

## **Nature Must Be New York City's First Line of Coastal Defense**

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**March 2026**

As you visit Coney Island this summer, an area known for its iconic boardwalk and Luna Park, you might wander to Coney Island Creek Park. Hidden away in a residential area, the Park is Brooklyn's last urban estuary. Alongside residents enjoying the shoreline and shorebirds stopping by on migratory routes, you may notice expansive beachgrass plantings on the Park's dunes. These plantings are not just designed to make Coney Island Creek Park more beautiful, but to put nature to work.

They are an example of "nature-based solutions," which harness nature to protect shorelines and cities from worsening coastal flooding due to rising seas, while also creating habitat for wildlife and beautiful green spaces for people. As climate change is impacting New York City and reshaping its coastline, these restoration efforts are a reminder that one of our most effective tools to protect our communities is nature itself.

Sea levels around New York City have risen 9 inches since 1950. Many neighborhoods are also vulnerable to flooding from heavy rainfall. As the many named superstorms, including Sandy, have taught us, effective mitigation strategies to protect people and property at scale are urgently needed. While the city has invested in traditional "grey" infrastructure like seawalls in Staten Island, flood gates in lower Manhattan, and raised and hardened shorelines in Queens and Brooklyn, the opportunities for natural solutions are often lesser known. Nature-based solutions, however, can match and often outperform engineered defenses, while providing a wide range of additional benefits.

Coastal wetlands, for example, can reduce wave energy by 30–90% and coastal flooding by over 30%, protecting properties and preventing shoreline erosion. By comparison, typical seawalls reduce roughly 20–35% of wave energy. Oyster reefs can act as living breakwaters, significantly reducing the height of waves before they reach the shore. The long roots of American beachgrass plants spread vertically and horizontally underground, forming interlocking networks that stabilize sand and prevent erosion. Vegetated dunes act as natural seawalls, absorbing the impact of storm surges and high waves, and preventing them from traveling inland.

This Spring, students, teachers, community members, and partners planted American beachgrass in Coney Island Creek Park as part of National Wildlife Federation's Resilient Schools and Communities (RiSC) program. Some 30,000 residents living adjacent to the Park experienced an 11-foot storm surge in 2012 that destroyed homes and livelihoods. Our program aims to revegetate frontal dunes in the Park to create a living wall of

protection for the neighborhood. Because one American beachgrass plant can create 100 new stems annually, the beachgrass will continue reproducing itself throughout the year, working overtime long after planting crews and volunteers have put down their shovels.

The grasses also create habitat for native and migratory birds, small mammals, and pollinators, producing a variety of benefits for wildlife that traditional concrete solutions can't offer. At the same time, these projects create healthier, more enjoyable public outdoor spaces for recreation. Beaches with intact dunes and maritime forests are more beautiful places to walk, fish, birdwatch, and cool off on a hot day.

Local governments and engineers may default to traditional grey infrastructure because they aren't as familiar with nature-based solutions and so don't integrate them into plans and budgets. But data on the economic benefits of investing in natural solutions are compelling. Research has shown that nature-based solutions are up to 50% cheaper than traditional grey infrastructure strategies, for the same infrastructure service. And unlike traditional concrete and steel infrastructure projects, which degrade over time and require repairs, natural solutions can grow stronger as plants mature and habitats reestablish themselves.

The RiSC program's Coney Island Creek plantings may seem modest compared to massive seawalls or floodgates, but they show us how protecting New York City means restoring the natural defenses that shaped our coastlines. The RiSC program purposely engages New York City public school students – our future scientists, urban planners, and engineers - in learning about how nature-based solutions can be implemented locally.

It is more important than ever to roll out community-scale nature-based solutions and inspire people of all ages to understand and embrace their benefits. By conserving and expanding the systems nature put into place and restoring what we've damaged, New Yorkers can participate in building back a city that is safer, more resilient, and more livable for people and wildlife.

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