

## 5.0 Introduction and Objectives

Jamaica Bay offers a unique opportunity to study a complex salt marsh environment in an urban setting. This diverse ecosystem is threatened by landfill seepage, combined sewer overflow, JFK Airport expansion pressures and illegal fishing induced by the high urban population.

To effectively manage the Jamaica Bay region, and to insure its health and survival, requires an understanding of the complex interplay of materials and energy flow within the system and its coupling to its urban surroundings. It is essential that the system be viewed in its entirety.

Researchers at Columbia Earth Institute have carried out an integrated, coordinated pilot reconnaissance of the physical, chemical, geological, and biological systems within Jamaica Bay, entitled “Integrated Reconnaissance of the Physical and Biogeochemical Characteristics of Jamaica Bay”. We believe that such an integrated approach is necessary to fully understand the complex inter-relationship of the wetland ecosystem. This effort was jointly funded by the US National Park Service/Gateway National Recreational Area and the Columbia Earth Institute of Columbia University.

### 5.1 Objectives of the program

The overall objective was to obtain a synergistic view of varied elements of Jamaica Bay: its diverse ecosystems; the sediment geomorphology and layering; circulation and mixing of its waters; chemical, natural and anthropogenic properties of the Bay waters and sediments. A suite of measurements was carried out which enhances the monitoring program of the NPS within Jamaica Bay by providing a broader range of measurements and a high resolution snap-shot view of the spatial scales.

This objective was pursued through a series of focussed studies, whose results are given in this report:

[A] The sediment morphology of the Bay floor from sonar and sidescan:

Geophysical Mapping of Submarine Environments (Robin Bell, Suzanne Carbotte and Roger Flood)

[B] Sediment and soil sampling:

Investigations into Recent Salt Marsh Losses in Jamaica Bay (Ellen Hartig, Alexander Kolker and Vivien Gornitz)

Paleoenvironmental History of Jamaica Bay Marshes (Dorothy Peteet and Louisa Lieberman)

[C] Circulation and mixing:

Temperature, Salinity and Currents in Jamaica Bay (Arnold Gordon, Bruce Huber and Robert Houghton)

Dye Tracer Experiments in Jamaica Bay (Robert Houghton, Arnold Gordon and Bruce Huber)

Stable Isotope Evidence for Water Mass Mixing in Jamaica Bay (James Rubenstone)

[D] Nutrient and Other Chemistry of the Bay waters:

Patterns of Nutrient Enrichment and Depletion in Jamaica Bay, Summer 2000 (Renee Takesue and Alexander van Geen)

Trophic Status of Jamaica Bay: Spatial and Temporal Patterns (Chris Langdon)

Nitrogenous Nutrients and Plankton Production in Jamaica Bay (Ray Sambrotto)

## **6.0 Study Area**

Measurements were obtained throughout Jamaica Bay. Specific sites are described in the program descriptions which follow.