



How Adaptable and Robust are Urban Coastal Ecosystems?

Partners of the Science and Resilience Institute at Jamaica Bay study urban coastal ecosystem resilience

Background

Established in 1972, Gateway National Recreation Area offers more than 26,000 acres of marshes, wildlife sanctuaries, recreational facilities, beaches, and historic structures. One of three park units, Jamaica Bay is an 18,000-acre wetland estuary (about the size of Manhattan) that consists of numerous islands, a labyrinth of waterways, meadowlands and two fresh water ponds. The wetlands provide a unique environment for both wildlife preservation and urban recreation. Enclosed by the Rockaway Peninsula and protected from the Atlantic Ocean, the region currently hosts over 325 species of birds, 50 species of butterflies and 100 species of fish. A favorite stop for migratory waterfowl, the area is an integral part of the larger, regional ecosystem.

In July of 2012, the NPS and the City of New York signed an unprecedented agreement to cooperatively manage Jamaica Bay's 10,000 acres of federal and

city-owned public parkland. Under the agreement, federal and City agencies will jointly promote visitation, recreation, education programs, and scientific research, creating a new "jewel in the crown" of the national and city park systems.

Collaborative Research

The Department of the Interior's Hurricane Sandy Mitigation Funding is supporting research projects throughout Gateway's Jamaica Bay region aimed at advancing the knowledge of resilience in urban coastal ecosystems. Ten research projects are currently underway, each conducted by partners of the Science and Resilience Institute at Jamaica Bay. The Institute, a cooperative effort initiated by the National Park Service and the City of New York, is a consortium of top-tier research institutions, led by the City University of New York. The Institute's mission is to increase understanding of how disturbances impact natural and human systems in urban watersheds through



The Manhattan skyline as seen from Gateway NRA's Jamaica Bay Wildlife Refuge. Jeffrey Bary image.

resiliency-focused research of Jamaica Bay, and to engage government and community stakeholders in the translation of that knowledge toward a more robust and resilient system. Sandy Mitigation support provides an excellent boost to the recently created Institute and will provide essential information to guide habitat restoration, adaptation and resilience efforts throughout Jamaica Bay and with relevance to other urban coastal systems.

The Projects

The research projects, started in fall 2014 and planned for completion in fall 2016, encompass an exciting array of disciplines. Studies are focused on enhancing our understanding of coastal habitat response and resiliency to sea level rise and storms, asking and helping to answer questions like: “Will coastal habitats (beaches, dunes, and salt marshes) that fringe the Bay be able to migrate landward and are there restoration measures that will increase the ability to maintain essential ecosystem services and adapt to climate change?” Scientists are developing advanced models capable of projecting the response of Jamaica Bay to sea-level rise and storm surge, as well as understanding how coastal adaptation or restoration practices (e.g., beach nourishment, marsh elevation enhancement) in the Bay will influence coastal flooding, storm waves, and water quality. Some funds are dedicated to the design and deployment of a real-time observing system to monitor local meteorology, water circulation, sediments, nutrients, and other parameters – this information will support models and capture valuable information on responses to future storm

events and climate change. Some of our cooperating scientists are analyzing the environmental history and past water quality trends, providing historical insight to the resilience concept. There is also a social science project that engages local communities, government agencies and scientists on their visions of resilience and adaptation strategies.

There is a long history of science in Jamaica Bay, but never has there been such a focused effort with broad collaboration from multiple institutions. The Hurricane Sandy funding is supporting research partners of the Science and Resilience Institute affiliated with Brooklyn College-CUNY, Columbia University, Cornell University, Hunter College-CUNY, Queens College-CUNY, Rutgers University, Stevens Institute of Technology, Stony Brook University, and the Wildlife Conservation Society. Students, both undergraduate and graduate, are fully engaged in the Jamaica Bay resiliency projects, collaborating with faculty mentors and interacting with agency managers – students are the future of environmental stewardship.

These Hurricane Sandy projects have just begun and findings are not yet available, but there is much anticipation that these projects will provide the scientific knowledge necessary to support restoration and adaptation strategies that will enhance the long term sustainability and ecosystem resilience of Jamaica Bay. The Science and Resilience Institute at Jamaica Bay, with representation from federal, state and city agencies, provides an ideal forum to facilitate the translation of research findings to implementation of management and policy actions.

Marsh at Gateway NRA's Jamaica Bay Wildlife Refuge. NPS image.



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