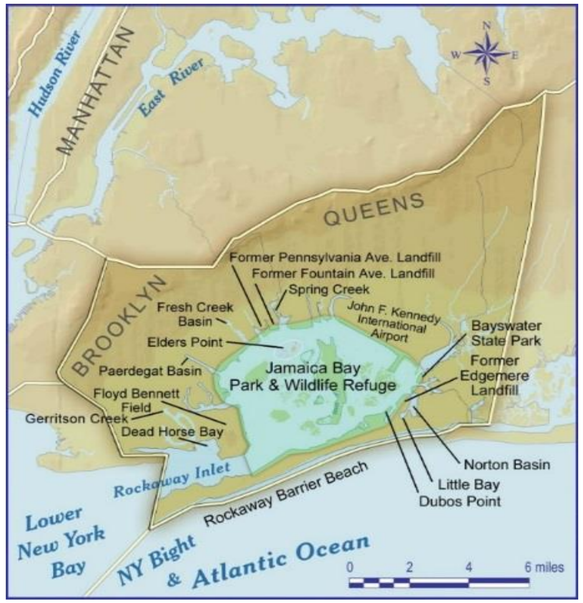
JAMAICA BAY PLANNING REGION

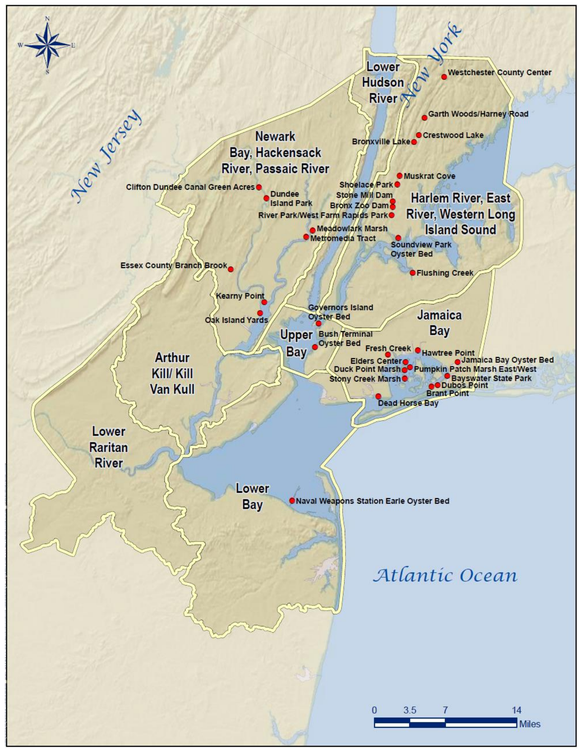


Jamaica Bay, Marine Park and Plumb Beach "Source" Feasibility Study Background

- Study Resolution (1990), Reconnaissance Report (1994) and Feasibility Cost Share Agreement executed with NYCDEP (1996).
- 39 restoration opportunities identified and evaluated.
- Eight (8) restoration sites recommended at USACE milestone meeting in 2010.
- Hurricane Sandy 113-2 Interim Report #2 to Congress identified study to be evaluated for Coastal Storm Risk Management.
- Restoration opportunities considered in the "perimeter plan" for East Rockaway to Rockaway -Jamaica Bay Reformulation Study. However, Storm Surge Barrier selected as Tentatively Selected Plan.
- Six (6) of eight (8) sites were evaluated further for recommendation in HRE Feasibility Report.

Tentatively Selected Plan within Jamaica Bay Planning Region

Restoration Site	Measures/Target Ecosystem Characteristic	First Level Costs			Non-Federal Sponsors (Congressional Representatives)
		Federal	Non-Federal	Total	
Jamaica Bay Perimeter Sites					
Dead Horse Bay	Tidal channel; Wetlands (low/high marsh); Dunes; Maritime forest (beneficial use of sand); Removal of landfill	$53,799,850	$28,969,150	$82,769,000	NYCDEP, NYC Parks, NYSDEC (Jeffries, NY-5)
Fresh Creek	Wetlands (low/high marsh); Tidal creek/pool; Maritime forest; Shallow water habitat through channel regrading	$29,557,450	$15,915,550	$45,473,000	
Hawtree Point	Coastal scrub/shrub and grassland wetlands	$950,950	$512,050	$1,463,000	NYCDEP, NYC Parks, NYSDEC (Meeks, NY-8)
Bayswater Point State Park	Wetlands (low/high marsh); Beach/dune; Tidal channel; Tidal pool	$3,779,750	$2,035,250	$5,815,000	NYS Parks & Recreation (Meeks)
Dubos Point	Wetlands (low/high marsh); Tidal creek/pool; Maritime forest	$6,214,000	$3,346,000	$9,560,000	NYCDEP, NYC Parks, NYSDEC (Meeks)
Brant Point	Wetlands (existing/low marsh); Meadow; Maritime forest	$4,862,000	$2,618,000	$7,480,000	
	Total	**$99,164,000**	**$53,396,000**	**$152,560,000**	
Jamaica Bay Marsh Islands					
Stony Creek	Wetlands	$19,838,800	$10,682,200	$30,520,000	NYSDEC, NYCDEP (Jeffries/Meeks)
Duck Point	Wetlands	$18,057,000	$9,723,000	$27,780,000	
Elders Point Center	Wetlands	$13,474,500	$7,255,500	$20,730,000	
Pumpkin Patch West	Wetlands	$13,026,000	$7,014,000	$20,040,000	
Pumpkin Patch East	Wetlands	$24,667,500	$13,282,500	$37,950,000	
	Total	**$89,063,800**	**$47,957,200**	**$137,020,000**	



Baseline Conditions and Water Resource Problems

- Loss of 75% of marsh habitat (over 2000 acres in the last century)
- Disappearance of Marsh Islands
- Shoreline dominated by non-native, invasive plant species, which is a threat to existing desirable wetland habitats
- Poor benthic habitat
- Poor tidal flushing and circulation
- Continuing shoreline erosion
- Fill and hardened shorelines
- Poor water quality, landfill leachate, Confined Sewer Overflows (CSOs) and waste water discharges
- Straightened and deepened creek with no finger tributaries (Fresh Creek)
- Trash and debris

Restoration Opportunities/Measures

- Habitat improvements
- Wetland restoration/creation
- Invasive species removal/native species plantings
- Tidal Channel modification/realignment
- Bank stabilization
- Tidal Channel geomorphology restoration
- Sediment load reduction
- Basin bathymetry reconfiguration to promote optimal circulation
- Beneficial re-use of material onsite
- Public education/access

NYC Parks

NYC Environmental Protection

NEW YORK STATE OF OPPORTUNITY Department of Environmental Conservation

NEW YORK STATE Parks, Recreation and Historic Preservation

JAMAICA BAY PERIMETER SITES

Dead Horse Bay Tentatively Selected Plan Design:

- Maximizes marsh habitat by creating a tidal channel in the northern portion of the site and regrading this existing upland *Phragmites* stand to salt marsh elevations.
- Stabilize the tidal creek and protect the existing beach habitat, training structures will be created on the banks at the mouth of the creek.
- The area will also be stabilized with geotubes beneath the dunes to avoid erosion of the site back into the remaining landfill.
- Materials will be beneficially reused on site to create dunes along the edge of the water and to restore a buffer to the maritime forest.
- Remove landfill and create dunes on ~27.7 acres of the site and restore 61 acres of maritime forest on the southern parcel of the project area. Roughly 9 acres of existing beach will be preserved in the north.
- To stabilize the tidal creek and protect the existing beach habitat, training structures will be created on the banks at the mouth of the creek.

PROJECT FIRST COST (Oct 2016): $82,769,000

Selected Alternative Map
Dead Horse Bay, Jamaica Bay, New York

Source: NYS GIS Clearinghouse 2014 Orthoimagery

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- EMERGENT WETLAND (LOW MARSH)
- EMERGENT WETLAND (HIGH MARSH)
- COASTAL AND MARITIME FOREST
- BEACH
- DUNE
- HABITAT FOR FISH, CRAB AND LOBSTER
- TRAINING STRUCTURE

0 700 1,400 Feet

Key Map

Source: Esri World Topo Map

Fresh Creek Tentatively Selected Plan Design:

- Restoration of ~33 acres tidal marsh system with protective buffers will be created, which includes 13.6 acres of low marsh, 2.5 acres of high marsh, 1.5 acres of creek/pool, 11.3 acres of maritime forest.
- 42.4 acres of shallow water through channel regrading will be restored.
- The head of the basin will be filled to create tidal marshes and creeks; however, the basin will be recontoured to the mouth of Fresh Creek substantially improving flushing throughout the basin, improve DO, increase wetland, and cap contaminated sediment.
- Creation of a small detention pond at the head of Fresh Creek as a means of filtering CSO output.

PROJECT FIRST COST (Oct 2016): $45,473,000

Selected Alternative Map
Fresh Creek, Jamaica Bay, New York

Source: NYS GIS Clearinghouse 2014 Orthoimagery

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- EMERGENT WETLAND (LOW MARSH)
- EMERGENT WETLAND (HIGH MARSH)
- COASTAL AND MARITIME FOREST
- HABITAT FOR FISH, CRAB AND LOBSTER
- CHANNEL REGRADING
- RIP RAP

0 500 1,000 Feet

Key Map

Source: Esri World Topo Map

Hawtree Point Tentatively Selected Plan Design:

- Within the limited confines of Hawtree Point, one solution was developed.
- Recovers 1.7 acres of coastal scrub shrub and grassland habitat from the existing invasive dominated areas. Some regrading and grubbing would remove the invasive species and native grasses and shrubs will be planted at the site.
- Includes the creation of a natural barrier to motorized vehicles. By placing boulders along the boundary of the restoration area, the newly created habitats as well as the preserved existing marshes will be protected.
- Through implementation of this project, an existing patch of salt marsh hay (0.07 acres) will be excavated and replaced.
- This area is currently being invaded by the surrounding invasives. Salt marsh hay will be planted in the location after the excavation and regrading of the surrounding land. The net amount of wetland habitat will be the same before and after project implementation.

PROJECT FIRST COST (Oct 2016): $1,463,000

Selected Alternative Map
Hawtree Point, Jamaica Bay, New York

Source: NYS GIS Clearinghouse 2014 Orthoimagery

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- EMERGENT WETLAND (HIGH MARSH)
- COASTAL SHRUB GRASS
- BARRIER

0 100 200 Feet

Key Map

Source: Esri World Topo Map

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JAMAICA BAY PERIMETER SITES

Bayswater Point State Park Tentatively Selected Plan Design:

- Removal of invasive dominated areas by regrading and creating a tidal channel of ~ 0.21 acres and associated salt marsh of 2.0 acres low marsh and 0.4 acres high marsh. All existing areas of marsh or native species will be preserved to the extent possible.
- Creation of ~ 0.7 acres of beach/dune
- Through selective removal of invasive/non-native vegetation, the mature woodland stands will be restored and replanted with native vegetation to prevent the spread of invasive species into the aquatic habitat and to provide a protective buffer for the marsh system.
- Creation of a tidal pool to the west of the creek/marsh complex. The tidal pool will cover approximately 0.6 acres to allow the creation of an additional 0.5 acres of low marsh.
- Hard structures will cover approximately 0.6 acres including armoring of the point and training structures at the mouth of the channel to protect the area from erosion.

PROJECT FIRST COST (Oct 2016): $5,815,000

Selected Alternative Map
Bayswater State Park, Jamaica Bay, New York

Source: NYS GIS Clearinghouse 2014 Orthoimagery

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- EMERGENT WETLAND (LOW MARSH)
- EMERGENT WETLAND (HIGH MARSH)
- BEACH
- HABITAT FOR FISH, CRAB AND LOBSTER
- HARD STRUCTURE

0 100 200 Feet

Dubos Point Tentatively Selected Plan Design:

- A total of 7.1 acres will be restored at this site including, 3.3 of low marsh, 0.9 of high marsh, 0.7 of creek or pool, and 2 acres of maritime forest.
- The north and west shorelines are exposed to high wave velocities from Jamaica Bay. Soldier piles were installed in the past, and still exist on the site but are beginning to fail. In the areas of failure, the erosion is quite obvious. Toe protection in this alternative includes the use of soldier piles or its equivalent, placed to the level of MLW, along the entire shoreline replacing all of the existing piles.

PROJECT FIRST COST (Oct 2016): $9,560,000

Selected Alternative Map
Dubos Point, Jamaica Bay, New York

Source: NYS GIS Clearinghouse 2014 Orthoimagery

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- EMERGENT WETLAND (LOW MARSH)
- EMERGENT WETLAND (HIGH MARSH)
- COASTAL AND MARITIME FOREST
- HABITAT FOR FISH, CRAB AND LOBSTER
- TRAINING STRUCTURE
- TOE STABILIZATION

0 300 600 Feet

Brant Point Tentatively Selected Plan Design:

- Protection of existing 1.2 acres of marsh, and restoration of an additional 1.9 acres of low marsh, 0.7 acres of high marsh, 2.5 acres of meadow, and 2.4 acres of maritime forest to prevent the spread of invasive species into the aquatic habitat.
- Soil excavated to regrade for the marsh creation will be used for onsite landscaping.
- Maximizes marsh habitat protection and creates macroinvertebrate habitat by creating offshore rubble mounds.
- The grounded barge at this site shows that offshore structures are capable of protecting the marshes and creating beneficial habitat for macroinvertebrates. Three rock mounds are needed to protect the point from the ongoing erosion. The rocks will be placed randomly within a trapezoidal shape to create interstitial spaces of various sizes that can be used as refugee by various species.

PROJECT FIRST COST (Oct 2016): $7,480,000

Selected Alternative Map
Brant Point, Jamaica Bay, New York

Source: NYS GIS Clearinghouse 2014 Orthoimagery

PROPOSED MEASURES LEGEND

- SITE BOUNDARY
- EMERGENT WETLAND (LOW MARSH)
- EMERGENT WETLAND (HIGH MARSH)
- GRASSLAND
- COASTAL AND MARITIME FOREST
- HARD STRUCTURE

0 150 300 Feet

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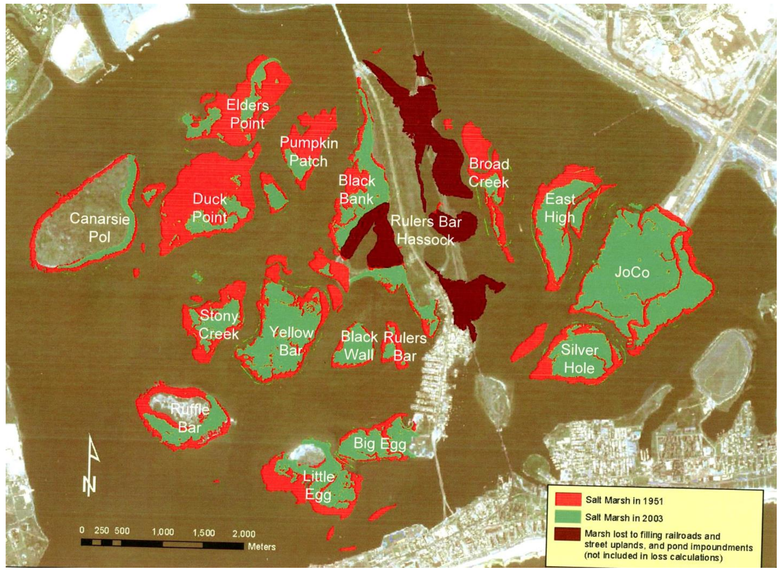
Baseline Conditions: Continued Marsh Loss



Stony Creek Tentatively Selected Plan Design:

- Restoration of 26 acres of low marsh and 25.3 acres of high marsh.
- Highly efficient restoration (cubic yards: marsh acres ratio) owing to the high existing condition elevations found within the 1974 footprint.
- The 1974 footprint of Stony Creek Marsh reveals a land area of approx. 85.0 acres. This restoration effort may be appreciably enlarged without a significant decrease in cubic yards: marsh acres efficiency.
- Pending further investigation of existing conditions, certain areas may not be restored or disturbed, thereby resulting in greater efficiency.

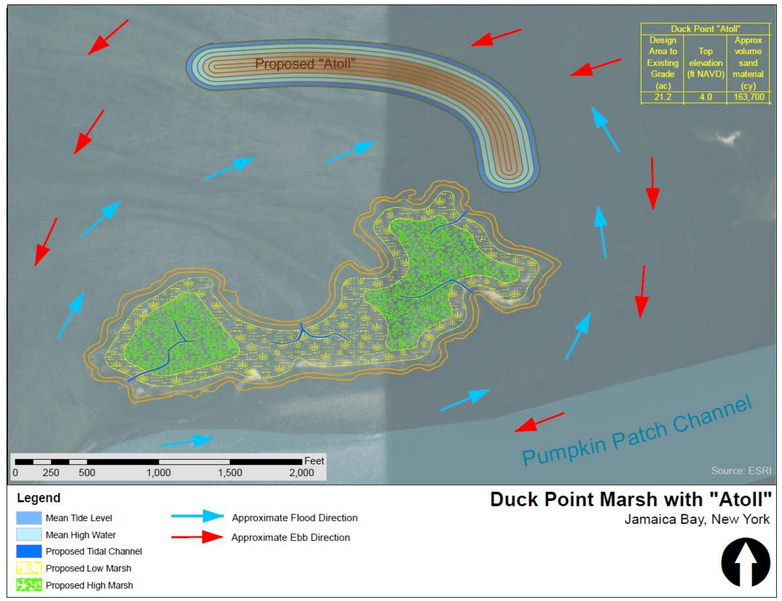
PROJECT FIRST COST (Oct 2016): $30,520,000

JAMAICA BAY MARSH ISLAND SITES

Duck Point with Atoll Terrace (9 acre) Tentatively Selected Plan Design:

- Restoration of 15.4 (+3.5 atoll) acres of low marsh and 12.5 (5.5 atoll) acres of high marsh.
- Restores the "core' of this marsh to approximate 1974 dimensions.
- Highly efficient restoration (cubic yards: marsh acres ratio) owing to the high existing condition elevations found within the 1974 footprint.
- Atoll terrace design, based on Structures of Costal Resilience research, seeks to harness natural processes of sediment transport to promote sediment accretion and sustainability.

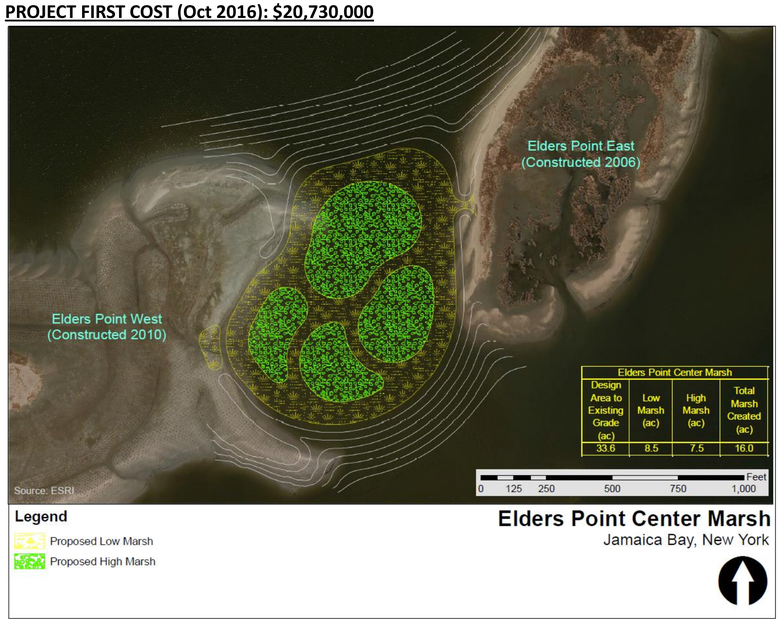
PROJECT FIRST COST (Oct 2016): $27,780,000



Elders Point Center Tentatively Selected Plan Design:

- Restoration of 8.5 aces low marsh and 7.5 acres of high marsh.
- Restores an area largely within the 1974 footprint of Elders West and connects two prior restoration projects.
- Improves the sustainability of the Elders Marsh complex.
- Serves as a potential area for natural sediment deposition and accretion.

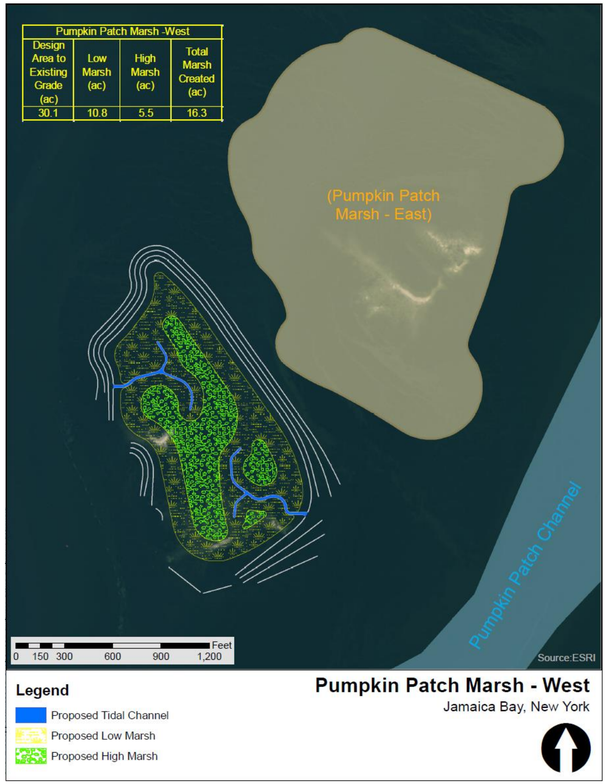
PROJECT FIRST COST (Oct 2016): $20,730,000



Pumpkin Patch West Tentatively Selected Plan Design:

- Restoration of 10.8 acres of low marsh and 5.5 acres of high marsh, returning this portion of Pumpkin Patch Marsh to the approximate dimensions of the 1974 footprint.
- Increases land above MTL (-0.27 ft. NAVD88) from existing condition area of less 4.5 acres to 20.2 acres

PROJECT FIRST COST (Oct 2016): $20,040,000



Pumpkin Patch West Tentatively Selected Plan Design:

- Restoration of 18.5 acres of low marsh and 16.8 acres of high marsh, returning this portion of Pumpkin Patch Marsh to the approximate dimensions of the 1974 footprint.
- Increases land above MTL (-0.27 ft. NAVD88) from existing condition area of less than 5 acres to 35.3 acres.

PROJECT FIRST COST (Oct 2016): $37,950,000

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