Case Study 11:
Restoring the Jamaica Bay Wetlands,
Gateway National Recreation Area, New York

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Goals

Gateway National Recreation Area partnered with other state and federal agencies to restore wetlands in Jamaica Bay, a eutrophic urban estuary, through sediment addition and plantings. While the project was not driven by climate change concerns, addressing marsh elevation loss is consistent with methods to address sea level rise. The monitoring program strives to determine factors contributing to project performance; to test several experimental techniques; to develop and justify adaptive management actions; and to better understand factors contributing to marsh loss throughout Jamaica Bay.

Challenges and Needs

Historically, Jamaica Bay's extensive marsh islands, tidal creeks, and mud flats served as important nursery and feeding grounds for fish. The quantity and quality of bay habitat has declined due to urban development, shoreline hardening, channel dredging, sewage treatment plant operations, and causeway and jetty construction. Emergent salt marsh islands have converted to intertidal and subtidal mudflats. The current (2003–2008) annual average rate of salt marsh island loss is 7.7 ha (19 ac) per year, a rate that is high in terms of both annual loss and percentage by area. That loss is likely to be further exacerbated by sea level rise.

In response to public recognition and concern about the loss of salt marsh habitat and functions within the Jamaica Bay ecosystem, an interagency wetland restoration project was developed. Compliance and design work were completed by a contractor for the first restoration site in 2006 and by the US Army Corps of Engineers (USACE) and an interagency team for subsequent sites under special use permits. USACE performed the National Environmental Policy Act (NEPA) planning, which the National Park Service (NPS) adopted to issue a Finding of No Significant Impact.

Restoration methods were based on ecological expertise, NPS policies, bio-benchmarks (elevation requirements for vegetation), and engineering guidance from the USACE. Using a variety of experimental techniques, sediment was added to the marsh surface to increase elevation, and vegetation was planted or relocated. A comprehensive monitoring and adaptive management program has been implemented at each restoration site; data are collected prior to restoration and will continue for five years following restoration. Monitoring results and practical experience gained at each restoration site are used to improve planning and execution at subsequent sites. Research efforts focus on mechanisms of salt marsh loss, including regional sea level rise, hydrologic modifications, and eutrophication.

Responsive Actions

The project faced several challenges. Development of a functional interagency team was not smooth at first but has become one of the project's successes. When construction funding could not be secured, the project was repackaged as a beneficial use project for sediment dredged by a harbor deepening project. Because USACE policies limit monitoring to 1% of project costs, NPS funding and in-kind cost sharing were used to maximize limited resources. Initially, partners did not support the NPS preference for higher-elevation marsh, which supports a different species assemblage and which builds in resilience under sea level rise; fortunately restoration at each successive site has included increasingly more high marsh.

The park obtained fiscal year 2014 funding through the NPS servicewide combined call to support research that will focus on marsh response to sea level rise and that will populate published models with project monitoring data.

Future restoration efforts may be inhibited by the availability of a cost-effective clean source of sediment. NPS and park standards for sediment quality that exceed Environmental Protection Agency and New York Department of Environmental Conservation standards were met with resistance from funding partners. Fund transfer mechanisms among state and federal partners will likely be a recurring challenge. Another challenge is the inability of restoration fund sources to support basic research that would improve restoration by optimizing techniques or identifying the causes of marsh loss. For example, this project would have benefitted from a better understanding of the tidal range, and the elevation range for saltmarsh cordgrass (*Spartina alterniflora)* growth within Jamaica Bay, in order to restore marshes to the maximum elevation at which the desired habitat could establish. Site-specific data relating to shallow subsidence and compaction would have improved estimates for the fill volume required to achieve design elevations.

Salt marsh restoration in Jamaica Bay has tried a variety of experimental techniques to increase marsh elevation, including spraying the marsh surface using a swing-ladder dredge. Image credit: USACE New York District.

This project is ongoing. This case study is an example of the following adaptation strategies:

- Reducing local climate or related change
- Coordinating planning and management across institutional boundaries
- Conducting/gathering additional research, data, or products

For more information:

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