

**ECOLOGICAL PILOT PROJECTS  
OF THE JAMAICA BAY WATERSHED  
PROTECTION PLAN**

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HDR**

# Habitat Degradation Factors in Jamaica Bay include:

Direct habitat loss

Shoreline hardening

Degraded water quality

Dredging/hydrodynamic modifications

Loss of natural freshwater and sediment inputs



*“seeks active solutions to long term problems instead of reactive fixes aimed at current issues”*

Jamaica Bay ecological demonstration projects address  
PlaNYCs water quality goals

Eelgrass beds

Oyster reefs

Ribbed mussels

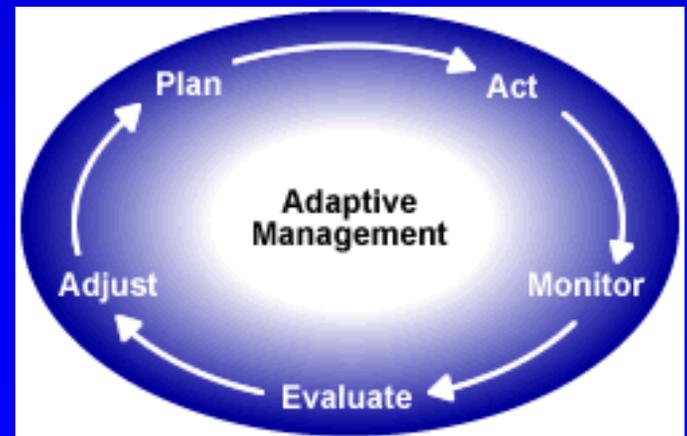
Macroalgae harvesting



Photo by Chris Pickerell, [www.seagrassli.org](http://www.seagrassli.org)

# Demonstration Project Approach:

- 1) Identify historic ecological functions.
- 2) Identify impairments to ecological functions.
- 3) Identify physical impairments.
- 4) Identify restoration performance metrics.
- 5) Identify conceptual restoration actions.
- 6) Conduct site characterization and selection.
- 7) Evaluate restored functions.
- 8) Assess costs and benefits.
- 9) Monitor and measure performance.



# Partners/Collaborating Institutions

NYCDEP

Biohabitats

HydroQual

Hazen and Sawyer

HDR

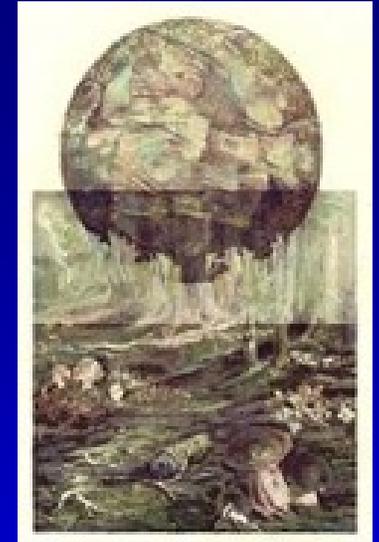
Gaia Institute

Cornell University

Montclair State University

VIMS

Manhattan College



# Role of Local Stakeholders:

Essential to the success of the feasibility assessment phase.

May highlight constraints or issues not readily apparent during the initial information gathering phase.



# Eelgrass (*Zostera marina*) Restoration

Possible locations: Western Jamaica Bay,  
Rockaway/Breezy Point.

40,000 sq ft. demonstration pilot.



# Eelgrass Restoration Methods

Transplants – taken from donor beds (eastern LI, southern NJ). May be free-planted as individual units or planted in clusters, peat pots, etc.

Seeding – not likely to be used as a stand-alone technique in JB due to wave/current energy. could be used to supplement plantings/enhance coalescence.

Seeds may be manually broadcast, mechanically planted or dispersed from buoys containing viable flower shoots.



# Oyster (*Crassostrea virginica*) Reef Construction



One adult oyster can filter approximately 1.3 gallons of water each day.

Resource managers should exercise caution in extrapolating the filtration benefits of oyster reefs to entire estuaries.

Oyster distribution is governed by the interaction of several factors (hydrodynamics, substrate type, water depth, etc.).

Oyster reefs are not simply biological filters, they are also *processors*.



# Oyster Reef Construction Methods

Shell deposits (oyster, hard clam, etc.)

Sand mounds w/ shell cap

Other substrate (rock, fly ash)

Modular “reef balls”

Natural spatfall vs. “seeding”

Possible locations *may* include:

Hendrix Creek

Gerritsen Creek

Shellbank Basin



# Oyster Reef Fish Communities

- Reef resident: e.g., naked gobies
- Facultative: e.g., black sea bass
- Transient: e.g., Atlantic silverside, Atlantic menhaden, striped bass, bluefish, weakfish, winter flounder



Naked goby



Striped bass



Black sea bass



Bluefish



Atlantic silverside



Weakfish



Atlantic menhaden



Winter flounder



# Ribbed Mussel (*Guekensia demissa*) Bed Creation

Mussels may occur singly, or in dense aggregations throughout the mid-lower intertidal zone. Especially high natural densities of *G. demissa* occur in Jamaica Bay.

Pilot study: 20 m<sup>3</sup> bed of mussels.

Pilot study could involve transplanting mussels to artificial hard bottom substrate and/or attachment of mussels to substrate suspended from surface buoys.

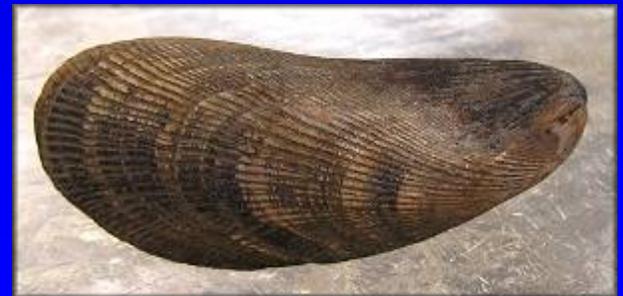
Possible locations *may* include:

Hendrix Creek

Gerritsen Creek

Shellbank Basin

*G. demissa* is generally not consumed by humans, so nuisance control measures are not needed...???



# Macroalge (*Ulva lactuca*) Removal

Mechanical Harvesters? NYCDEP skimmer boats?

Biofuels? Fertilizer? other uses?

Other macroalgae removal programs:

TNC - Waikiki Beach, HI

DNREC – Delaware's Inland Bays





# Baseline Assessments

Might collect data on:

Water quality/hydrodynamics up-current and down-current of demonstration sites.

Light attenuation at proposed eelgrass sites.

Sediment texture, accretion rates.

Porewater biogeochemistry.

Benthic invertebrate communities.

Resident and transient finfish and macrocrustaceans.

Cultural resources in vicinity of project area.



# Post-Construction Monitoring of Demonstration Projects

Water quality/hydrodynamics at all sites

Sediment deposition rates at shellfish reefs and eelgrass beds

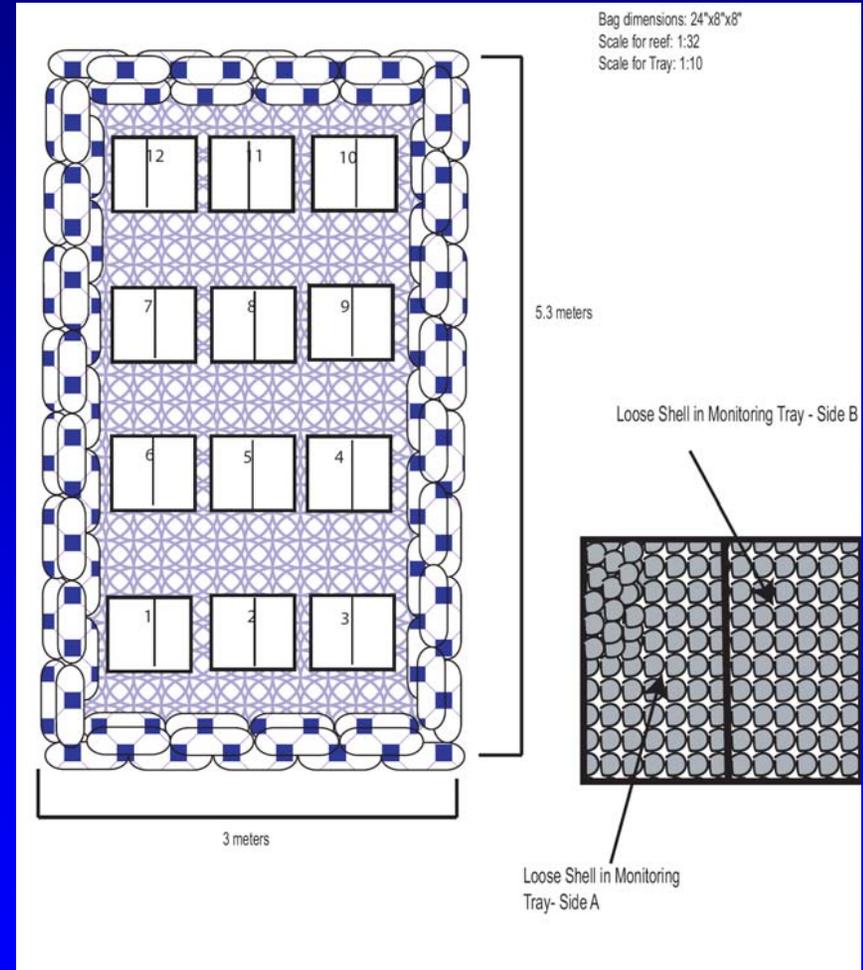
Larval recruitment (settlement) on oyster reefs

Growth, fecundity, mortality, incidence of disease at oyster and mussel sites

Transplant survival, area coverage, shoot density at eelgrass beds.

Filter-feeding and deposit-feeding invertebrates living on the reefs/beds themselves

Fish/macrocrustaceans that rely on the structure provided by shellfish reefs and eelgrass beds



# Performance Indicators

Represent measurable characteristics (e.g. % cover of eelgrass transplants, no. of stems/unit area).

Performance indicators should be quantitative and used to determine if project will meet pre-determined success criteria.

e.g., if goal is to “create sustainable eelgrass beds in JB,” success criteria might be number of acres created 1, 3, 5, years after project initiation.

Failure to met these targets would trigger re-evaluation of goals and/or implementation of corrective measures to optimize eelgrass bed coalescence, reduce grazing, etc. AKA Adaptive Management.



**THE END**

