE programs. These programs provide students with the skills and experience they need to obtain jobs that will be in demand in the 21st century economy.

New York Harbor School

The Harbor School, which has been operating on Governors Island since 2010 is a NYC public school with approximately 430 students enrolled. All Harbor School students participate in traditional State Regents-based academic courses and one of six CTE programs of study. CTE programs include aquaculture, marine policy and advocacy, marine systems technology, marine biology research, ocean engineering, vessel operation and professional diving. In addition to achieving industry certification, students have access to paid internships, service-learning opportunities, professional visits, conference presentations and work-site tours.



Brooklyn STEAM Center

The Brooklyn STEAM Center, which opened in 2019 at the Brooklyn Navy Yard has a maximum enrollment of 300 students. It brings high school juniors and seniors from local public high schools who are interested in pursuing careers in construction technology, design and engineering, film and media, computer science and information technology, and culinary arts and hospitality management. Students spend half the day taking required academic classes at traditional high schools and the other half at the Center, an industrial campus comprised of tenants that specialize in these industries. The program helps students develop skills and uses tours and internships to form relationships with potential future employers based at the Navy Yard.

State University of New York Maritime College

SUNY Maritime College educates students to become leaders in the global marine transportation industry, the business of shipping, engineering, energy, facilities management, finance, the armed forces and public service. Each academic program at SUNY Maritime College emphasizes hands-on experiences that expands classroom learning. Every student has the ability to complete credit-bearing professional internships or earn a U.S. Coast Guard license to start or advance their careers.

Credits:
Top: Maritime and Freight Career Awareness Fair 2018, Brooklyn.
Middle: Brooklyn STEAM Center.
Bottom: SUNY Maritime College.


CMA CGM
POLO

Goal 4: Advance categories of investments in waterfront areas that broadly support economic activity locally and throughout the region

Although NYC is a 21st century global city, its relies upon aging infrastructure and suffers from capacity constraints. Many of the infrastructure connections to people, neighborhoods and businesses occur at or near the waterfront. NYC's public infrastructure must be maintained in a state of good repair with timely fortification and upgrades. NYC's transit system, for example, requires infrastructure improvements to increase its resiliency to climate change and expand access to neighborhoods that are underserved by mass transit. Investing directly in transit systems — including a citywide ferry system — and coordinating with regional entities helps to restore NYC's competitiveness and growth. Since infrastructure is expensive, the City needs to work with State, regional and federal partners to leverage resources and resolve inefficiencies in the design and construction necessary to achieve the 21st century infrastructure that NYC needs.

The work of the Port is a good example of a connection between infrastructure investment and the economy. As of 2017, the Port provided the region with an estimated 229,000 jobs and over $64.8 billion in annual income. The Port's economic impact is tied to steady overall growth in cargo volume, which is expected to continue. Drivers of this growth are attributed to changes in the freight industry, including the rapid expansion of e-commerce and the demand for a new generation of larger container ships. To keep pace, the Port Authority of New York and New Jersey (PANYNJ) and the USACE made substantial investments, including raising the Bayonne Bridge and dredging navigation channels to accommodate the increasingly large ships used to move global goods. This increased navigational clearance helps the Port remain among the nation's leading maritime gateways, supporting more than 28 million consumers in the region. Based upon container moves and cargo volume, the Port is the busiest on the East Coast and the second busiest in the United States.

In addition to making key infrastructure investments, NYC's existing stock of land must be used as effectively as possible to meet the growing demand for space. Brownfield cleanup has the potential to simultaneously address a full range of environmental, social and economic problems. Brownfields often contain a wide range of pollutants that are a legacy of past industrial practices that predate

Opposite:
CMA CGM Marco Polo passing under the raised Bayonne Bridge.

Credit: Courtesy of The Port Authority of New York and New Jersey.

modern environmental protection standards. These properties remain vacant or underutilized because potential developers fear the risks of environmental liability, and the construction delays and cost overruns caused by land pollution. Brownfields result in lost opportunities to create small businesses, new jobs, affordable housing and open space in areas where opportunities are needed most. The City aims to clean up contaminated land to eliminate environmental toxin exposure and alleviate social inequality caused by disproportionately high occurrences of brownfields in low-income neighborhoods.

Since 2010, the City has overseen the remediation of more than 700 properties, resulting in 400 acres becoming available for development.

NYC runs the largest municipal land cleanup program in the nation. In most cases, states oversee the contaminated land clean up, but the City finds it advantageous to operate a local cleanup program alongside the New York State Brownfield Cleanup Program. The Mayor's Office of Environmental Remediation (OER) manages the New York City Voluntary Cleanup Program and the E-designation Program for rezoned lots. Both programs protect public health and streamlined the process of converting underused, neglected and contaminated land into safe places ready for new construction.

Since 2010, the City has overseen remediation of more than 700 properties — resulting in 400 acres becoming available for development across the five boroughs. Buildings constructed on these remediated sites bring new jobs, affordable and market rate housing, community facilities, retail stores and open space.

OER also oversees the NYC Clean Soil Bank. Clean soil recovered through the program is reused at other construction sites and in resiliency projects, wetland restoration projects and other open space waterfront projects.

In addition to city cleanup programs, the NYS DEC also operates a state Brownfield Cleanup Program, which offers significant tax credits to developers that remediate brownfields.

Strategy 4.1
Continue to implement *Food Forward NYC*, *Freight NYC*, and *Delivering New York: A Smart Truck Management Plan*, which include infrastructure and operational strategies to ensure that NYC's supply chains are modern, efficient, and resilient.

Support regional and local projects that advance the U.S. Department of Transportation's Marine Highway Program initiatives to enable NYC to shift to a hub-and-spoke approach with marine highway barging operations.

Continue to leverage federal and State grants to support marine highway services.

Continue investment in critical waterfront food distribution infrastructure, including the Hunts Point Food Distribution Center, to ensure that NYC's food supply chains are modern, efficient and resilient.

Promote waterborne and rail options through investment in new infrastructure near or adjacent to key NYC food markets.

Advocate for deepening primary navigation channels, where appropriate, to advance container, offshore wind, recreation and other marine activities, and deepening secondary channels that provide access to marine terminals and recreational boating marinas.

Support the development of geographically dispersed freight hubs across the city.

Advocate for federal infrastructure funding to improve the ease of loading and unloading goods from water to land and vice versa.

Analyze and support strategies to move more e-commerce freight by water, including encouraging distributors to use waterborne options to reach fulfillment centers located along NYC's waterways.

Support NYCDOT's freight programs for curbside management and off-hour deliveries, particularly when pedestrian volumes are high and curb space is limited.

Strategy 4.2
Build and maintain waterfront infrastructure to support day-to-day harbor operations while identifying means to address deferred maintenance.

Invest in preventative maintenance technology for bulkheads to reduce corrosion and decrease future capital reconstruction needs.

Activate and refurbish more of NYC's existing piers and docks to move goods by water and to create growth opportunities for NYC maritime businesses.

Strategy 4.3
Improve capital project delivery to accommodate the current and future needs of waterfront communities, particularly those that have experienced historical disinvestment and face the greatest risks from the effects of climate change.

Expand use of triple-bottom-line planning among City agencies, with a focus on inter-agency collaboration to maximize the economic, environmental, and social benefits of capital investments.

Promote forward-looking, holistic capital planning, target investment in infrastructure in advance of growth and recognize historical disinvestment trends in certain areas.

Incorporate *Climate Resiliency Design Guidelines* into all capital project design and construction exposed to climate hazards.

Strategy 4.4
Upgrade critical regional transportation infrastructure at or near the waterfront to help improve the reliability and resiliency of NYC's transportation network while linking millions of people to well-paying jobs.

Advocate for federal funding for the Gateway Program, which will provide new tunnels across the Hudson River to increase capacity and redundancy and allow for the proper rehabilitation of the existing 110-year-old tunnels that sustained damaged from Hurricane Sandy and face growing risk from rising sea levels.

Support implementation of near-term and long-term flood mitigation measures introduced by the MTA to address critical climate vulnerabilities.

Strategy 4.5
Promote the clean-up of contaminated sites and waterways.

Continue use of the Brownfield Incentive Grant Program to support the cleanup and redevelopment of vacant and underutilized property in NYC.

Support the expansion of the Clean Soil Bank to provide low-cost soils for construction of berms and other structures to make the City's waterfront more resilient and sustainable.

Continue use of pre-development grants to support community-based organizations that seek to redevelop vacant or underutilized property in their communities.

Continue use of federal funds to help remediate sites where the City is financing construction of affordable or supportive housing and to help community-based organizations that want to develop new buildings in their communities conduct Phase I and Phase II studies.

Support the extension of the State's voluntary Brownfield Cleanup Program tax credits, which will expire in 2022.

Next Page:
NYC Sanitation facility.


künz
NYC sanitatic

Planning for the Future of NYC's Supply Chain

Within the past four years, the City has released plans to improve the effectiveness and sustainability of NYC's supply chain. Implementation of these plans is underway and transform the way goods move through our city, including via safer and more environmentally-friendly alternatives to moving goods via large trucks.

Delivering New York: A Smart Truck Management Plan

In 2021, NYCDOT released a plan to envision how the City could achieve a safe, sustainable, equitable and efficient last-mile freight delivery system. This plan provides key strategies and actions to enhance management of existing freight operations, truck safety, and compliance programs and policies. Truck movement would be managed to ease congestion and create innovative opportunities for safe deliveries. The plan considered and incorporated City priorities such as bus lanes, cycling infrastructure, pedestrian spaces and curb utilization. The Plan also recognized the need for incentives to support truck safety upgrades with features (such as sideguards) and cleaner technologies to reduce that the effects of major trucking infrastructure on adjacent communities.

Food Forward NYC

Food Forward NYC is the NYC's first 10-year food policy plan, which presents a comprehensive framework to provide a more equitable, sustainable and healthy food system by 2031. By investing in food production and distribution infrastructure, supply chains would modernize disposal would become more sustainable, and more New Yorkers would have greater access to healthy, affordable and culturally appropriate food.

Freight NYC

In 2017, NYCEDC released a plan to modernize NYC's aging freight distribution systems by making strategic investments in maritime and rail assets and by creating new distribution facilities. Among its many strategies, the plan outlined how NYC would benefit from a hub-and-spoke marine highway barging operation. Instead of relying on trucks to move goods from large regional container terminals, shipping containers and palletized cargo would travel by waterway. This approach was expected to reduce the number of trucks on roads and highways and to improve air quality.


NATHANS
Gelato &

Goal 5: Promote the use of our waterways for entertainment, hospitality, and education to provide jobs and drive tourism, including ecotourism

NYC tourism has long been a driver of economic opportunity, supporting more than 403,000 jobs across the five boroughs and generating almost $7 billion in State and City taxes, including $4.9 billion in the City pre-pandemic. In 2019, NYC's travel and tourism industry experienced its 10th consecutive year of growth, welcoming 66.6 million visitors (up 2.4% from 2018). This combined economic activity drives one of the most powerful job-creation engines in NYC's economy.

Tourism supported more then 403,000 jobs and almost $7 billion in State and City taxes.

NYC's waterfront and waterways play an important role in supporting tourism—world-class parks draw both New Yorkers and visitors with views of the water, skyline, bridges and piers; cruise ship terminals host some of the largest passenger ships in the world; and commercial and public marinas provide recreational opportunities.

In 2017, more than 1 million cruise ship passengers traveled through NYC, generating revenues of $228 million. This figure was up 41% from 2016 and up 82% from 2009. The City responded to this growth by investing millions of dollars to upgrade the NYC cruise ship terminals in Manhattan and Brooklyn to accommodate larger, more modern classes of ships and to ease passenger flow to and from ground transportation.

Although NYC's tourism industry stretches well beyond the waterfront and waterways, the City can harness these resources to attract visitors and to reconnect New Yorkers with the city through neighborhood exploration and staycations.

Opposite:
Coney Island, Brooklyn.

Credit: Brittany Petronella/
NYC & Company

Strategy 5.1
Celebrate NYC's waterfront and waterways in marketing initiatives to highlight tourism opportunities throughout the five boroughs.

Strategy 5.2
Complete planned upgrades of the NYC cruise ship terminals in Manhattan and Brooklyn.

Strategy 5.3
Ensure that berthing locations can accommodate a wide variety of vessels, including tug and barge operators, excursion operators, and cultural, historic and educational ships.

Strategy 5.4
Support the network of commercial and non-profit marinas that anchor many of NYC's waterfront communities and provide access to recreational boating services.

Support historic vessels and non-profit uses of public marinas and docks, where feasible.

Reduce permitting and operational barriers to marina operations, including routine dredging, dock rehabilitation, and bulkhead maintenance.

Ensure that permitting for marina operations supports necessary long-term investments in resiliency and capital and provide opportunity for community input.

Opposite:
Cruise ships docked at the Manhattan Cruise Terminal, Piers 88 and 90.

Credit: NYCEDC

Goal 1: Advocate for a 21st century working waterfront by pivoting to green technology and environmentally sustainable practices

Strategy 1.1: Position NYC to become a regional hub for the manufacturing, assembly, installation, and operation of offshore wind components by upgrading key waterfront facilities.

Strategy 1.2: Study the potential for renewable energy generation and storage on Rikers Island.

Strategy 1.3: Streamline permitting processes to unlock the safe and rapid deployment of battery energy storage.

Strategy 1.4: Continue to work with energy stakeholders to reduce reliance on old, inefficient fossil fuel-based generators located along the waterfront.

Strategy 1.5: Pursue energy efficiency and sustainable energy solutions on City-owned waterfront property including school sites, housing campuses and wastewater treatment facilities.

Strategy 1.6: Increase the availability of shore power whereby cruise ships can plug into the local electricity grid and turn off auxiliary engines while at dock to reduce or eliminate on-site emissions.

Strategy 1.7: Support the research and implementation of alternative fuels and other clean technology in the maritime industry to reduce carbon and particulate emissions from vessels.

Strategy 1.8: Promote low- and zero-emission vehicles that provide last-mile delivery to businesses and consumers.

Strategy 1.9: Leverage the City's procurement power to drive increased safety, efficiency and sustainability in freight.

Strategy 1.10: Improve the efficiency and sustainability of air travel by expanding capacity at airports and working with airlines and other stakeholders to reduce noise and greenhouse gas emissions.

Goal 2: Harness NYC's waterfront setting to help diversify the economy and drive equitable economic recovery.

Strategy 2.1: Activate and modernize publicly controlled waterfront sites with business activity that grows and diversifies the city's economy, including industrial, tech, creative, and cultural uses.

Strategy 2.2: Help businesses acquire property, construct and renovate facilities, and invest in equipment.

Strategy 2.3: Address the need for additional workspace for a wide variety of activities, flexibility to accommodate evolving business needs, as well as the building, site, and logistical needs of waterfront commercial and industrial uses.

Strategy 2.4: Help small businesses and M/W/DBEs sustain and expand their businesses.

Goal 3: Connect investments on the waterfront to employment and career advancement opportunities for New Yorkers.

Strategy 3.1: Help job seekers and incumbent workers develop high-demand skills in existing and emerging industries on the waterfront, as outlined in New York Works.

Goal 4: Advance categories of investments in waterfront areas that broadly support economic activity locally and throughout the region.

Strategy 4.1: Continue to implement *Food Forward NYC*, *Freight NYC*, and *Delivering New York: A Smart Truck Management Plan*, which include infrastructure and operational strategies to ensure that NYC's supply chains are modern, efficient, and resilient.

Strategy 4.2: Build and maintain waterfront infrastructure to support day-to-day harbor operations while identifying means to address deferred maintenance.

Strategy 4.4: Upgrade critical regional transportation infrastructure at or near the waterfront to help improve the reliability and resiliency of NYC's transportation network while linking millions of people to well-paying jobs.

Strategy 4.5: Promote the clean-up of contaminated sites and waterways.

Goal 5: Promote the use of our waterways for entertainment, hospitality, and education to provide jobs and drive tourism, including ecotourism.

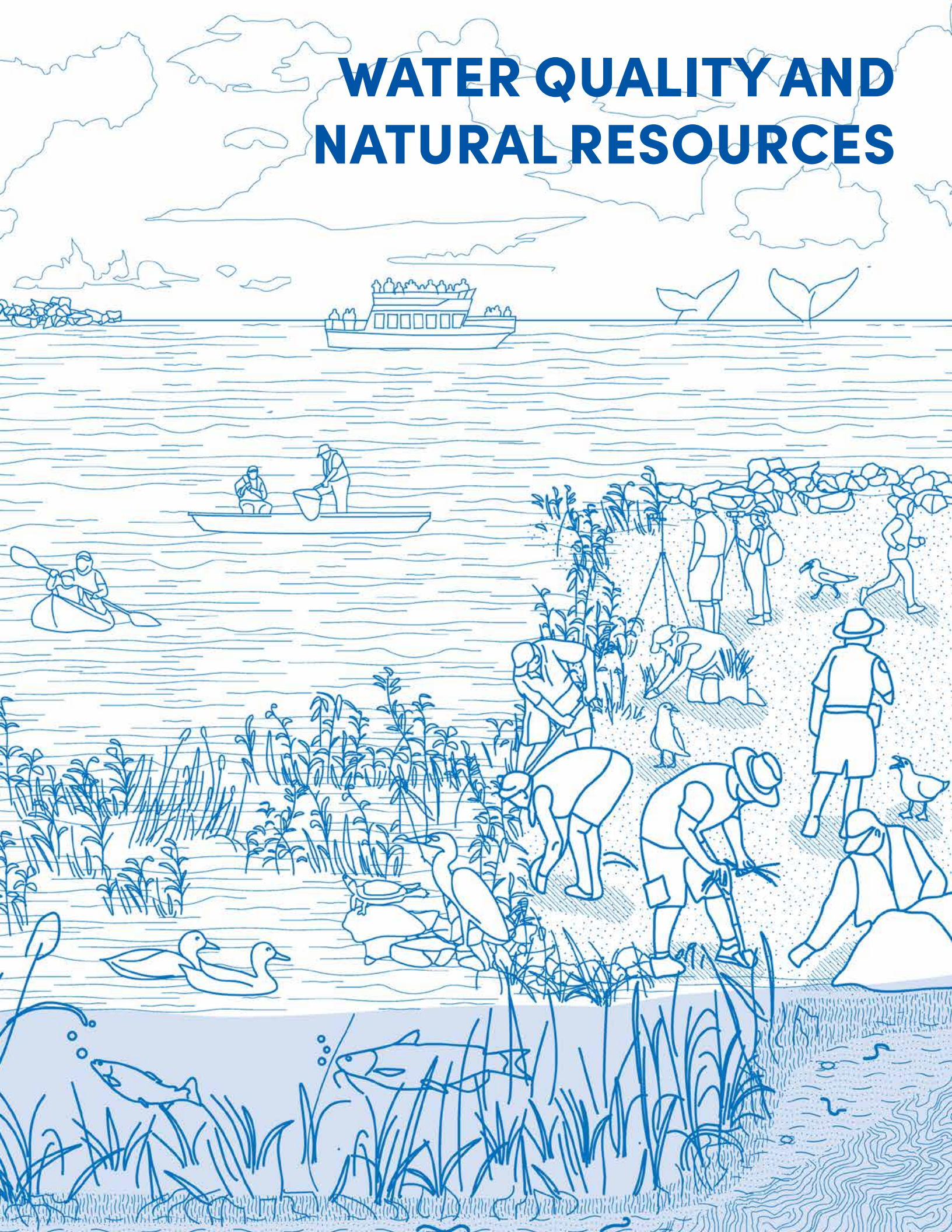
Strategy 5.1: Celebrate NYC's waterfront and waterways in marketing initiatives to highlight tourism opportunities throughout the five boroughs.

Strategy 5.2: Complete planned upgrades of the NYC cruise ship terminals in Manhattan and Brooklyn.

Strategy 5.3: Ensure that berthing locations can accommodate a wide variety of vessels, including tug and barge operators, excursion operators, and cultural, historic and educational ships.

Strategy 5.4: Support the network of commercial and non-profit marinas that anchor many of NYC's waterfront communities and provide access to recreational boating services.

WATER QUALITY AND NATURAL RESOURCES



In the next 10 years, New Yorkers will have access to cleaner bodies of water, expanded water safety education and more interaction with nature. The City has opportunities to build on its multibillion-dollar investments to improve water quality through various programs and policies. These opportunities include investing in existing critical infrastructure for the transport and treatment of sanitary sewage, updating rules for stormwater management on new and redeveloped properties, and continuing to build out the nation's largest green infrastructure program.

Habitat restorations and improvements in water quality have encouraged wildlife to return to NYC. The City will continue to maintain and restore the waterfront's natural habitats and ecological diversity through robust planning and research, especially in the face of climate change. Collaborations among City agencies and community stewards will support the rewilding of treasured estuaries and wetland ecosystems. And, because climate change threatens wetlands, City agencies will need to continue to use the best available data to restore and protect these essential habitats.

Improvements in water quality have led to more New Yorkers now able to access and enjoy the waterfront. The COVID-19 pandemic highlighted the benefits of public access to waterfront open spaces and the mental and physical benefits of getting out to the natural waterfront. Making sure all New Yorkers benefit from water quality improvements and access to waterfront ecology is vital. Excellent nature centers currently exist throughout the five boroughs, with programming that could be extended to NYC schools. The City encourages community involvement in waterfront restoration efforts, from monitoring oyster reefs to planting seagrass and participating in cleanup activities.

Goal 1: Improve water quality throughout the five boroughs and build upon key agency and public partner collaborations

Goal 2: Protect ecosystems, support ecosystem services, and enhance biodiversity of the natural waterfront, including in-water strategies

Goal 3: Help connect New Yorkers with waterfront ecology and raise awareness of water quality and habitat protection

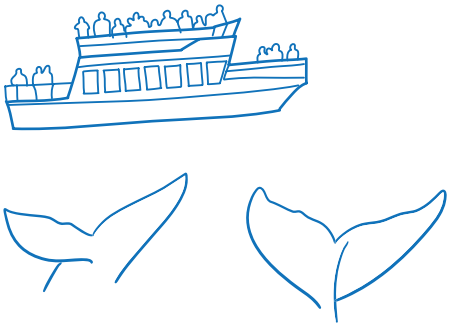
Goal 4: Utilize existing and new data sources to assess natural resources and inform decision making for restoration and protection

Overview

With more than 520 miles of shoreline and an interconnected network of islands, NYC is a city of water and diverse marine habitats. Clean waterways allow residents and visitors to engage in safe and healthy recreational activities, such as swimming at one of NYC's many public beaches, fishing and boating. NYC's coastal ecosystems provide many benefits for people and the environments by promoting biodiversity and mitigating the effects of climate change.

The quality and ecology of NYC's waterways are strongly shaped by the city's wastewater management infrastructure. NYC is served by two types of sewer systems — separate and combined — that are defined by how they handle wastewater and stormwater. In Municipal Separate Storm Sewer System (MS4) areas, stormwater and sanitary sewer systems operate independently: Pipes carrying wastewater connect directly to the wastewater resource recovery facility (WRRF) for processing, while pipes carrying stormwater connect directly to local waterways. Unfortunately, stormwater may pick up pollutants (such as oil, trash, and fertilizers) from the street and carry them into the water.

In combined systems, a single pipe carries sanitary sewage and stormwater flow to the local WRRF. NYC's sewer system is approximately 60% combined. During heavy rain or snowstorms, the combined sewer system discharges a diluted mixture of stormwater and sewage into local waterways, which is called a combined sewer overflow (CSO). This release is necessary to protect the wastewater infrastructure and treatment systems. CSOs become a concern, however, when they occur too frequently or in large amounts. The result is harmful to water quality.



In 2011, only 3 whales were spotted near NYC, in 2020, there were more than 300. Whale watching tours are now a part of the NYC tourism industry!

At the start of NYC's industrial age, local waterways supported manufacturing and maritime industries. In the early 1800s, as NYC's population grew, open trenches and early sewers sent waste directly to the nearest waterbody. Physical changes to historic marshes and creeks and widespread industrial pollution further degraded water quality and harmed local ecosystems. Since the start of the Harbor Survey Monitoring Program and the construction of NYC's first wastewater treatment facility in 1886, water quality has improved steadily. Today these improvements can be seen by the diversity of marine life that has returned to NYC, such as whales, sharks, seals, sea turtles and various fish populations.

Since the 1970s, the City has invested more than $40 billion to upgrade and expand wastewater treatment services, an essential move to improve water quality near NYC's shoreline. More recently, the City has invested $1.2 billion to upgrade six WRRFs to reduce nitrogen

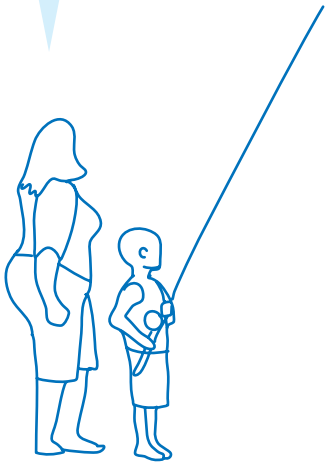
discharges. Too much nitrogen in water creates an environment where algae grow too fast, overwhelming the ecosystem and making the water less healthy. Less nitrogen in the water provides more oxygen to help fish, other aquatic animals and plants survive. Work on two additional WRRFs is expected to be complete by the end of 2022. To reduce CSOs that affect water quality during heavy rainfall, the City has spent nearly $2.7 billion on grey infrastructure projects since 2010 and has committed almost $6 billion for investment toward future CSO reduction.

Over the last decade, the City has actively engaged local stakeholders in developing 11 Long Term Control Plans (LTCPs), a multibillion-dollar effort to reduce the frequency and volume of CSOs. The City also oversees a $1.6 billion green infrastructure program — the nation's largest — which will reduce CSO discharges by 507 million gallons per year by the end of 2021. The overall stormwater management and water quality in NYC's waterways also will benefit from new stormwater regulations expected to be in place in 2022. Together, these efforts have made NYC's water quality the best it has been in more than a century.

See **"Unified Stormwater Rule" on page 216** for more information.

Brandt Preserve, Queens.

"The waterfront needs to respect existing plant and animal habitats; polluted bodies of water need to be carefully remediated and access to water transportation services needs to be improved."



Enforced regulations are another effective tool to protect waterways. When Congress passed the Clean Water Act (CWA) in 1972, wetlands frequently were drained and filled to create new building developments. Section 404 of the CWA was written to reverse that trend by preventing fill material in wetlands. Its enforcement has helped to protect many areas; however, the challenges presented by climate change and rising sea levels require new solutions. For example, clean fill and eroded salt marsh can help build up low-lying coastal wetlands that cannot expand inland or acquire new sediment naturally. Flexible regulations will be critical in allowing practitioners to support wetland restoration and protection under today's conditions.

Since the City released the first **Comprehensive Waterfront Plan** in 1992, NYC Parks has overseen more than 30 salt marsh restorations across all five boroughs, encompassing more than 75 acres. More than 355 acres of wetlands were restored citywide. These restoration efforts strengthen coastal habitats, improve water quality and offer a degree of protection against storm surges by reducing the effect of waves. However, these spaces need additional support to provide these essential services. Improving water quality and protecting and enhancing natural areas also can create co-benefits for public enjoyment.

Restoration and remediation efforts help connect New Yorkers to the natural waterfront by allowing for safe in-water recreation such as boating, fishing and swimming, where appropriate. NYC has more than 50 launches for human-powered boats, proving opportunities for on-water recreation from Long Island City to the North Shore of Staten Island to Jamaica Bay and beyond. Increased access to on-water recreation has been made possible through strategic collaborations among City agencies, State and federal partners, and community stewards of waterfront spaces. These activities provide opportunities for New Yorkers to stay healthy, connect with fellow New Yorkers, and enjoy a reprieve from living in a dense urban environment.

A 10-Year Vision

Building on a focus on environmental remediation that goes back to the 1992 Plan, the City remains committed to cleaning its waterways by addressing environmental contamination, loss of natural resources and crumbling infrastructure. The City has earmarked $1.6 billion for green infrastructure. More than 11,000 rain gardens have already been built to collect and absorb stormwater before it enters our sewer system. Rain gardens reduce the pollution that enters and harms NYC's waterways, and more rain gardens are being planned.

Key partnerships among the City, State and community organizations also have helped advance in-water restorations, expand habitats and promote biodiversity. Over the past few years, millions of oysters, which function as natural filters for cleaning waterbodies, have been restored to NYC's waters. In 2019, the State announced $1.5 million in capital funding to help create approximately four acres of enhanced habitat for between 5 million and 10 million oysters in the Hudson River Park's Estuarine Sanctuary. Oyster monitoring stations and community oyster reefs — maintained by the Billion Oyster Project in collaboration with community scientists — are located throughout the five boroughs. Future habitat improvements may include the installation of reef balls, gabion baskets and mounds of recycled shells to create habitat corridors between piers.

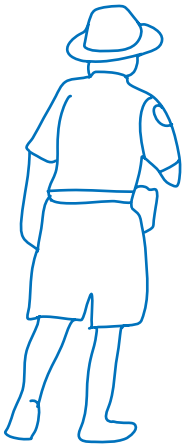
Oysters at field visit to Richmond County Yacht Club (RCYC) in Staten Island

Credit: SCAPE


WERNER

Goals and Strategies

Goal 1: Improve water quality throughout the five boroughs and build upon key agency and public partner collaborations



The New York City Department of Environment Protection (NYC DEP) manages the largest municipal wastewater treatment program in the United States. The City continually improves the ways it manages pollution during heavy rain events. Every day, the City treats 1.3 billion gallons of wastewater. The system can treat 3.7 billion gallons of stormwater and wastewater on a rainy day, nearly three times as much as it does on a dry day. In response to CSOs, the City has invested billions of dollars to upgrade wastewater treatment infrastructure and increase its resilience to the effects of climate change.

In CSO areas, DEP implements LTCPs, which use both grey infrastructure (CSO tanks and tunnels, curbs, gutters, drains, piping) and green infrastructure to capture rain water where it falls and to move urban stormwater away from the built environment. This hybrid approach maintains the specific conditions of each waterway.

In MS4 areas, the City continues to implement the NYC Stormwater Management Program. This program includes several initiatives, ranging from enforcement around illegal discharges to rules about managing stormwater runoff during and after construction. Under the City's NYS SPDES MS4 permit, the City coordinates a construction permitting program with the NYS DEC. As part of the most recent update, NYC is simplifying and aligning its stormwater rules. The new unified rule will, in part, require a larger share of construction projects to control their stormwater runoff.

DEP has significantly scaled up its green infrastructure work through the NYC Green Infrastructure Plan. The initiative includes construction of rain gardens, rooftop water catchment basins and green streets. In March 2012, the Green Infrastructure Plan was incorporated into a consent order with the State to eliminate or defer $3.4 billion in traditional investments and achieve annual CSO reductions of approximately 1.5 billion gallons by 2030. More than $1 billion has been committed to the initiative since 2012, and more than 11,000 green infrastructure assets have been constructed or are under construction.

Public rights of way (sidewalks, parking lanes, medians and the roadway) offer a tremendous opportunity for siting green infrastructure and, as such, have been the largest implementation area of the Green Infrastructure Plan. These surfaces make up

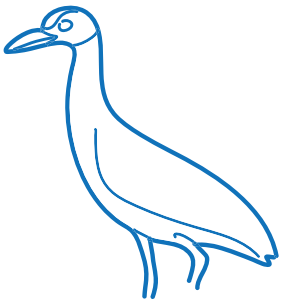
Opposite:
$10M Drainage Upgrade for Bay Terrace, Staten Island.

Credit: NYCDEP

approximately 30% of the impervious cover in NYC that does not absorb rainfall. Through the Green Infrastructure Plan, the City has added more than 660,000 square feet of pervious surfaces to NYC streets and sidewalks, which reduces stormwater runoff.

"NYCs waterfront, despite being mostly armored, still has capacity to provide habitat for diverse aquatic organisms, making the water edges important areas for urban conservation and ecological rehabilitation."

Another area in which DEP has made positive strides is the launch of an updated advisory system that makes it easier for waterfront enthusiasts to see if daily water conditions are safe for recreational activity. While basic water-quality alerts are issued through the Notify NYC system, the updated DEP system offers a more interactive platform based on State water quality standards. Users now have access to data for 45 waterbodies (up from 28). The dashboard displays rainfall data from rain gauges at all 14 WRRFs and provides more detailed advisory durations based on measured rainfall.



Strategy 1.1
Enact the new Unified Stormwater Rule to align on-site stormwater management requirements across NYC and expand best practices for retaining stormwater on-site with green infrastructure.

Strategy 1.2
Continue to implement the NYC Stormwater Management Program to reduce pollution generated in MS4 areas. Ensure that cleanup plans, permits, and other key decisions are grounded in local solutions developed with community engagement and support.

Strategy 1.3
Further reduce CSOs by improving and expanding green and grey infrastructure, as described in the NYC Green Infrastructure Program and LTCPs.

Prioritize expansion and equitable implementation of green infrastructure and nature-based solutions.

Strategy 1.4
Increase interagency coordination to identify barriers to and opportunities for expanding green infrastructure implementation, maintenance and stewardship.

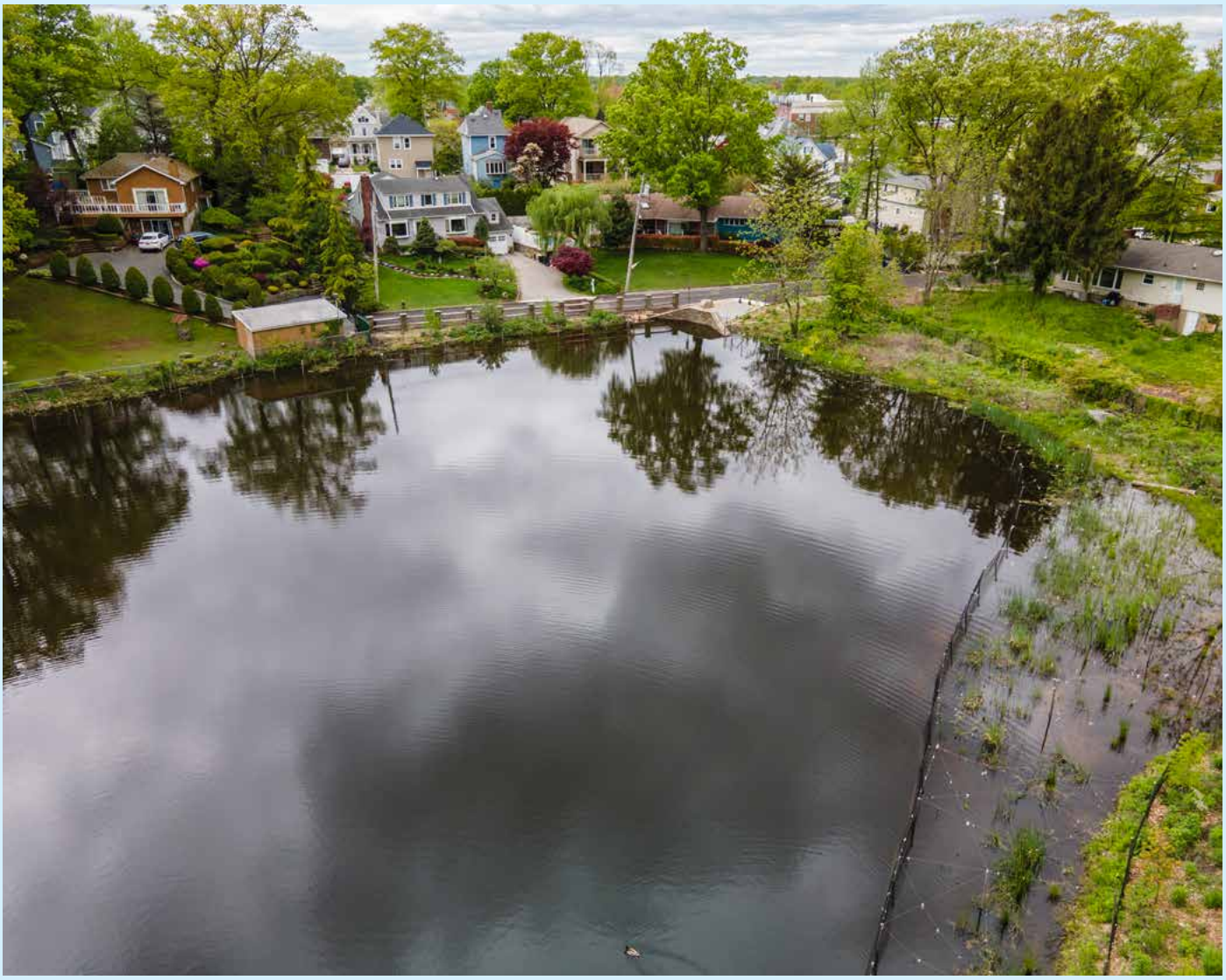
Strategy 1.5
Support innovative bio-extraction pilot programs to improve water quality (including oysters, ribbed mussels and eelgrass) to support cleaner water across New York Harbor and all five boroughs.

Strategy 1.6
Continue expanding the Bluebelt program with associated aquatic ecosystem protection strategies.

Unified Stormwater Rule

The Unified Stormwater Rule (USWR) will change how new and redeveloped properties in NYC manage stormwater. The USWR updates and aligns water quantity requirements in NYC's combined sewer drainage areas with water quality requirements in separate sewer drainage areas, providing a comprehensive, citywide stormwater management policy for public and private development.

As part of the USWR, the NYC Stormwater manual offers clear technical guidance and incentives for meeting multiple stormwater requirements with a holistic, retention-based green infrastructure approach to stormwater management. The rule requires more on-site stormwater management, which will lead to improved water quality, reduced urban flooding, lower burden on public infrastructure and reduced energy demands. The rule will provide CSO reductions of 362 million gallons per year by 2030 in combined sewer areas.



Above:
Jack's Pond, Staten Island.

Credit: NYC DEP

Next page credits:
Top and middle: Rebecca Swadek, NYC Parks
Bottom: Billion Oyster Project

Innovative, Nature-Based Methods for Treating and Transporting Water

Managing billions of gallons of wastewater and stormwater per day is a massive challenge that requires a complex wastewater treatment system and a broad range of policies and strategies to protect residents and marine life from polluted water. The City is working to improve wastewater infrastructure equitably across the five boroughs, particularly by addressing environmental justice communities near the Bronx River, Hutchinson River, Flushing Bay, Flushing Creek and Newtown Creek. These waterbodies have historically borne a disproportionate share of the negative effects associated with water pollution.

Tibbetts Brook Daylighting

At the southern end of Van Cortlandt Lake in the Bronx, Tibbetts Brook enters the Broadway sewer at a rate of 4 million to 5 million gallons of water per day, on a dry day. This water is treated at the Wards Island WRRF. When it rains, the combination of sewage, street runoff and water from the brook enters the combined sewer—bypassing the treatment plant and flowing directly into the Harlem River. This single CSO outfall—known as WI-056—generates more than half of the CSO discharge entering the Harlem River. DEP will construct a bypass to remove this streamflow from the sewer and direct it along a new path to the Harlem River, "daylighting" it in an open channel—a development that will significantly reduce CSO occurrences on the Harlem River.

Bluebelt

Bluebelts are nature-based, cost-effective drainage systems that preserve and enhance existing natural drainage corridors, such as streams, ponds and other wetland areas. Their role is to assist in transporting, treating and detaining stormwater in place — instead of relying on traditional grey infrastructure. Bluebelts receive stormwater from the developed landscape, slow the flow of stormwater using vegetation, and detain the stormwater in ponds and wetlands. DEP's Bluebelt program started in Staten Island and currently features almost 10,000 acres. Efforts continue to expand in Staten Island and other areas, including Southeast Queens WRRF.

Bioremediation Techniques

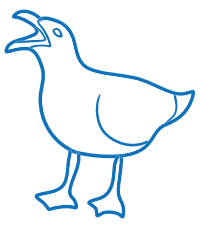
Narrow waterways (such as Coney Island Creek, Flushing Creek, Newtown Creek, Westchester Creek and Gowanus Canal) are a key challenge to improving water quality, particularly in industrial areas. Local bioremediation techniques (such as wetlands) can help to reduce pollution. Water quality improvements can be made by restoring natural ecosystems. Wetlands, oysters and ribbed mussels all act as natural filters to clean waterbodies and waterways. A partnership involving City and State agencies and nonprofit organizations has successfully restored oyster habitats.

Goal 2: Protect ecosystems, support ecosystem services, and enhance biodiversity of the natural waterfront, including in-water strategies

Although it is primarily viewed as a concrete jungle, NYC actually contains thousands of acres of salt marshes, freshwater wetlands, rivers, streams and about 286 miles of natural shoreline (out of 520 miles of total shoreline). NYC Parks manages approximately half of NYC's 5,650 acres of wetlands, including 1,540 acres of salt marsh, 850 acres of freshwater wetlands and 60 miles of streams. This habitat supports a diverse range of organisms and provides recreational and educational opportunities for residents and visitors. NYC has worked hard to protect and conserve the remaining wetlands since Congress passed the Clean Water Act more than 50 years ago. Although this effort has slowed the destruction of this critical habitat and helped to preserve many acres for future enjoyment, it is no longer sufficient simply to conserve existing habitat. Degraded natural resources must be restored as well.

The City is committed to maintaining and restoring the waterfront's natural habitats and ecological diversity through robust planning and research, especially as it confronts the potential effects of climate change. From 2013 through 2017, NYC Parks and the Natural Areas Conservancy (NAC) assessed the condition of more than 1,300 acres of tidal and freshwater wetlands and 26 miles of streams. The ***Wetland Management Framework*** (WMF) summarizes these indicators of ecological health and threat and proposes a path forward for wetland management in NYC.

"The habitats that support us must be cared for as integral elements of the urban ecosystem where biodiversity flourishes and ecological resilience is maintained"



Wetlands help slow storm surges and mitigate flooding by trapping and slowly releasing precipitation and by helping to slow erosion. Quantifying the true benefits that coastal marshes bring to mitigating the impact of erosion due to waves is difficult. Current models suggest that incredibly large areas of wetlands are needed to provide adequate protection from coastal flooding, but they still provide benefits and need protection. Healthy wetlands can sequester carbon and help mitigate the effects of climate change for coastal communities. NYC wetlands are vulnerable to the effect of rising sea levels, and NYC's dense urban environment makes it less likely that wetlands are able to migrate naturally to higher ground.

Salt marshes managed by NYC Parks will lose several acres per year as vegetated marsh erodes and potentially face the threat of drowning

Opposite:
Soundview Park Ecological Restoration, The Bronx.

Credit: NYC Parks

as the climate changes. Stormwater flows and a loss of adjacent protective vegetation degrade streams. Freshwater wetlands face degradation from a range of factors including adjacent development, invasive species, stormwater pollution and the gradual losing of their connection to robust water sources.

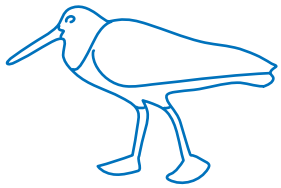
"[We should...] Prioritize the health and maintenance of existing wetlands, and push for legislation to preserve them from development; where feasible, reconstruct them."

Wetlands and marshes require increased protection and maintenance to survive for decades to come. Degraded marshes can be restored by removing debris and invasive species and by planting native species. Placing a thin layer of clean soil on existing salt marshes also can help adapt wetlands to rising sea levels. Ecologically sensitive design features, such as roads constructed with eco-culverts and wildlife passages, can help minimize the negative effects of development on wetland habitat quality and biodiversity.

NYC's waterfront is characterized by a wide range of conditions — sandy beaches, living shorelines, bulkheads and esplanades — that are generally classified as either soft, hard or hybrid infrastructure. The City has made substantial progress in restoring coastal habitats and promoting ecologically healthy shorelines. The U.S. Army Corps of Engineers' Nationwide Permit # 54 (**USACE NWP #54**), designed specifically for living shorelines, has been a particularly helpful tool.

These efforts are an important first step, but must be accompanied by additional in-water restoration activities that directly restore the ecology of the harbor and promote biodiversity. Oyster reefs, eelgrass meadows, reef balls and other in-water interventions can create marine habitat that also clean the water. A single oyster alone can filter up to 50 gallons of water per day. Opportunities exist to expand intertidal experiences for all New Yorkers, especially as restoration efforts extend into the water. A few years ago, oyster reef pilot programs were being designed and implemented, but creation of large-scale oyster reefs had not yet been attempted in NYC. Today, NYC's oyster reefs are an important natural infrastructure tool to improve water quality and reduce storm surge effects.

Strategy 2.1
Increase City, State and federal investment in wetland protection, restoration, acquisition, management and monitoring.



Continue to prevent habitat loss, create new habitat and secure space for tidal wetlands migration, while recognizing the constraints presented by the dense, surrounding urban environment.

Explore options to protect smaller wetlands.

Ensure that wetlands and streams have adjacent natural land, where feasible, to mitigate the effects of storm-related flooding and to facilitate the migration of wetlands when sea levels rise.

Strategy 2.2
Implement priority projects from the NYC Parks and NAC WMF and explore new strategies to restore and enhance the natural waterfront.

Strategy 2.3
Develop a reserve supply of clean sediment that can be used to elevate marshes that are vulnerable to sea level rise.

Strategy 2.4
Continue to advance Mitigation and Restoration Strategies for Habitat and Ecological Sustainability (MARSHES), such as the Saw Mill Creek Pilot Wetland Mitigation Bank. Make wetland impact offset credits steadily available for the permitting process associated with implementing critical public and private waterfront infrastructure projects.

Strategy 2.5
Increase coordination between capital infrastructure planning and habitat restoration planning.

Strategy 2.6
Work with State and federal partners to modify permit requirements to promote nature-based solutions, building upon the success of designated USACE Nationwide Permits for Living Shorelines and Aquatic Habitat Restoration.

Strategy 2.7
Support innovative in-water strategies to promote biodiversity and ecosystem restorations, including the propagation of oysters, ribbed mussels and eelgrass.

Restoring Ecosystems and Promoting Biodiversity

Marine wildlife is returning to NYC through the dedicated efforts of community scientists, nonprofit organizations and government agencies. The preservation and expansion of coastal habitat in NYC and the presence of cleaner waters have led to incredible sightings of marine wildlife throughout the City.

In Jamaica Bay during 2021, a resident seal gave birth to a pup in what was considered the first instance of seal nativity in NYC in 100 years. Jamaica Bay, an 18,000-acre wetland estuary and an unit of the National Park's Gateway National Recreation Area, provides a unique environment for both wildlife preservation and urban recreation. Jamaica Bay currently hosts over 325 species of birds, 50 species of butterflies, and 100 species of finfish.

During 2020, ecologists at CUNY Queens College spotted a bobcat roaming along the Bronx River, likely foraging for food. The Bronx River is NYC's only freshwater river. In the last three years, local ecologists have noted 20 different animal species spotted in and along the Bronx River, including muskrats, flying squirrels, and white-tailed deer. The presence of these species is a sign of the river's health, demonstrating the value of preserving city habitats and the biodiversity that they can support.

Wallabout Basin Nursery

Artificial Reef Program

Artificial reefs are human-made structures created to provide habitat for fish and other organisms. They feature a variety of hard, durable materials including rock, concrete and steel. In 2020, NYS DEC launched the third year of the largest artificial reef expansion in history. This initiative includes publication of an interactive map online, where visitors can view images of the artificial reefs. Volunteer scuba divers are invited to dive on the artificial reefs, record their observations, and submit the data to the NYS DEC.

Randall's Island Living Shoreline

The Randall's Island Living Shoreline features terraces and tide pools that create new ecological habitats and encourage biodiversity. Markers at different shoreline elevations allow the public to observe the effects of changing tides and rising sea levels. The shoreline uses poplar plants for environmental remediation, acting as a "living cap" on contaminated sediment. These site improvements address environmental justice concerns by eliminating the need to dredge contaminated soils and export them to another community.

Randall's Island Living Shoreline.

Saw Mill Creek Wetland Mitigation Bank

The Saw Mill Creek Wetland Mitigation Bank, NYC's first mitigation bank, protects and preserves NYC's valuable wetlands. Developers of waterfront infrastructure projects near wetlands can purchase tidal wetland mitigation credits to improve and protect critical coastal resources. This process is a predictable, efficient and environmentally responsible way to serve a coastal area's wetland mitigation requirements. More than 50 acres of tidal wetlands have been restored through the Saw Mill Creek wetland mitigation bank program.

Saw Mill Creek amphipod traps, Staten Island.
Credit: Tara Stewart, WSP

New York Restoration Project (NYRP): Revitalization of Sherman Creek

A former illegal dumping ground, Swindler Cove at Sherman Creek Park is a vibrant, versatile green space in Northern Manhattan. The five-acre site is home to the Riley-Levin Children's Garden, which is considered the crown jewel of New York Restoration Project's public park projects. Opened to the public in August 2003, Swindler Cove exemplifies the full spectrum of NYRP's mission to restore open space as a catalyst for community revitalization and environmental conservation. This cove features native natural habitats with a lush array of restored woodlands, wetlands, native plantings and a freshwater pond, accented by a gracious pathway.

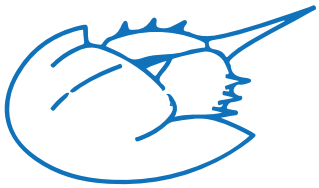
Sherman Creek, Manhattan. Credit: NYC Parks

Goal 3: Help connect New Yorkers with waterfront ecology and raise awareness of water quality and habitat protection

From whales in New York Harbor to bobcats along the Bronx River and dolphins in the East River, wildlife has made an incredible return to NYC. NYC is not typically considered an eco-tourism destination, but this image is starting to change. The expansion of ferry service has made it easier to travel to waterfront destinations in all five boroughs.

Increases in wildlife throughout NYC have sparked renewed interest in birding, fishing and other outdoor activities. Popular activities include free fishing clinics in Hudson River Park and Brooklyn Bridge Park, pier fishing from Coney Island and fishing charters in the Rockaways. Many waterfront parks feature fish cleaning stations and other innovative designs to promote fishing. While there are dozens of opportunities to fish throughout NYC, deciding whether to eat the fresh-caught fish is a more complicated matter. The NYS Department of Health issues clear and specific guidance (updated regularly) on the safest fish to eat.

Field trips and site visits are important activities that engage students in environmental science and other science/technology/engineering/math (STEM) fields. Waterfront stewards regularly organize beach cleanups and special projects to remove plastics and other marine debris. Participation in these hands-on stewardship activities fosters participants' connection to specific waterfront locations and often lead to people's greater interest in advocating for the site's protection and enhancement.



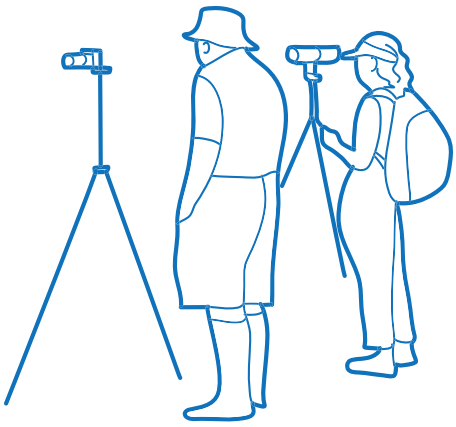
"The last few years witnessing climate change and the pandemic here in New York were a personal wake up call. As the more-than-human beings called me to be in conversation with them, the teaching from this conversation is: we are not separate from nature. In fact, the opposite is true: we are nature. In ways simple and complex we are truly and deeply entangled with the more-than-human beings."

Opposite:
Randall's Island walking tour, NYC 520, 2019.

Strategy 3.1
Support stewardship opportunities that elevate New Yorkers' awareness of the health of our waterways.

Strategy 3.2
Increase educational signage and improve trails to ensure that the public's access does not disrupt sensitive habitats.

Strategy 3.3
Support community science efforts to monitor and restore the natural waterfront.



Strategy 3.4
Organize community bio-blitzes to engage New Yorkers and track biodiversity.

Strategy 3.5
Increase public awareness of green infrastructure programs through public education and wayfinding.

Strategy 3.6
Collaborate with NYC Parks' Urban Park Rangers, local stewardship and nonprofit groups to conduct boat tours, bird-watching hikes and fishing clinics, and highlight the return of wildlife to the city.

Opposite:
Living Shoreline Installation at Alley Creek, Bayside, Queens.

Credit: NYC Parks

Connecting New Yorkers to Nature

NYC contains thousands of acres of salt marshes, freshwater wetlands, streams and forests. New Yorkers and visitors can experience these types of environments in hundreds of waterfront parks. Many opportunities exist for the public to get involved in the stewardship of these spaces and to foster a deeper connection to nature through first-hand experience learning at wildlife education centers.

Alley Creek Restoration

Alley Pond Park in Bayside, Queens, is home to the nonprofit Alley Pond Environmental Center (APEC) for children and adults. APEC was established in 1972 through grassroots organizing and a partnership with NYC Parks. In 2015, NYC Parks developed the Alley Creek Watershed Management and Habitat Restoration Plan to guide restoration and green infrastructure efforts throughout the watershed. The Plan was developed alongside NYC DEP's 2015 LTCP to improve water quality in Alley Creek and Little Neck Bay. Currently, DEP and NYC Parks are restoring tidal salt marshes along Alley Creek to improve water quality and enhance marsh resiliency. In Spring 2021, construction began on a living shoreline along the western shore of Alley Creek at Little Neck Bay.

Hunts Point Riverside Park

This former illegal dumping ground at Hunts Point situated at a predominantly industrial waterfront along the Bronx River, has been transformed into a waterfront oasis, featuring a fishing pier, a kayak and canoe launch and a spray park for children. NYC Parks currently is designing a reconstructed dock in the park (scheduled for completion by October 2021) to enhance public opportunities for kayaking and rowing.

Read more in **Governance Goal 3 on page 271.**

Photo Credit:
NYC Parks

Natural Areas Map

The "**NYC Nature Map**" created by the Natural Areas Conservancy with NYC Parks, is an online tool to provide New Yorkers with information about the location, size and condition of natural resources on local public lands. The map also includes information about previous improvement projects and the potential for future restoration and management of these important spaces.

Photo Credit:
NAC/NYC Parks

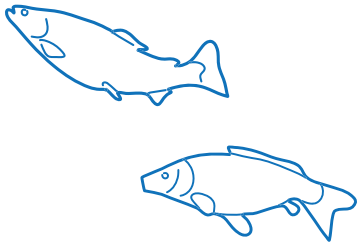
Jamaica Bay – Rockaway Parks Conservancy (JBRPC): Shoreline Cleanups

JBRPC's cleanups remove floatable trash, plastics and marine debris from the shorelines of Jamaica Bay and Rockaway. Jamaica Bay and Rockaway parks offer the public a unique, exciting way to connect with nature, since they collective host more than 325 species of birds, 50 species of butterflies and 100 species of fish. These attractions offer participants a thrilling day of park stewardship at some of NYC's most diverse, beautiful shorelines.

Photo Credit:
Daniel Avila, NYC Parks

Goal 4: Utilize existing and new data sources to assess natural resources and inform decision making for restoration and protection

Light Detection and Ranging (LiDAR) provides precise elevation data to identify topographic and other changes to the land, and has become an important tool to evaluate the extent of wetlands. Updating local maps using LiDAR provides more precise location data on the scope of NYC's wetland resources to ensure they can be better protected. In 2016, NYC Parks partnered with the University of Vermont Spatial Analysis Lab to update NYC wetland and stream hydrography maps using 2010 LiDAR and other field and remote sensing data. This geographic information system (GIS) methodology was used to accurately estimate the extent of freshwater wetlands, particularly under forest canopy. This work generated a reliable preliminary map for tidal wetlands but required additional field verification to be used for quality control of freshwater wetlands. NYC Parks is providing this new map information to the U.S. Fish and Wildlife Service (USFWS) for use in their next, as-yet unscheduled NWI map update. NYC Parks will also share this data with NYS DEC for future updates to State regulatory maps. The data is publicly available on NYC OpenData.



"A healthy waterfront would be flourishing with wildlife. These are very important ecosytems. We must also protect them from numerous pollutants such as solid waste, heavy metals, and plastic."

Strategy 4.1
Continue local efforts to use LiDAR to provide precise elevation data to detect land use and topographic changes and provide better information on the current extent of wetlands.

Strategy 4.2
Align locally generated wetland map updates with any future State or federal mapping updates to accurately depict the extent of wetland resources to help better protect and manage them.

Opposite:
Waterfront monitoring.

Credit: NYC Parks

Goal 1: Improve water quality throughout the five boroughs and build upon key agency and public partner collaborations

Strategy 1.1:Enact the new Unified Stormwater Rule to align on-site stormwater management requirements across NYC and expand best practices for retaining stormwater on-site with green infrastructure.

Strategy 1.2: Continue to implement the NYC Stormwater Management Program to reduce pollution generated in MS4 areas. Ensure that cleanup plans, permits, and other key decisions are grounded in local solutions developed with community engagement and support.

Strategy 1.3: Further reduce CSOs by improving and expanding green and grey infrastructure, as described in the NYC Green Infrastructure Program and LTCPs.

Strategy 1.4: Increase interagency coordination to identify barriers to and opportunities for expanding green infrastructure implementation, maintenance and stewardship.

Strategy 1.5: Support innovative bio-extraction pilot programs to improve water quality (including oysters, ribbed mussels and eelgrass) to support cleaner water across New York Harbor and all five boroughs.

Strategy 1.6: Continue expanding the Bluebelt program with associated aquatic ecosystem protection strategies.

Goal 2: Protect ecosystems, support ecosystem services, and enhance biodiversity of the natural waterfront, including in-water strategies

Strategy 2.1: Increase City, State and federal investment in wetland protection, restoration, acquisition, management and monitoring.

Strategy 2.2: Implement priority projects from the NYC Parks and NAC WMF and explore new strategies to restore and enhance the natural waterfront.

Strategy 2.3: Develop a reserve supply of clean sediment that can be used to elevate marshes that are vulnerable to sea level rise.

Strategy 2.4: Continue to advance Mitigation and Restoration Strategies for Habitat and Ecological Sustainability (MARSHES), such as the Saw Mill Creek Pilot Wetland Mitigation Bank. Make wetland impact offset credits steadily available for the permitting process associated with implementing critical public and private waterfront infrastructure projects.

Strategy 2.5: Increase coordination between capital infrastructure planning and habitat restoration planning.

Strategy 2.6: Work with State and federal partners to modify permit requirements to promote nature-based solutions, building upon the success of designated USACE Nationwide Permits for Living Shorelines and Aquatic Habitat Restoration.

Strategy 2.7: Support innovative in-water strategies to promote biodiversity and ecosystem restorations, including the propagation of oysters, ribbed mussels and eelgrass.

Goal 3: Help connect New Yorkers with waterfront ecology and raise awareness of water quality and habitat protection

Strategy 3.1: Support stewardship opportunities that elevate New Yorkers' awareness of the health of our waterways.

Strategy 3.2: Increase educational signage and improve trails to ensure that the public's access does not disrupt sensitive habitats.

Strategy 3.3: Support community science efforts to monitor and restore the natural waterfront.

Strategy 3.4: Organize community bio-blitzes to engage New Yorkers and track biodiversity.

Strategy 3.5: Increase public awareness of green infrastructure programs through public education and wayfinding.

Strategy 3.6: Collaborate with NYC Parks' Urban Park Rangers, local stewardship and nonprofit groups to conduct boat tours, bird-watching hikes and fishing clinics, and highlight the return of wildlife to the city.

Goal 4: Utilize existing and new data sources to assess natural resources and inform decision making for restoration and protection

Strategy 4.1: Continue local efforts to use LiDAR to provide precise elevation data to detect land use and topographic changes and provide better information on the current extent of wetlands.

Strategy 4.2: Align locally generated wetland map updates with any future State or federal mapping updates to accurately depict the extent of wetland resources to help better protect and manage them.

FERRIES

NYC's waterways provide a unique resource to expand transportation options for New Yorkers enabling ferries to connect waterfront communities in NYC and New Jersey to jobs, recreation destinations, and each other. Ferries will continue to be used in NYC to provide affordable, convenient transit in communities with limited public transportation options and an important resource that supports growing neighborhoods and increases the resilience of NYC's larger transportation network, especially when there are disruptions to other means of transit service. The City will continue to explore ways to improve ferry services and expand the role our waterways in the larger transportation network.

Goal 1: Increase the sustainability and efficiency of City ferry services.

Goal 2: Complete the planned expansion of NYC Ferry to provide greater mobility to waterfront neighborhoods that are underserved by other forms of mass transit or where residents face long commute times.

Goal 3: Examine ways to improve the delivery of ferry services to New Yorkers while minimizing public subsidy.

Goal 4: Strategically plan ferry services within NYC and the region.

Goal 5: Strengthen the role of ferry landings as hubs to neighborhoods, to other forms of transportation and for emergency response.

Overview

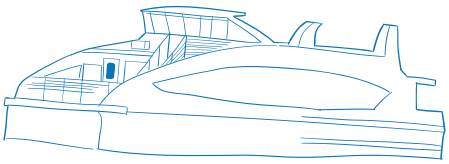
Based on ridership, the NYC Metro Region has the largest ferry system in the United States. The system includes the Staten Island Ferry (the single busiest ferry route in the country), NYC Ferry and service provided by private operators between New York and New Jersey. As of 2019, ferry services in New York Harbor carried approximately 40 million people a year. By comparison, the Washington State ferry system, with the second largest ridership in the country, carried about 24 million passengers in 2019.

Ferry services offer direct connections to jobs and waterfront open spaces providing an attractive transportation option for commuters and other travelers. Ferries have played an important role in moving New Yorkers around during emergencies. Ferry service has played a crucial role in augmenting service when major transportation disruptions occur for example during the emergency closure of the Williamsburg Bridge in 1988; the Nor'easter storm of December 1992, which knocked out the Downtown branch of the PATH commuter railroad for a week; the first World Trade Center bombing in February 1993; the evacuation of Lower Manhattan on September 11, 2001 and the two years of dramatically increased ferry service until the region's commuter rail network was finally restored in November, 2003; the August 2003 Blackout; the December 2005 Transit Strike; the "Miracle on the Hudson" crash of US Airways Flight 1549 in January 2009; and the two years following Hurricane Sandy in 2012, when extra ferry service was needed to provide service when the subway service was disrupted by flood damage.

Maintaining and expanding ferry services is not simple. The City seeks to balance requests to increase the number of communities that ferries serve with reducing the levels of public subsidies needed to provide these services. Like all forms of mass transit, ferry services experienced steep ridership declines during the COVID-19 pandemic.

To help get ferry services back on course and prepare them for the challenges ahead, the City will need to explore ways to make services more efficient, to improve regional partnerships and adapt ferry infrastructure to the threats of climate change.

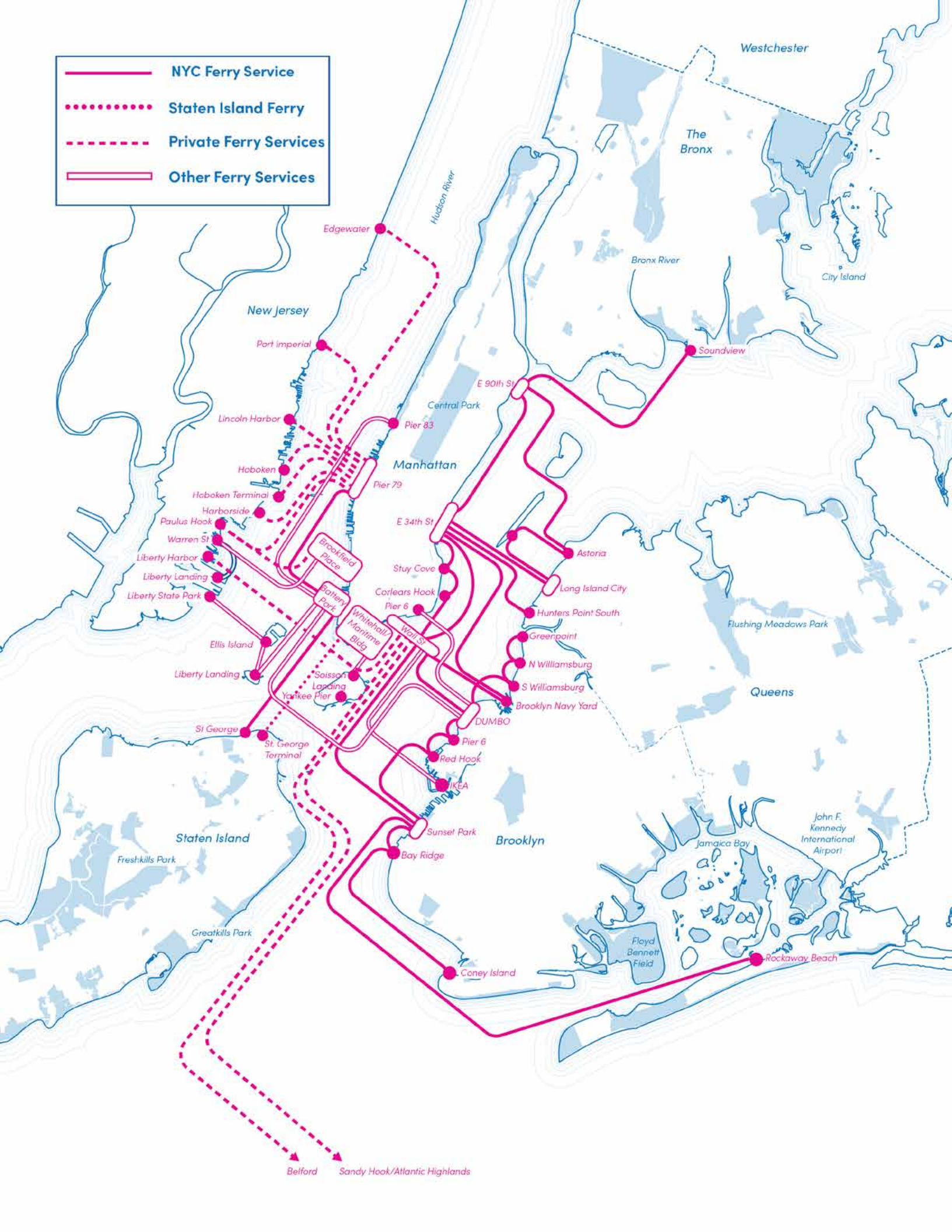
"The accessibility that has been provided as a result of the ferry has allowed me to see diverse waterfront neighborhoods that I would have otherwise never gone to visit and enjoy."



As of 2019, ferry services in New York Harbor carried about 40 million people a year.

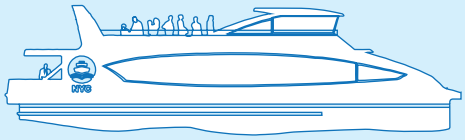
Opposite:
Riders on NYC Ferry.

Credit: NYC EDC


NYC Ferry Service
Staten Island Ferry
Private Ferry Services
Other Ferry Services
Westchester
The Bronx
Hudson River
Edgewater
Bronx River
City Island
New Jersey
Port Imperial
Soundview
E 90th St
Central Park
Lincoln Harbor
Pier 83
Manhattan
Hoboken
Pier 79
Hoboken Terminal
Harborside
Paulus Hook
E 34th St
Warren St
Astoria
Liberty Harbor
Brookfield Place
Stuy Cove
Liberty Landing
Long Island City
Liberty State Park
Battery Park
Corlears Hook
Pier 6
Hunters Point South
Whitehall/ Maritime Bldg
Wall St
Flushing Meadows Park
Greenpoint
Ellis Island
N Williamsburg
Liberty Landing
Soissons Landing
S Williamsburg
Queens
Yankee Pier
Brooklyn Navy Yard
DUMBO
St George
Pier 6
St. George Terminal
Red Hook
IKEA
John F. Kennedy International Airport
Staten Island
Sunset Park
Brooklyn
Jamaica Bay
Freshkills Park
Bay Ridge
Floyd Bennett Field
Greatkills Park
Rockaway Beach
Coney Island
Belford
Sandy Hook/Atlantic Highlands

Ferry Service at a Glance

NYC Ferry

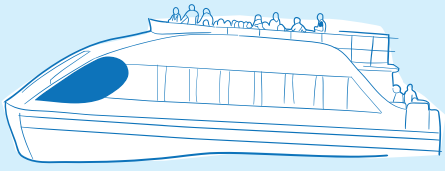


In 2017, the City launched NYC Ferry, with NYCEDC managing the service on its behalf. The service currently operates six routes using 21 landings. In 2019, average daily weekday ridership was approximately 16,000. NYC Ferry has carried 16 million riders since it launched, and overall ridership in 2019 was 30 percent higher than 2018 — far exceeding earlier projections about the service's growth potential. In 2021, the system is expanding to eight routes serving all five boroughs. Before the COVID-19 pandemic, NYC Ferry anticipated serving 11 million annual riders by 2023.

Staten Island Ferry

The Staten Island Ferry annually serves 22 million people, with an average weekday ridership of 70,000 passengers. NYCDOT operates and maintains a nine-vessel fleet, the St. George Ferry Terminal on Staten Island and the Whitehall Ferry Terminal in Manhattan. The main purpose of the Staten Island Ferry is to transport New Yorkers between Staten Island and Manhattan, but the 25-mintue ride is also popular with tourists because of its views of New York Harbor, including the Statue of Liberty and Ellis Island.

Private Ferry Operators



Privately operated ferry services have operated continuously in NY Harbor since ferry service was reactivated in 1986, primarily running between New York and New Jersey. Unlike the municipally-operated Staten Island Ferry and the City-subsidized NYC Ferry, these private companies do not receive direct operating subsidies and fund their operations on farebox and related revenue. These ferry operators do benefit, however, from public investments in docking and terminal infrastructure.

NY Waterway runs 20 routes between New Jersey and the Manhattan terminals at Brookfield Place/Battery Park City (controlled by PANYNJ), Midtown/West 39th Street and Pier 11/Wall Street. Pre-pandemic, NY Waterway's average weekday ridership was approximately 30,000.

Seastreak operates ferry service from Monmouth County in New Jersey to Pier 11/Wall Street and East 35th Street in Manhattan. Pre-pandemic, Seastreak's average daily weekday ridership was approximately 4,000.

Other Ferry Services

The Trust for Governors Island operates ferries from Manhattan and Brooklyn to Governors Island. The Manhattan ferry departs from the Battery Maritime Building in Lower Manhattan. Brooklyn service departs from Pier 6 in Brooklyn Bridge Park. This Lower Manhattan ferry service is one of the only routes in the NYC that carries motor vehicles, facilitating the only vehicular access to Governors Island for emergency vehicles, deliveries and construction/maintenance operations. Ferry service here is expected to increase in conjunction with the plan to redevelop a portion of the island.

Liberty Landing Ferry operates between Brookfield Place/Battery Park City in Manhattan and Jersey City in New Jersey. In New Jersey, the ferry stops at Liberty State Park and Warren Street before returning to the World Financial Center in Manhattan.

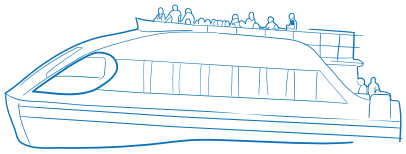
NY Water Taxi operates shuttle service between Pier 11 in Manhattan and Ikea in Red Hook, Brooklyn. NY Water Taxi also operates hop-on-hop-off sightseeing services.

Historical Context

For much of the 19th century, ferries were the primary means of crossing the Hudson and East rivers into Manhattan. By the 20th century, the use of passenger ferries throughout the region rapidly declined due to improved access from newly constructed bridges and tunnels that connected Manhattan with the rest of NYC and New Jersey. By 1967, all that remained of the ferry network was the Staten Island Ferry.

Privately operated ferry services were reintroduced to the region in the mid-1980s. Cross-Hudson ferries provided commuters with an alternative to crowded trains and congested bridges and tunnels. Ferries became especially important transportation links in redeveloping areas in New Jersey, such as Weehawken and Jersey City, where residential density and demand for new commuting routes increased.

"It is amazing to have a different perspective from the water, and I began to realize how massive the East River and other areas of our waterways are."



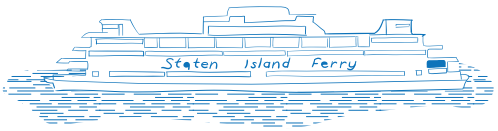
Until recently, ferry services operating within NYC were limited. The scale of service and ridership within NYC remained modest because of higher fares charged by operators to cover costs, entrenched competition from highly available and more affordable subways and buses, and low residential density along much of NYC's waterfront. Demand for ferry service grew as stretches of the NYC waterfront transitioned from traditional industrial use to new residential, commercial and recreational developments. In response, the City undertook several studies to examine the viability of a citywide ferry system. In 2011, the City-contracted East River Ferry system began as a pilot project. In 2017, NYC Ferry launched as its successor.

Pier 11 Ferry Terminal in Manhattan.

Issues and Challenges

Ferry services are an important resource within the regional transportation network, but operating ferries within New York Harbor successfully require dealing with several complex challenges.

The primary issue facing NYC ferry service is how to generate enough revenue to pay for its high operating expense. Ferry services operating between New Jersey and Manhattan generally do not require public subsidies. Waterfront neighborhoods having high residential density and high demand from commuters are conditions that make ferry services profitable for these private operators. Ferry services with routes serving communities within NYC alone, are subsidized with public funds like other forms of NYC public transit. Ferry services within NTYC, however, currently require a higher per-rider subsidy than other forms of public transit.



"We should be looking at how to incorporate ferries within the MTA and new revenue structures that make it more financially viable over the long haul."

This situation is due to several reasons: First, significant up-front capital costs were needed to build the infrastructure to launch the ferry system. Second, the City's policy is to keep fares low. A ride on NYC Ferry costs $2.75 – the equivalent of a single-ride fare on an MTA subway or bus. The fare for the Staten Island Ferry is free. Low- and no-cost fares ensure that ferry service remains affordable to New Yorkers with a wide range of incomes. Third, the NYC Ferry network includes long routes to relatively low-density areas, such as the Rockaways in Queens and Soundview in the Bronx. These longer routes to low-density communities have higher operating costs than shorter routes to high-density neighborhoods along the East River.

Despite these challenges, the City plans to gradually expand ferry services over the next 10 years. New Yorkers have expressed interest in service expansion to waterfront locations that do not have easy access to mass transit or where commute times are extremely long. New Yorkers also want better coordination between ferry services with other forms of mass transit, creating easier transfers, increasing ridership across all modes, and enhancing operational efficiency at terminals. To accomplish this, the City must reach agreements between transit providers to coordinate schedules, accept transfers and share fare revenue.

Another challenge is the need for suitable ferry landings, especially to support emergency management. Ferry services have played a crucial role in the City's ability to respond to emergencies. The events of September 11, the Northeast Blackout of 2003 and Hurricane Sandy each caused major disruptions to NYC's transportation system. Nearly 460,000 people evacuated lower Manhattan by ferry on 9/11. During the Blackout and NYC's recovery from Hurricane Sandy, ferry services were expanded to help move New Yorkers while subway service was

restored. Increasing the number of ferry landings and expanding the capacity of existing landings will enhance NYC's resilience during and after other potential disasters.

The threat of coastal flooding is another significant issue for ferry services. Locating ferry infrastructure within waterways and along shorelines makes it vulnerable to the effects of rising sea level and damage caused by coastal storms. The City and PANYNJ must take steps to adapt ferry infrastructure to minimize damage and disruption from potential storms and coastal flooding. As the City continues to adapt its fleet of vehicles toward its sustainability goals, it will explore how to reduce the environmental footprint of ferry services.

Nearly 460,000 people evacuated lower Manhattan using ferries on 9/11.

Right:
Staten Island Ferry.

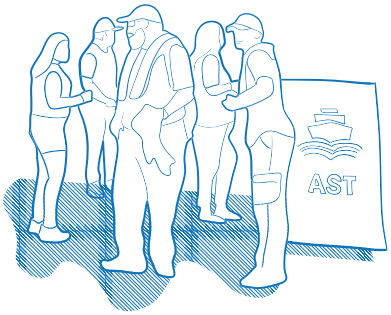
Credit: Julienne Schaer,
NYC & Company

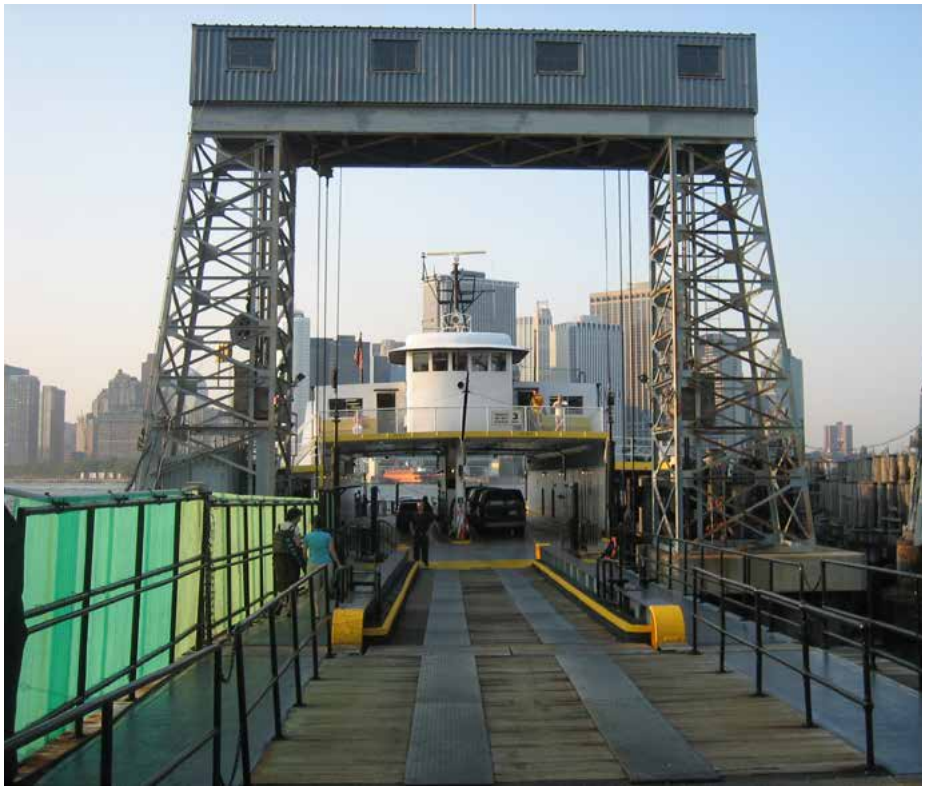
A 10-Year Vision

To support and strengthen ferry services over the next 10 years, the City will continue to optimize routes and identify ways to make service more sustainable. The City's ferry fleet will incorporate new vessels with no or reduced air emissions. Ridership must increase to ensure the financial strength of ferry services. To broaden the reach of ferry services, the City will proceed by expanding NYC Ferry, including service to Coney Island, home to approximately 4,000 NYCHA residents. The City also intends to explore opportunities for regional collaboration on ferries.

Over the past decade, New Yorkers have expressed excitement about the role that ferries play in creating neighborhoods hubs and expanding transportation options. The Whitehall and St. George ferry terminals, for example, are multimodal transit hubs serving as critical links in the regional transit network. The City will explore ways to connect other ferry landings to adjacent neighborhoods more effectively, for example, by adding more bicycle racks or wayfinding signs. As the City plans future ferry services, plans must include infrastructure that is resilient to sea level rise and coastal storms and ongoing support for operations and maintenance.

"The waterfront has become an alternative mode of transportation in the city. It is a low carbon transportation system that we should continue to invest in and make sure it can continue to work better."





Governors Island Ferry.

Goals and Strategies

Goal 1: Increase the sustainability and efficiency of City ferry services

Strategy 1.1
Launch three new Staten Island Ferry vessels with improved propulsion, ease of access, enhanced efficiency and improved air emissions standards.

Strategy 1.2
Launch a new electric ferry to service Hart Island.

Strategy 1.3
Continuously review ridership demand and other factors to ensure that NYC Ferry is operating as efficiently and effectively as possible.

New Staten Island Ferry Vessel, The SSG Michael H. Ollis.

Credit: NYCDOT

Goal 2: Complete the planned expansion of NYC Ferry to provide greater mobility to waterfront neighborhoods that are underserved by other forms of mass transit or where residents face long commute times

Strategy 2.1
Launch the St. George Route in 2021 with stops at St. George, Battery Park City at Vesey Street and Midtown West at Pier 79.

Strategy 2.2
Launch the Coney Island Route in 2021 with stops at Coney Island, Bay Ridge and Wall Street/Pier 11.

Strategy 2.3
Extend the Soundview Route in 2021 to a new landing at Throgs Neck/Ferry Point Park.

2021 NYC Ferry Expansion Map.

Credit: NYC Ferry

Goal 3: Examine ways to improve the delivery of ferry services to New Yorkers while minimizing public subsidy

Strategy 3.1
Ensure the service is financially strong by expanding ridership for existing NYC Ferry locations, especially those near job hubs and by pursuing other revenue-generating opportunities.

Strategy 3.2
Examine opportunities for systemwide optimization and resource planning for the NYC Ferry fleet, landing site infrastructure and operations to ensure safe and reliable service.

NYC Ferry riders boarding at Pier 11, Manhattan.

Credit: NYCEDC

Goal 4: Strategically plan ferry services within NYC and the region

Strategy 4.1
Identify and pursue opportunities for regional collaboration on ferry services to expand transit options for commuters and other travelers.

Strategy 4.2
Analyze ferry slip capacity in Lower and Midtown Manhattan to assess ferry congestion and better plan for future growth.

Strategy 4.3
Continue to address the operational and maintenance needs of the ferry system.

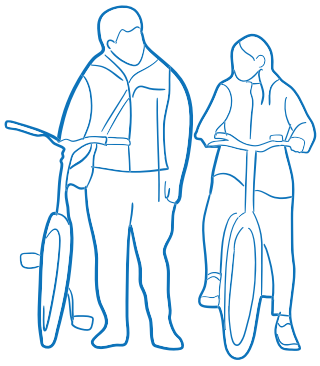
Strategy 4.4
Connect New Yorkers to jobs related to ferry maintenance and operation.

NYC Ferries pass Lower Manhattan.

Credit: NYCEDC


South St and Whitehall St
Whitehall Ferry Terminal
citi bike
Walk NYC
citi bike
37481

Goal 5: Strengthen the role of ferry landings as hubs to neighborhoods, to other forms of transportation and for emergency response



Strategy 5.1
Support the provision of bicycle racks and expanded mobility options, such as bike share and scooters, adjacent to ferry landings to connect the ferry system more effectively with nearby neighborhoods.

Strategy 5.2
Improve the connectivity of ferry landings as hubs for buses and other forms of mass transit.

Strategy 5.3
Explore intermodal freight opportunities at ferry landings to improve freight deliveries and further enhance the marine highway.

Strategy 5.4
Design ferry terminals for adaptation to sea level rise, ensuring service will not be disrupted.

Complete planned investments at the Whitehall and St. George Ferry Terminals to make them more resilient to coastal storm flooding.

Strategy 5.5
Continue to work with public- and private-sector partners to develop and implement plans for ferry services to play a role in emergency response.

Strategy 5.6
Continue to minimize on-water conflicts between ferries and human-powered boats by raising awareness about rules for water safety. Plan for future on-water and in-water uses in an increasingly busy harbor.

Opposite:
Citibike station and wayfinding signage at Staten Island Ferry Whitehall Ferry Terminal, Manhattan.

Goal 1: Increase the sustainability and efficiency of City ferry services

Strategy 1.1: Launch three new Staten Island Ferry vessels with improved propulsion, ease of access, enhanced efficiency and improved air emissions standards.

Strategy 1.2: Launch a new electric ferry to service Hart Island.

Strategy 1.3: Continuously review ridership demand and other factors to ensure that NYC Ferry is operating as efficiently and effectively as possible.

Goal 2: Complete the planned expansion of NYC Ferry to provide greater mobility to waterfront neighborhoods that are underserved by other forms of mass transit or where residents face long commute times

Strategy 2.1: Launch the St. George Route in 2021 with stops at St. George, Battery Park City at Vesey Street and Midtown West at Pier 79.

Strategy 2.2: Launch the Coney Island Route in 2021 with stops at Coney Island, Bay Ridge and Wall Street/Pier 11.

Strategy 2.3: Extend the Soundview Route in 2021 to a new landing at Throgs Neck/Ferry Point Park.

Goal 3: Examine ways to improve the delivery of ferry services to New Yorkers while minimizing public subsidy

Strategy 3.1: Ensure the service is financially strong by expanding ridership for existing NYC Ferry locations, especially those near job hubs and by pursuing other revenue-generating opportunities.

Strategy 3.2: Examine opportunities for systemwide optimization and resource planning for the NYC Ferry fleet, landing site infrastructure and operations to ensure safe and reliable service.

Goal 4: Strategically plan ferry services within NYC and the region

Strategy 4.1: Identify and pursue opportunities for regional collaboration on ferry services to expand transit options for commuters and other travelers.

Strategy 4.2: Analyze ferry slip capacity in Lower and Midtown Manhattan to assess ferry congestion and better plan for future growth.

Strategy 4.3: Continue to address the operational and maintenance needs of the ferry system.

Strategy 4.4: Connect New Yorkers to jobs related to ferry maintenance and operation.

Goal 5: Strengthen the role of ferry landings as hubs to neighborhoods, to other forms of transportation and for emergency response

Strategy 5.1: Support the provision of bicycle racks and expanded mobility options, such as bike share and scooters, adjacent to ferry landings to connect the ferry system more effectively with nearby neighborhoods.

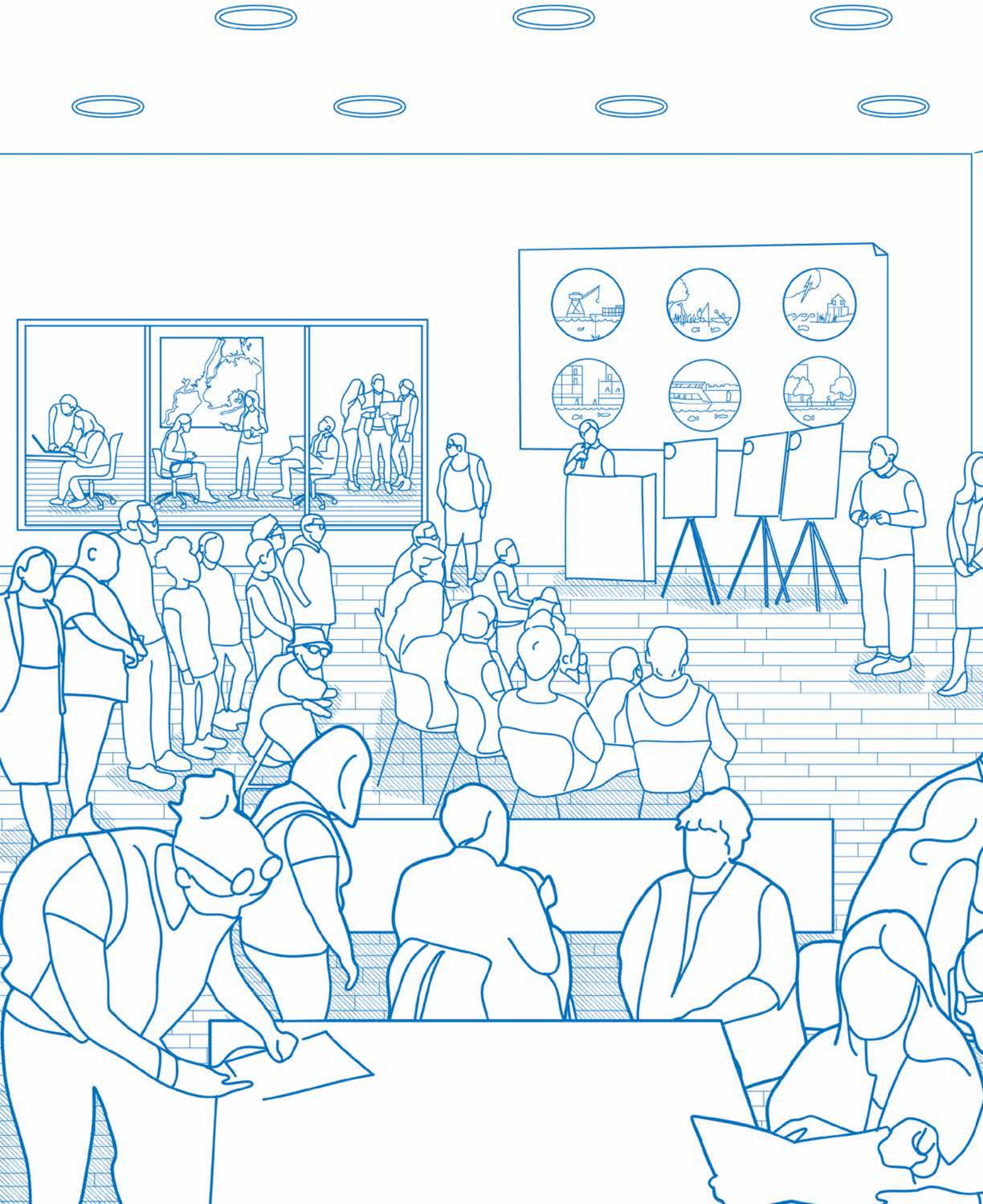
Strategy 5.2: Improve the connectivity of ferry landings as hubs for buses and other forms of mass transit.

Strategy 5.3: Explore intermodal freight opportunities at ferry landings to improve freight deliveries and further enhance the marine highway.

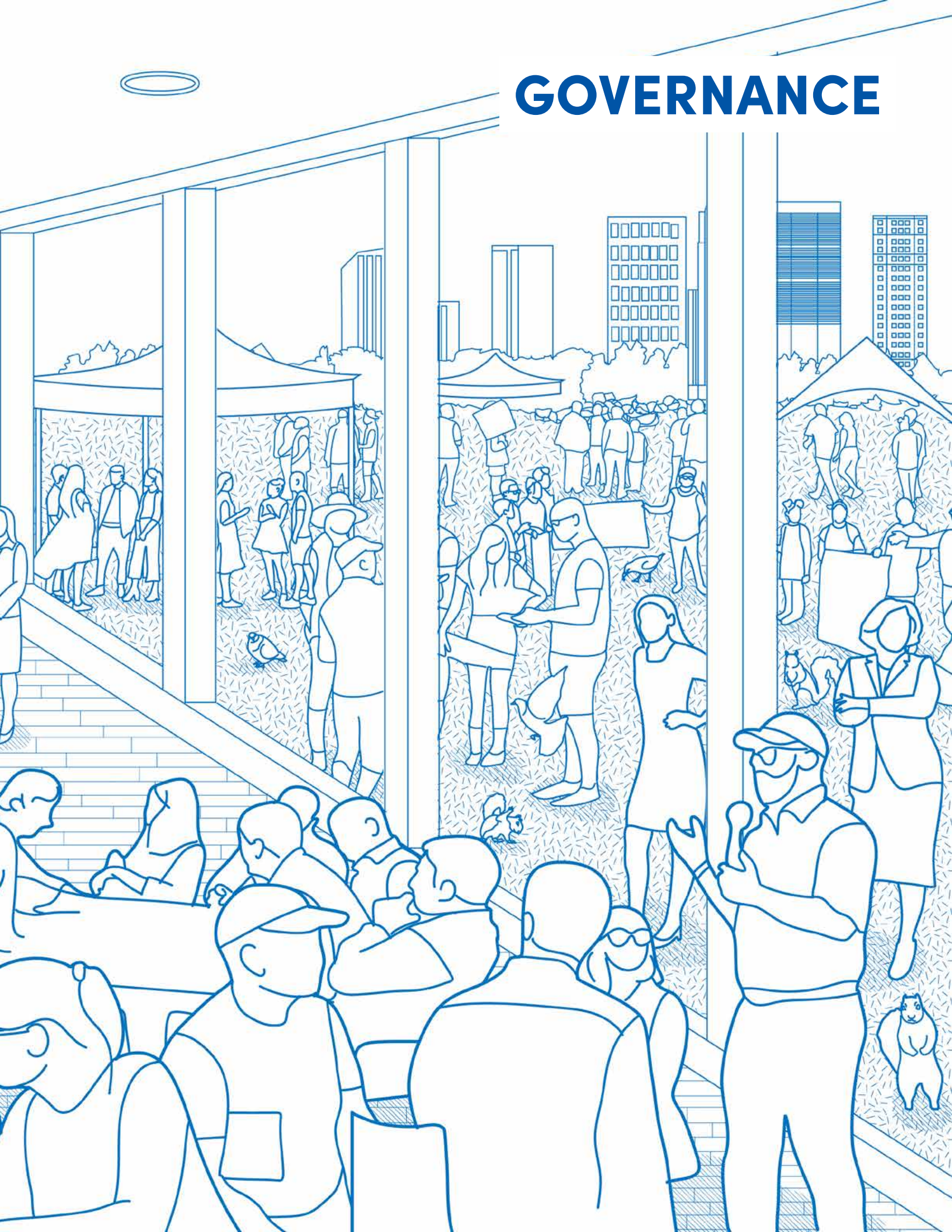
Strategy 5.4: Design ferry terminals for adaptation to sea level rise, ensuring service will not be disrupted.

Strategy 5.5: Continue to work with public- and private-sector partners to develop and implement plans for ferry services to play a role in emergency response.

Strategy 5.6: Continue to minimize on-water conflicts between ferries and human-powered boats by raising awareness about rules for water safety. Plan for future on-water and in-water uses in an increasingly busy harbor.



GOVERNANCE



For the City to rise to the combined challenges of competing demands of the waterfront, rising sea levels and a changing climate, and realize the goals laid out in this Plan, it must improve its coordination of building and maintaining critical shoreline infrastructure across agency jurisdictions and different levels of government. This work will also involve collaborating with the owners of privately owned shoreline areas, design and engineering practitioners and local communities.

Goal 1: Improve coordination, management and monitoring of current and future public waterfront infrastructure

Goal 2: Ease the path to construction by improving the City's permitting processes and developing gold-standard guidelines for NYC's waterfront and waterways

Goal 3: Improve the ecological condition of the City's shorelines by modifying the environmental regulatory processes to allow for in-water material placement for ecological benefit

Overview

This section of the Plan outlines the City's opportunities to improve the management of waterfront infrastructure, the permitting processes and guidelines applicable to these projects, and the regulations that govern waterfront and waterways.

Historically, changes in management structures and regulatory reforms at different levels of government have both shaped how waterfront governance is administered and the shoreline itself. For example, in 1921, the United States Congress approved the request of New York and New Jersey to form the Port Authority of New York and New Jersey (PANYNJ), an interstate agency with a mission to oversee the creation of vital infrastructure to serve the New York-New Jersey Harbor. This creation of PANYNJ transformed the infrastructure and operation of neighboring waterfronts and waterways with the goal of improving commerce and trade for the region. NYC's waterfront and waterways have also been shaped by the Clean Water Act, which Congress expanded in 1972 to restrict landfilling of the country's waterways and protect marshes and wetlands, among other protections. This critical environmental law has been crucial in maintaining or improving the health of NYC's waterways and led to renewed interest in the use of our waterways and waterfront. The 1991 dissolution of the City's Department of Ports and Trade, the agency that managed City-owned maritime infrastructure, distributed its responsibilities and infrastructure assets to NYCSBS, NYCEDC and other City agencies.

Today, NYC has an opportunity to reimagine waterfront governance and regulations to meet the challenges of building and maintaining waterfront infrastructure in the face of climate change.

Coordination and Oversight of NYC's Waterfront

The complexity of NYC's waterfront is due to the variety and intensity of its use and the many entities overseeing this range of uses. Fourteen City, State and federal agencies share oversight of NYC's waterfront. USACE, NYSDEC and New York State Department of State (NYSDOS) regulate and issue permits for construction and maintenance of in-water structures. This jurisdictional landscape is further complicated by the significant stretches of NYC's waterfront under private ownership

NYC's publicly owned waterfront houses everything from marine transfer stations operated and managed by the New York City Department of Sanitation (DSNY) to bridges, public berths, marine terminals and ferry landings managed by NYCDOT and NYCEDC; to ports and airports managed by PANYNJ; to open spaces, beaches, and wetlands managed by NYC Parks, National Park Service and the New York State Department of Parks, Recreation and Historic Preservation (State Parks).

The City generally has jurisdiction (decision-making authority) over land use near the waterfront, but multiple jurisdictions have authority at the water's edge and within the water itself. Responsibilities for inspecting and maintaining waterfront infrastructure are divided among several agencies, which can create confusion about the particular agency holding jurisdiction over specific parts of waterfront infrastructure. Understanding jurisdictional responsibilities can be even more confusing if waterfront infrastructure supports multiple uses, such as parks or roadways.

In addition to the challenge of coordination and oversight among City agencies, the scale and complexity of some waterfront projects can require coordination with State and federal entities for permits and funding. For example, USACE leads studies and projects requiring coordination among multiple federal, State and City agencies and numerous community stakeholders. FEMA and HUD also fund significant coastal flood protection infrastructure in NYC, which adds additional oversight layers to these projects. The City must provide advocacy and leadership to secure State and federal funding, organize and communicate citywide policy priorities to these partners and amplify community input at multiple stages.

As waterfront communities continue to adapt and transform, the City is able to take immediate steps as it establishes a long-term plan to manage NYC's waterfront and waterways in a manner that promotes equity, resiliency and health.


RESTROOMS
FULTON FISH

Goals and Strategies

Goal 1: Improve coordination, management and monitoring of current and future public waterfront infrastructure

Existing Management Structures for Traditional Waterfront Infrastructure

Traditional shoreline infrastructure — including piers, bulkheads, platforms, groins and dunes — plays a critical role in NYC's landscape by fulfilling transportation needs, supporting the movement of goods and people, and providing spaces for recreation, habitat and reducing coastal flood risks. The City can face challenges keeping waterfront infrastructure in a state of good repair.

The infrastructure for most of NYC's waterfront is supported by a series of interconnected foundations and marine structures that can be within multiple jurisdictions. Some waterfront assets, such as marine transfer stations, have well-defined management structures along with established long-term maintenance plans. However, many waterfront assets do not. Overlapping or ambiguous agency responsibilities can delay and challenge the coordination of inspections, capital planning efforts and repair. Even when agency responsibility for a waterfront property or infrastructure is clear, limited resources and competing agency priorities can lead over time to the infrastructure falling into disrepair and prolonged closure. These closures can limit public access to open spaces and amenities along the waterfront and exacerbate coastal flood risks.

Citywide coordination and waterfront asset management can be improved by clarifying and resolving questions about ownership and jurisdiction and by identifying common characteristics and needs across different asset classes to improve their maintenance and operation.

The City has already taken steps to improve coordination of waterfront infrastructure. For existing City-owned waterfront infrastructure, NYCEDC developed the Waterfront Facilities Maintenance Management System (WFMMS) and Waterfront Inspections Program (WIP) to centralize information and track current and future maintenance of bulkheads, waterfront facilities and marine substructures. These programs identify preventative maintenance requirements for existing assets, assist in budget development, and streamline maintenance funding requests among capital agencies that share jurisdiction.

Opposite:
The Interim Flood Protection Measures (IFPM) program is designed to protect critical facilities, infrastructure, and low-lying areas in New York City from flooding caused by a hurricane. The IFPM Mural Arts Program allows artists to showcase their work on the HESCO® barriers. These art installments are currently located in Red Hook, Brooklyn, and South Street Seaport, Manhattan.

Credit: MOCR

Emerging Management Structures for Coastal Protection Projects

To help NYC adapt to the impacts of climate change, the City is developing a new asset class: coastal flood protection infrastructure. These projects include floodwalls, temporary and permanent deployable floodgates, levees, and new drainage infrastructure, that can also be designed to incorporate other public uses such as open space. Today, several agencies hold jurisdiction and share responsibility on planning, designing and managing coastal protection projects.

For more information, see "Climate Resiliency and Adaptation Goal 5" on page 95

Building out NYC's first generation of coastal protection projects is a multiagency effort. MOCR typically works with agency partners to coordinate the overall project and provide support in solving problems. New York City Department of Design and Construction (NYCDDC) and NYCEDC are responsible for project design and construction, and other agencies advise on maintenance, operations and design. NYCEM takes on several important roles, including helping to secure funding, monitoring compliance and developing operational and deployment plans.

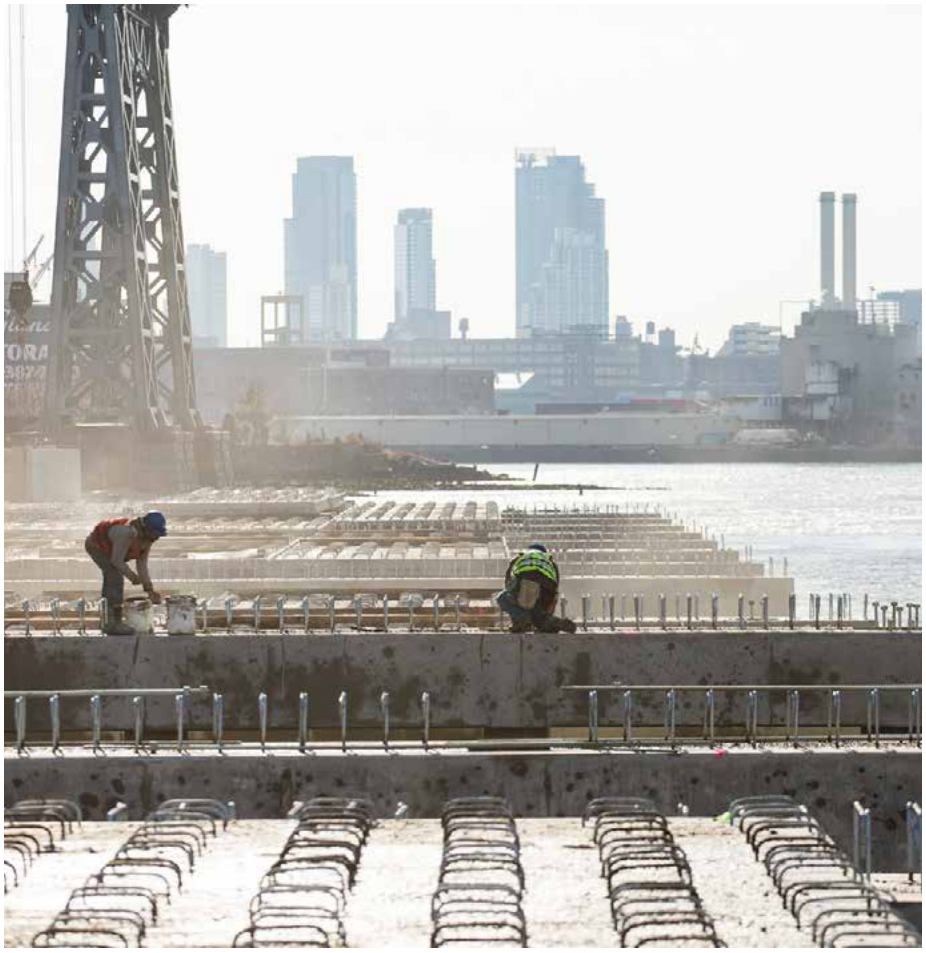
Based on early lessons learned from these projects, the City is moving away from ad-hoc decision making and toward codifying and relying upon best practices. MOCR is creating the set of Neighborhood Coastal Protection Planning Guidance to recommend approaches for stakeholders in coastal protection project planning and design. As the primary operating and maintenance lead for City-owned floodwalls and gates, NYCDOT has started to create design and operational guidelines for new coastal protection projects. NYC Parks released ***Designing and Planning for Flood Resiliency: Guidelines for NYC Parks*** in 2017 to guide construction and rehabilitation of resilient waterfront open spaces. Operational agencies are also seeking funding commitments to fulfill their operations and maintenance (O&M) obligations. Some are creating new programs for their overarching O&M roles across the new suite of coastal flood protection systems, while others are integrating their designated O&M tasks into existing operational functions. Agencies tasked with O&M components of coastal flood protection projects are currently shaping the early design phases to ensure that designs are compatible with long-term operational needs.

Previous interagency coordination was essential to designing and constructing NYC's current set of coastal protection projects. The lessons learned through these efforts demonstrates how the City can

formalize agency oversight and create capacity to sustained coastal protection projects and manage them efficiently over the long term.

Embedding Climate Change Within the Management of Existing and New Waterfront Infrastructure

As sea levels rise and climate projections are refined, the City will need to improve coordination of existing roles, account for new responsibilities, create capacity for operations and maintenance, and incorporate new ways of designing and managing waterfront projects. Routine state-of-good-repair work to replace deteriorating waterfront assets in-kind will not be sufficient. Instead, all investments to extend the useful life of waterfront infrastructure should be designed with consideration of future conditions.



Constructing Domino Park, Brooklyn.

Credit: McLaren Engineering Group

Strategy 1.1
Refine, expand and realign administrative processes and digital tools to help ensure infrastructure remains in a state of good repair and encourage modernized, resilient waterfront infrastructure.

Identify ways to improve City administrative processes to allow for greater efficiency and flexibility in implementing the Waterfront Inspection Program and address the findings of waterfront inspections through reconstruction, repairs and maintenance.

Strategy 1.2
Develop a structure for efficient and effective coordination, management and monitoring of current and future public waterfront infrastructure that includes:

Codification of the responsibility for portfolio oversight, project identification, design, construction, and operations and maintenance of coastal flood protection projects to a new or existing agency(s) and secure adequate funding to ensure agencies can fulfill these responsibilities.

Multi-agency capital planning exercises to identify funding needs for implementation and maintenance of waterfront infrastructure and coastal flood protection projects.

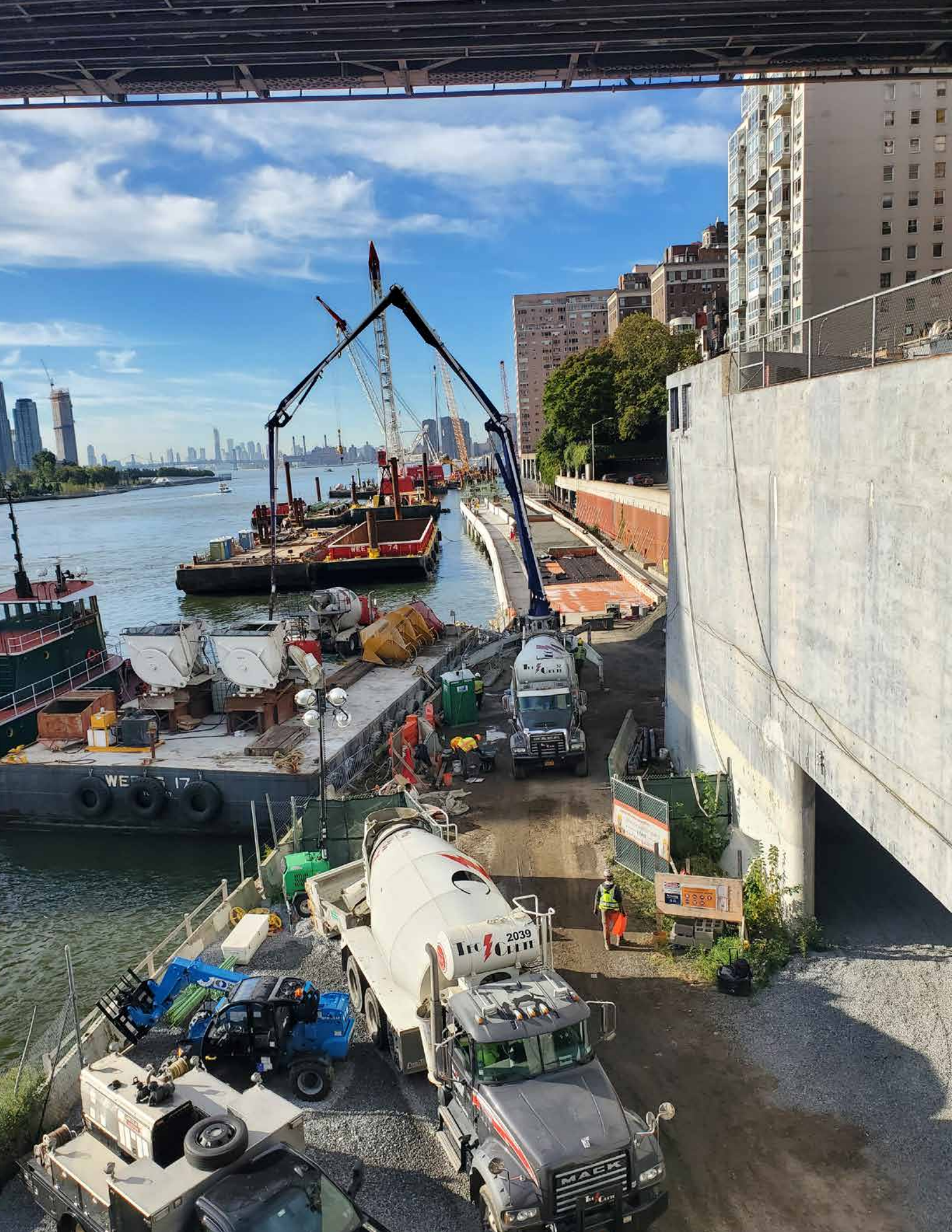
Program oversight to support coordination between City agencies, with State and federal agencies having the jurisdictional or regulatory authority to resolve inter-agency conflicts.

Coordination and oversight of long-term maintenance, monitoring, and operations of coastal flood protection systems.

Strategy 1.3
Develop processes to incorporate climate science feedback loops within the management and capital planning processes associated with existing and new waterfront infrastructure

Opposite:
Engineer-diver conducting a waterfront facilities inspection of Pier 5 at Brooklyn Bridge Park.

Credit: Jacobs


2039
MACK

Goal 2: Ease the path to construction by improving the City's permitting processes and developing gold-standard guidelines for NYC's waterfront and waterways

To ensure high performance and safety of waterfront structures, NYCDOB and NYCSBS are developing a new 'Waterfront Code' to coordinate and regulate the design, permitting, construction and maintenance of marine structures. This effort will align with existing City, State and federal laws, codes and regulations.

In addition to developing a clear set of codes to guide waterfront infrastructure, the City can also take steps to raise awareness about the **"Waterfront Navigator"** — the City's one-stop-shop online permitting guide for projects in or near NYC's waterfront and wetlands. Centralizing this information improves the predictability and efficiency of the permitting process. This website explains the role of each of the agencies involved in waterfront permitting and provides easy access to their waterfront project permits, programs and requirements. The City also will continue to work with State agencies to expedite review processes (including the increasing digitization of the waterfront permit submission and review process) and to prioritize projects that advance a shared vision for NYC's waterfront.

Opposite:
East Midtown Greenway under construction, Manhattan.

Credit: NYCEDC

Strategy 2.1
Complete the development of a Waterfront Code tailored to the specific and varied conditions of NYC's in-water and shoreline marine structures.

Strategy 2.2
Identify opportunities to improve permit review processes and coordination with federal and State agencies.

Strategy 2.3
Increase awareness of the Waterfront Navigator as a tool to facilitate permitting and regulatory coordination for in-water projects, such as bulkhead repair, floating platform construction and maintenance dredging.

Strategy 2.4
Explore opportunities to improve the WFMMS as an online geospatial data and computer modeling tool that allows multiple stakeholders to access detailed maps, shoreline imagery and other essential data on the NYC waterfront.

Strategy 2.5
Increase coordination among City agencies to align in-water habitat mitigation projects and fund restorations to remove historic fill and debris material from NYC shorelines.

Opposite:
Reconstruction of waterfront platform at Pier 35/36, Manhattan.

Credit: COWI

Goal 3: Improve the ecological condition of the City's shorelines by modifying the environmental regulatory processes to allow for in-water material placement for ecological benefit

NYC's current shoreline has been built and rebuilt for several hundred years. In adapting NYC's waterfront to climate change, there is an important opportunity to revisit the layers of regulations that play a role in shaping it.

The current City, State, and federal regulatory environment can impede resilient, more varied shoreline design by encouraging in-kind replacement of existing waterfront infrastructure and making in-water material placement — or clean fill — a difficult, costly and time-consuming proposition. Increasingly, however, waterfront project designers are identifying creative ways to transform hardened edges to help get New Yorkers closer to the water's edge and to increase the ecological benefits associated with **living shorelines**, a protected, stabilized shoreline made of natural materials such as plants, sand, or rock. Living shorelines are being used by public agencies to rewild NYC's shorelines with breakwaters or other in-water structures (like oyster cages) to can improve marine ecosystems and reduce the impacts of coastal flooding.

For many of NYC's hardened edges, such as bulkheads, the process of providing access to the water and increasing ecological habitat requires transforming a typically abrupt vertical division between the land and water into a sloped division to accommodate intertidal zones. However, a sloped division can reduce the land area intended for development, which private developers usually avoid, or require clean fill to be placed into the water – a highly regulated approach that can increase a project's timeline, cost and uncertainty over the ability to obtain required approvals.

For the City's coastal flood protection projects (some of which may take generations to complete), this issue arises on an entirely different scale. As large swaths of NYC's shoreline are redesigned to protect neighborhoods vulnerable to coastal storms, the City, along with State and federal partners, may need to explore in-water material placement and address the challenges that arise by taking this regulatory path. Projects like the East Side Coastal Resiliency Project, the Living Breakwaters in Staten Island and the FiDi Seaport Climate Resilience Plan are all examples that demonstrate different design

Opposite:
Living Breakwaters 3D basin model.

Credit: SCAPE


WEIGHT 5647 LB

responses to this issue: from designing the project within the existing shoreline, to exploring extension of the shoreline and building new in-water structures. By collaborating with State and federal regulatory partners to assess how to enable this important work, the City can explore how NYC's current shoreline can encourage resiliency and promote living shorelines or other natural features along NYC's mostly hardened edge.

Over the last decade, regulatory modifications have attempted to address these challenges. At the federal level, the USACE's Nationwide Permit #54 (NWP 54) is a prime example of a helpful tool designed specifically for living shorelines. Through NWP 54, clean sand placement (or clean fill) has been permitted for several NYC salt marsh restoration projects. These include Jamaica Bay to restore the salt marsh islands, in Alley Creek Park on Little Neck Bay to reduce salt marsh pool expansion, and along Hook Creek (at the head of Jamaica Bay) to trial thin-layer sediment applications on salt marsh. Although these initiatives demonstrate a regulatory path forward to designing and building future living shorelines in NYC, traditional bulkheads and hardened edges retain their advantage due to the relative ease of permitting.

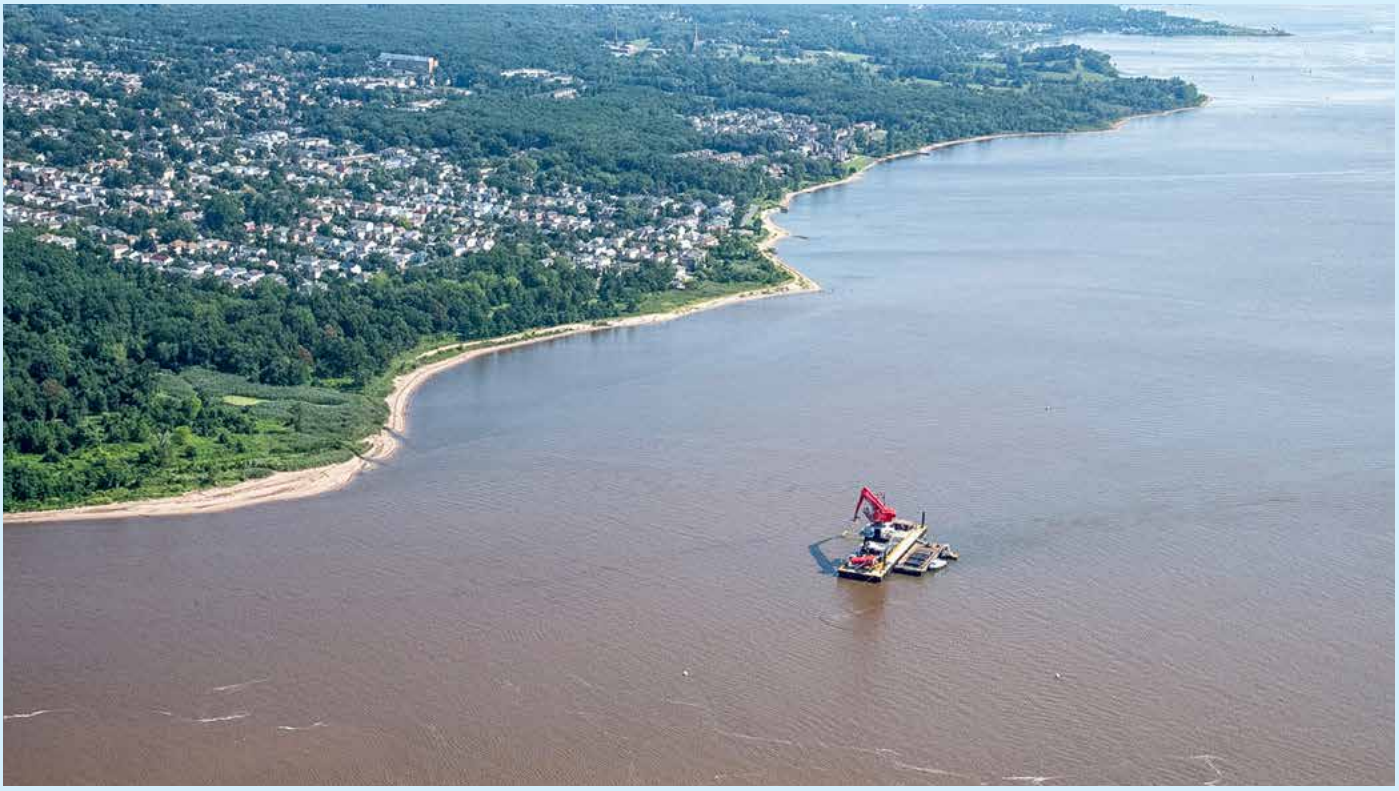
The existing regulatory environment for NYC's waterways was put into place to help protect natural habitats, but reforming these standards does not mean lowering or removing them. Reform can improve the process, expand upon existing requirements to reduce the time necessary to secure permits and enable other, more viable options for shoreline design. For example, criteria used to assess a project's natural resource benefits could include the habitat type to be recreated, the species it supports, its local or regional abundance, demonstrated success in establishing that habitat at similar locations and whether the habitat being altered is sufficiently abundant that displacement of existing species is minimized.

As investments are made to adapt NYC's shorelines to climate change and connect New Yorkers to the waterfront, opportunity exists to explore recommendations and guidelines that recognize that recognize the ecological benefits of in-water material placement (or clean fill) for NYC's waterways.

Strategy 3.1
Explore pathways to promote living shorelines, including allowances of small in-water material placement (or clean fill) for ecological benefit.

Opposite:
Marine mattress installation

Credit: Baird



Above: Living breakwaters construction, Staten Island.

Credit: Weeks Marine, Inc; Bernstein Associates Photographers

Above: Alley Creek living shoreline installation, Queens.

Credit: NYC Parks

Pursuing In-Water Material Placement at the Shoreline or in NYC's Waterways

Living Breakwaters Project

Overseen by the New York State Governor's Office of Storm Recovery (GOSR) Living Breakwaters is an innovative, nature-based coastal infrastructure project. Once completed, it will be owned and maintained by NYSDEC. Together with the Tottenville Shoreline Protection project, it will address coastal flooding, wave action and erosion, while restoring and enhancing the ecosystems, improving waterfront access and engaging the public on resiliency strategies.

This project's goal is to reduce or reverse shoreline erosion and damage from storm waves along Raritan Bay and to improve the health of the local ecosystem, encourage stewardship of our nearshore waters and enhance people's experience of the shoreline of southern Staten Island. A central feature of the project is approximately 2,400 linear feet of partially submerged rubble mound structures (or breakwaters) located between 790 and 1,800 feet from shore. The intent is to improve safety, prevent erosion and provide habitat for local marine life.

The proposed design was evaluated under the Endangered Species Act to assess the effects that construction activities would have on the habitats of essential fish and other protected species – specifically, how converting a soft bottom sand habitat to a complex rocky habitat would affect them. This evaluation was done in consultation with State and federal agencies. The process reviewed the results of a two-year site-specific aquatic sampling program. Habitat lost due to the presence of the breakwater structures required mitigation, which was achieved by purchasing mitigation credits from the Saw Mill Mitigation Bank.

The project team undertook extensive physical and biological surveys of Raritan Bay to understand current conditions, to help identify target species for the project and their habitat needs. Biological surveys looked at benthic invertebrates and fish living in existing sandy bottom areas and in limited areas of existing hard bottom rocky habitat. Studies also examined existing artificial structured habitat in the project's vicinity (such as rocky bases of channel markers). The project's environmental review and permitting documents included an extensive literature review, analysis, and a detailed description of the habitat-enhancing features and the ecosystem services to be provided. This demonstrated that the project would not have any adverse effect upon aquatic resources, would provide complex structured habitat to a range of aquatic species currently found on the site and provide ecosystem benefits to Raritan Bay generally.

Alley Creek Wetland Restoration Projects

Alley Creek has seen a series of restoration projects in the last decade, including new sewer overflow tanks and construction of an environmental center (read more in **"Water Quality and Natural Resources Goal 3" on page 225**). As part of these efforts, a recent NYC Parks-led phase of Alley Creek restoration includes restoring eroded marsh habitat along the historic shoreline. The project includes incorporating protective structures ("oyster castles") to stabilize the eroded shoreline and restoring the surface of the wetland by adding clean sand so that it is raised to the elevation where salt marsh vegetation thrives. For this project, NYC Parks met with NYSDEC early in the process, beginning with the project concept to specify the restoration objectives and the rationale for adding protective structures ("oyster castles") and clean sand (for filling salt math pans). Throughout the process, NYC Parks explained how these elements would work to improve the ecology of the sites. The process also included metrics, monitoring and other methodologies to assess existing ecological conditions. At these sites, Parks was able to show relatively recent wetland degradation. NYSDEC allowed the work to proceed as a pilot and included detailed monitoring requirements in the permit.

Goal 1: Improve coordination, management and monitoring of current and future public waterfront infrastructure

Strategy 1.1
Refine, expand and realign administrative processes and digital tools to help ensure infrastructure remains in a state of good repair and encourage modernized, resilient waterfront infrastructure.

Strategy 1.2
Develop a structure for efficient and effective coordination, management and monitoring of current and future public waterfront infrastructure that include:

- **Codification of the responsibility for portfolio oversight, project identification, design, construction, and operations and maintenance of coastal flood protection projects to a new or existing agency(s) and secure adequate funding to ensure agencies can fulfill these responsibilities.**

- **Multi-agency capital planning exercises to identify funding needs for implementation and maintenance of waterfront infrastructure and coastal flood protection projects.**

- **Program oversight to support coordination between City agencies, with State and federal agencies with jurisdictional or regulatory authority to resolve inter-agency conflicts.**

- **Coordination and oversight of long-term maintenance, monitoring, and operations of coastal flood protection systems.**

Strategy 1.3
Develop processes to incorporate climate science feedback loops within the management and capital planning of existing and new waterfront infrastructure

Goal 2: Ease the path to construction by improving the City's permitting processes and developing gold-standard guidelines for NYC's waterfront and waterways

Strategy 2.1
Complete the development of a Waterfront Code tailored to the specific and varied conditions of NYC's in-water and shoreline marine structures.

Strategy 2.2
Identify opportunities to improve permit review processes and coordination with federal and State agencies.

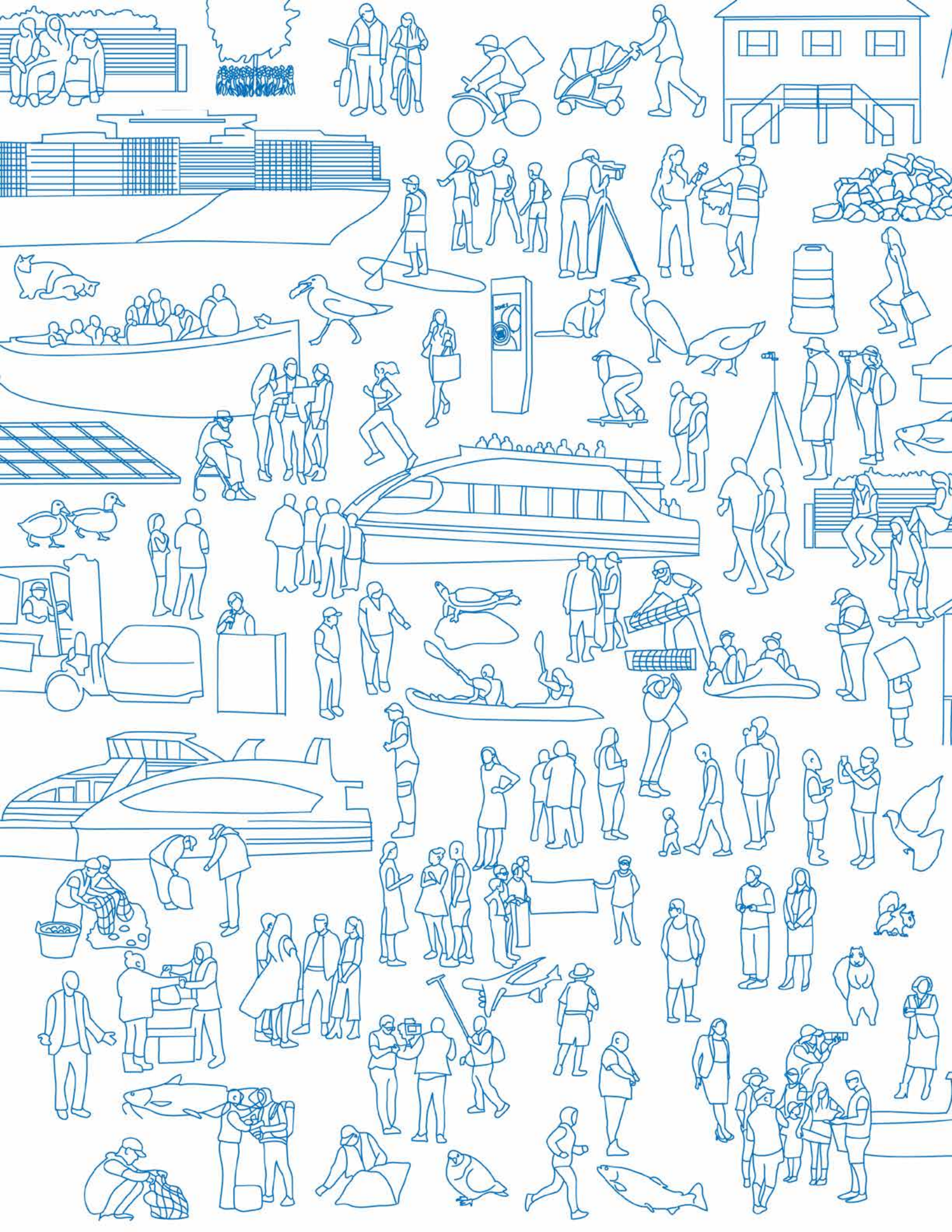
Strategy 2.3
Increase awareness of the Waterfront Navigator as a tool for facilitating permitting and regulatory coordination for in-water projects, such as bulkhead repair, floating platform construction and maintenance dredging.

Strategy 2.4
Explore opportunities to improve the WFMMS as an online geospatial data and computer modeling tool that allows multiple stakeholders to access detailed maps, shoreline imagery and other essential data on the NYC waterfront.

Strategy 2.5
Increase coordination among City agencies to align in-water habitat mitigation projects and fund restorations that remove historic fill and debris material from the shorelines across NYC.

Goal 3: Improve the ecological condition of the City's shorelines by modifying the environmental regulatory processes to allow for in-water material placement for ecological benefit

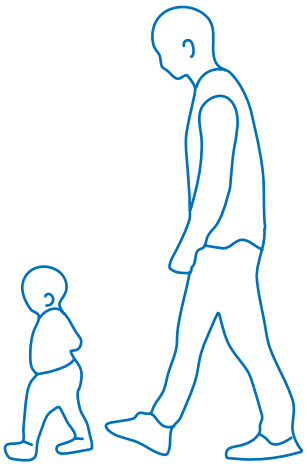
Strategy 3.1
Explore pathways to promote living shorelines, including allowances of small in-water material placement (or clean fill) for ecological benefit.



CHAPTER 5

NEXT STEPS

Next Steps



This Plan is the product of broad, deep collaboration across agencies and organizations and among New Yorkers. NYCDCP hopes to inspire New Yorkers with this vision for an equitable, resilient and healthy waterfront. Throughout the creation of the Plan, NYCDCP heard from New Yorkers about their hopes and dreams for the future of NYC's waterfront. NYCDCP also worked closely with agency partners and waterfront enthusiasts to develop goals and strategies and embodied their ideas within this Plan. As a result, this document and these collaborations lay essential foundations, for the collective work that has only begun.

The power of the Plan lies within its good ideas and the supporters who will champion them. As the City works to turn plans into action, we once again look to our agency partners, waterfront enthusiasts and all New Yorkers to help achieve the visions laid out in the Plan. Realizing these visions will require strengthening existing relationships, establishing new connections and creating meaningful forums to continue our collective work.

Many of the Plan's strategies fall within the purview of City agencies to continue advance. Other efforts, however, will require sustained collaboration among the City, other levels of government, waterfront communities, waterfront advocates, professionals who work on the waterfront and all New Yorkers.

We invite all New Yorkers to work with us to broaden public awareness and appreciation of NYC's waterfront and waterways and all they can offer. This includes developing the tools needed to better communicate climate risks and futures better and elevating the health of our natural resources for generations to come. It involves designing, operating and maintaining high-quality waterfront open spaces reflective of NYC's diverse communities. It means expanding waterfront access where it is needed the most while elevating the importance of NYC's maritime industries and supporting transformation toward a greener economy.

Our Future Waterfront

Think ahead 30 years or more from now.... How might New Yorkers live, learn, work and play on the waterfront? How will communities steward their waterfront? How will the built environment and ecosystems adapt to the impacts of climate change? How will New Yorkers travel across the water? What experiences of the waterfront will the next generation of New Yorkers have?

No one knows what the future holds — especially during a moment of intersecting crises. However, imagining what a shared vision can look like, extending beyond the 10-year timeframe of the Plan can help sustain the energy that drives changes and progress over time. Envisioning the NYC waterfront of the 2050s and beyond requires thinking about education and stewardship, community engagement and government accountability, and approaching the future with optimism.

Following are several farsighted scenarios that can help inspire the ambition of future Comprehensive Waterfront Plans:

Urban Harbor Ecology 101

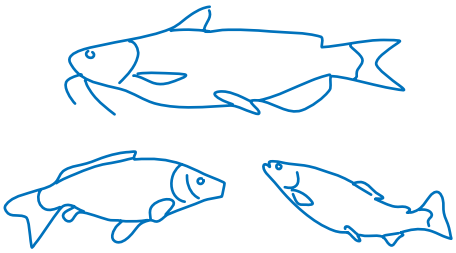
Learning about the climate and the ecology of the New York Harbor is as common in public schools as learning about recycling, technology or art was a generation earlier. Students have unique opportunities to learn from, steward and shape their urban harbor ecology. Increased access to the waterfront has given New Yorkers a deep understanding about climate change and resiliency and a firsthand relationship to their waterfront that engages all five senses.

Wetland Wildlife Once More

New York Harbor glistens with a new, healthier ecology that features sandy beaches and lush saltwater marshes on its coast. New Yorkers are proud of the urban coastal infrastructure systems that have been build, conjoining well-functioning grey infrastructure with natural wetland ecologies. The living breakwaters off Staten Island — completed in the mid 2020s — have created an additional layer of resiliency for the area that addresses wave attenuation and erosion. Similar coastal protection projects have restored and enhanced the natural ecosystems, improved waterfront access and engaged the community on resiliency strategies. These pilot projects have led to other projects welcoming the return of plants and animals and promoting ecosystem regeneration throughout the New York Harbor, Jamaica Bay, and other waterbodies and waterways.

NYC's Own "Emerald Necklace"

NYC's waterfront has become NYC's most iconic destination for visitors from around the world. A proliferation of community stewards overseeing all 520 miles of waterfront has helped attach a strong cultural identity to these places. Through the dedicated and focused efforts of City agencies, stewardship groups and community leaders, an interlaced parkland system — rivaling Boston's "Emerald Necklace" of parks, greenways and waterways — exists along the water's edge and reflects the diversity of NYC's communites. All our waterfront communities have reconnected with their waterfront through strategies that balance active waterfront uses and recreation. Every New Yorker has convenient access to safe, well-designed and universally accessible waterfront open space.



Making a Splash

Swimming in the New York Harbor for exercise or fun (in designated, accessible areas, of course!) has become as popular as jogging in Central Park or riding a bike in Flushing Meadows Park. Water safety education is as accessible to every New Yorker as Universal Pre-K is to 4-year-olds in the 2020s. All children across NYC are taught swimming by sixth grade and have opportunities to enjoy NYC's pools and beaches. In addition to swimming, kayaking and other human-powered watercraft activities are a regular part of NYC's waterfront culture. All neighborhoods enjoy improved water conditions and have access to get-downs, ramps and equipment storage facilities that make getting into the water easier and safer for everyone. In coordination with in-water safety and educational boating programs, all New Yorkers can now benefit from the unique experience of seeing NYC from atop the water.

A Blue/Green Tech Hub

The green economy and clean energy boom of the 2020s and '30s are providing exciting new job opportunities for New Yorkers in the renewable energy, transportation and blue/green technology fields. NYC is leading the country in creating these types of jobs, which in turn are helping NYC thrive in a changing climate and greener economy.

A Land-to-Sea Transportation Network

Waterfront bike paths and low-emission ferries are part of the everyday NYC commuting experience, along with buses and subways. Bike share stations and other amenities that encourage people to get to the waterfront dot the shoreline and allow New Yorkers to travel from waterfront to waterfront through low-carbon methods. NYC has met its carbon neutrality goal through a combination of building and infrastructure improvements and decarbonized transportation.

Destination: Public Meeting!

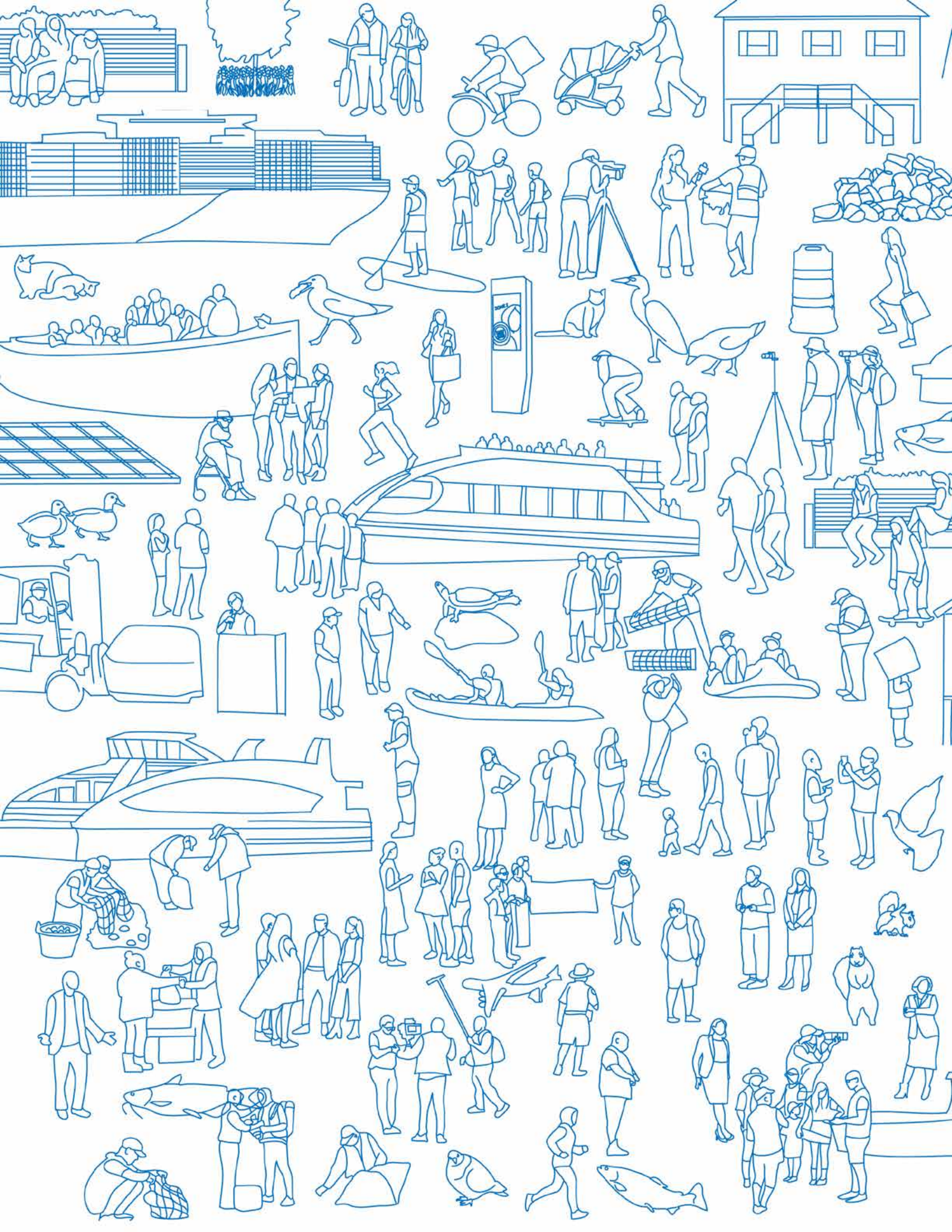
While not as popular as Broadway shows and concerts in Central Park, public meetings and events draw record crowds. Public engagement practices pioneered during the third Comprehensive Waterfront Plan of 2021 became a template for emphasizing engagement at the front end of public programs and City projects. New Yorkers feel heard through ongoing channels of sustained dialogue about climate adaptation, public access and economic opportunity. In the culture of 2050 New York, no one is excluded or marginalized in public engagement processes, and participants understand each other's needs and goals for the future.

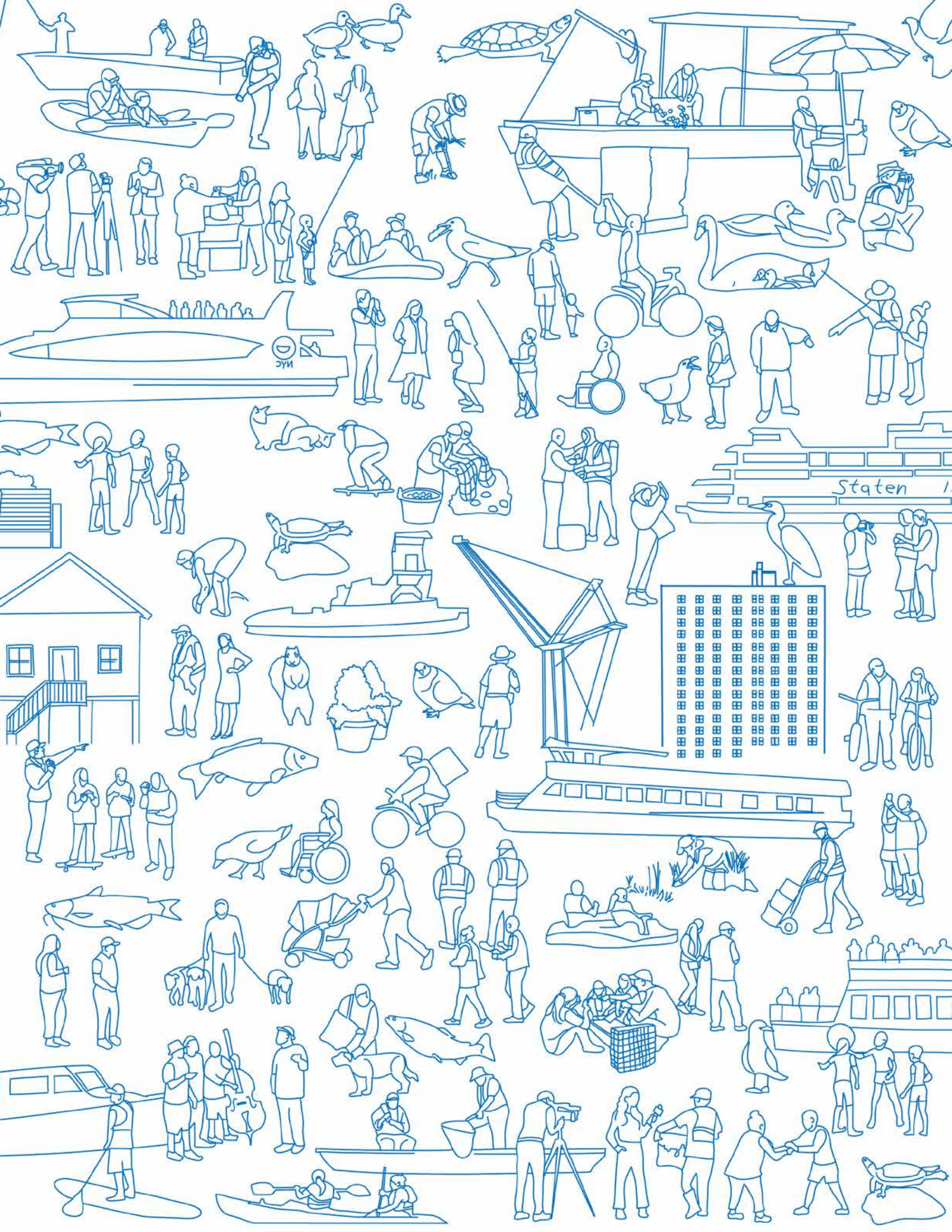
Communities Working Together

Some of the greatest success stories of NYC come from community-based initiatives. During the 2020s, when extreme weather events like Hurricane Ida began hitting NYC with greater frequency, New Yorkers started working together to reduce their exposure to climate risk at home. Today, New Yorkers have an abundance of publicly available information and resources in many languages. Community ownership projects, like the Edgemere Community Land Trust and Sunset Park Community Solar (begun in 2021), have blossomed into successful campaigns to increase the power of communities to expand sustainable practices. They also help residents balance demands for critical infrastructure services to keep communities livable in a more extreme climate.

Climate Justice for All

Climate adaptation is a fundamental part of every level of government and the principle of climate justice guides agency priorities. Together, New Yorkers and the public agencies that serve their needs will keep rising to meet the unprecedented challenges posed by a more extreme climate.




Staten

Acknowledgements

The Comprehensive Waterfront Plan is the product of the tremendous dedication, hard work and input from many City offices and agencies, as well as a strong coalition of community and non-profit organizations, who contributed their time, energy and knowledge of the waterfront to help NYCDCP shape the goals and strategies of the Comprehensive Waterfront Plan. Additionally, the Comprehensive Waterfront Plan would not have been possible without the help of thousands of New Yorkers who came out to in-person and remote workshops, forums and events to provide invaluable insights and ideas about NYC and its waterways. The Comprehensive Waterfront Plan is for them—and for future generations of waterfront enthusiasts.

The Comprehensive Waterfront Plan Team

Michael Marrella, Director, Waterfront and Open Space, NYC Department of City Planning

Brendan Pillar, Deputy Director, Waterfront and Open Space, NYC Department of City Planning

Allan Zaretsky, Senior Waterfront Planner, Waterfront and Open Space, NYC Department of City Planning

Lucrecia Montemayor Solano, Senior Waterfront Planner, Waterfront and Open Space, NYC Department of City Planning

Christopher Wassif, Waterfront Planner, Waterfront and Open Space, NYC Department of City Planning

Ariane Collins, Waterfront Planner, Waterfront and Open Space, NYC Department of City Planning

Lauren Wang, Senior Policy Advisory, NYC Mayor's Office of Climate Resiliency

Cory Mann, former Waterfront Planner, Waterfront and Open Space, NYC Department of City Planning

Julia Curbera, former Intern, Waterfront and Open Space, NYC Department of City Planning

Paloma Muriel Urbina, former Intern, Waterfront and Open Space, NYC Department of City Planning

Other Contributors

Peter Adams, Syed Ahmed, Lida Aljabar, Rachel Antelmi, Pinar Balci, Jainey Bavishi, Rafel Berges, Matthew Berk, Adam Berkowitz, Heidi Berman, Ryan Blair, Jumaris Brea-Berges, Shawn Brede, John Brock, Alison Brown, Tallant Burley, William Calabrese, Christine Camilleri, Andrew Cantu, Franny Civitano, Alan Cohn, Jessica Colon, Ryan Cote, Danielle DeCerbo, Teal Delys, Susanne DesRoches, Eugenia Di Girolamo, Jocelyn Dupre, Adriana Espinoza, Stephen Everett, Catherine Ferrara Iannitto, Julia Fiferman, Rebecca Fischman, Andrew Genn, Katherine Glass, Sagi Golan, Melissa Grace, Carrie Grassi, Erick Gregory, Carolyn Grossman Meagher, Nate Grove, Inna Grutman, Elizabeth Hamby, James Harris, Chris Hayner, Joseph Helferty, Jesse Hirakawa, David Hochbaum, Juton Horstman, Li Huang, Elijah Hutchinson, Lee Ilan, Jaclyn Jacobs, Ryan Jacobson, Erika Jozwiak, Laura Kenny, Eunice Ko, Angie Koo, Cecilia Kushner, Marisa Lago, Nega Lakew, Justin Lamorella, Anita Laremont, Marit Larson, Michael Leigh, Karina Leung, Amanda Levy, Amy Li, Angela Licata, Daphne Lundi, Amritha Mahesh, Nabeela Malik, Joe Marvilli, Trevor McProud, Adam Meagher, Dylan Meagher, Lara Merida, Annabelle Meunier, Geethanjali Minirajesh. Azka Mohyuddin, Cherry Mui, Anida Murati, Sanmati Naik. Callista Nazaire, Sarah Neilson, Alan Olmsted, Fernando Ortiz, Adam Parris, Alexandra Paty Diaz, Carlos Pesantes, Stephane Pierre, Matthew Pietrus, Sarit Platkin, Manuela Powidayko, Megan Quirk, Joy Resnor, Katherine Richard, Carsten Rodin, Jonah Rogoff, Heather Roiter, Frank Ruchala, Hallah Saleh, Carol Samol, Michael Sandler, Kathleen Schmid, Joy Sinderbrand, Howard Slatkin, Laura Smith, Thomas Smith, Julien Sneck, Scott Solomon, Charles Sorrentino, Perris Straughter, Jackie Strawbridge, Rebecca Swadek, Max Taffet, Bill Tai, Natasha Toal, George Todorovic, Anna Too, Chau Tran, Jose Trucios, Bob Tuttle, Melissa Umberger, Jorge Ventura, Tomi Vest, Daniel Vieira, Claudia Villar-Leeman, Casey Weston, Annie White, Eric Wilson, James Wong, Hye-Kyung Yang, Louise Yeung, Jean You

Agency Partners

The team would also like to thank the incredibly hardworking staffs at the following offices and agencies: Office of the Deputy Mayor for Housing & Economic Development, Mayor's Office of Climate Resiliency, Mayor's Office of Climate and Sustainability, Mayor's Office for People with Disabilities, Mayor's Office of Environmental Remediation, Department of Buildings, Department of Citywide Administrative Services, Department of Cultural Affairs, Department of Environmental Protection, Department of Health and Mental Hygiene, Department of Housing Preservation and Development, Department of Parks and Recreation, Department of Small Business Services, Department of Transportation, Department of Small Business Services, NYC Emergency Management, NYC Housing Authority, NYC & Company, NYC Economic Development Corporation, New York State Department of Environmental Conservation, New York State Department of State, Port Authority of New York and New Jersey, Untied States Army Corps of Engineers.

Oversight on the Plan provided by the Waterfront Management Advisory Board

Eric Johansson, Mychal Johnson, Jessica Katz, Edward Kelly, Aaron Koffman, Roland Lewis, Pete Malinowski, Dr. Geeta Mehta, Michael Northrop, Kate Orff, Debi Rose, Rafael Salamanca Jr., Peggy Shepard, Paul Sieswerda, Kellie Terry, Jay Valgora, Kelly Vilar, Henry Wan, Dr. Judith Weis

Organizational Partners

The team is grateful to the following organizations for their contributions to the Plan and its planning process: Waterfront Alliance, Works on Water, Culture Push, the American Institute of Architects New York Chapter, the Center for Architecture, Brooklyn Boatworks, Natural Areas Conservancy, New York City Environmental Justice Alliance, Riverkeeper, Regional Plan Association, Hudson River Foundation, Jamaica Bay Rockaway Parks Conservancy, Billion Oyster Project, Rocking the Boat, Rockaway Initiative for Sustainability and Equity, Bronx River Alliance, Randalls Island Park Alliance, Trust for Governor's Island, Maritime Association, Urban Design Forum, Kayak Staten Island, New York Aquarium, Harbor Estuary Program

The quotations used throughout the Plan were submitted as feedback to NYC DCP during public engagement on the Plan.

The team would like to recognize Louis Kleinman for his dedication to NYC's waterfront and for attending all 12 of NYCDCP's remote workshops and both remote public hearings.

The Comprehensive Waterfront Plan is published pursuant to Local Law 49 of 2008.

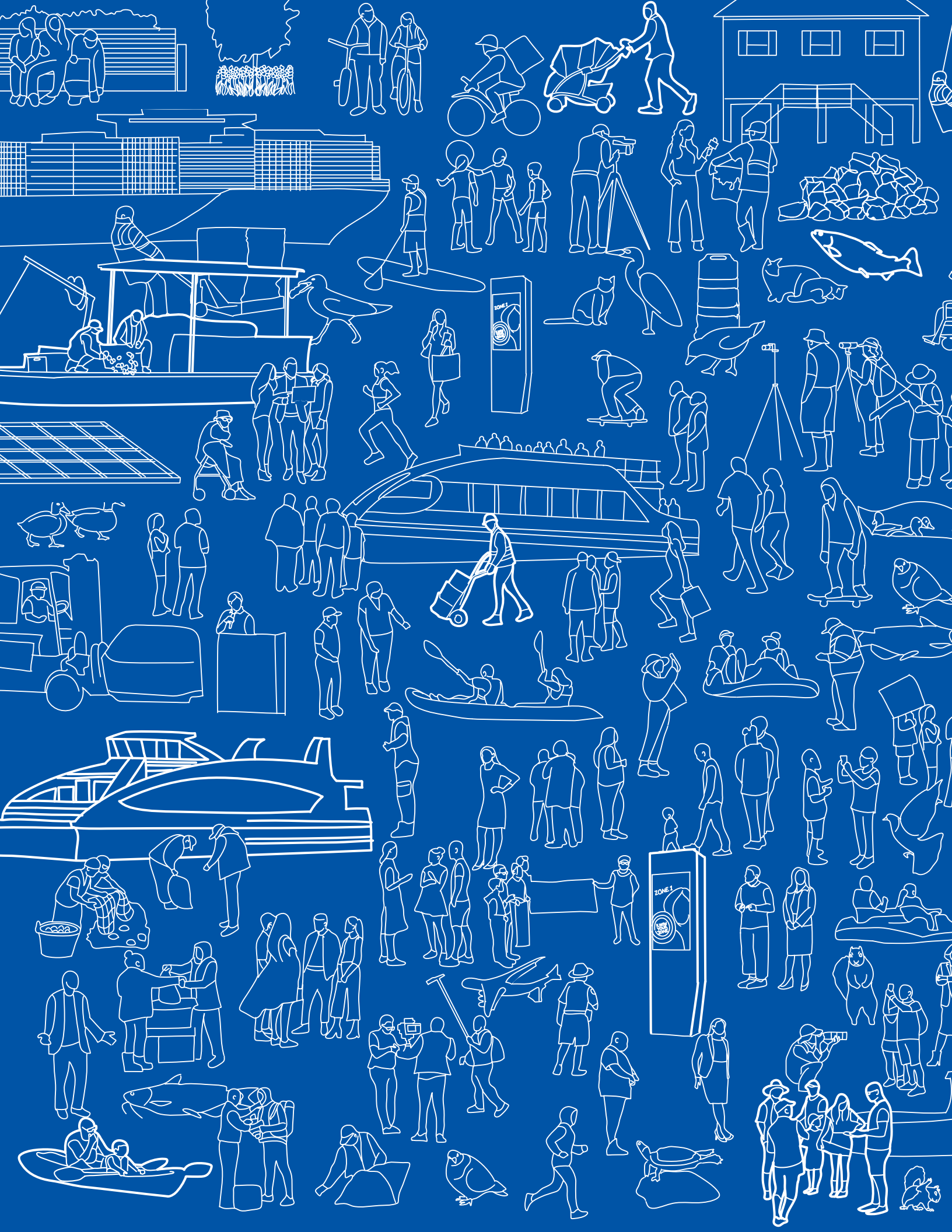
The Comprehensive Waterfront Plan and planning process are funded by the New York State Department of State under Title 11 of the Environmental Protection Fund.

Additional funding support provided by the Mayor's Grant for Cultural Impact from the NYC Department of Cultural Affairs.

Design by Interboro Partners (Georgeen Theodore, Andrew Wald, Brandy Vazquez, Ciara Stein)

Writing by Kathryn Roberts, CDR Studio Architects, PC

Editing by Susan Bednarczyk


ZONE 1
ZONE 1