New York City Salt Marsh Restoration and Protection, Post-Hurricane Sandy

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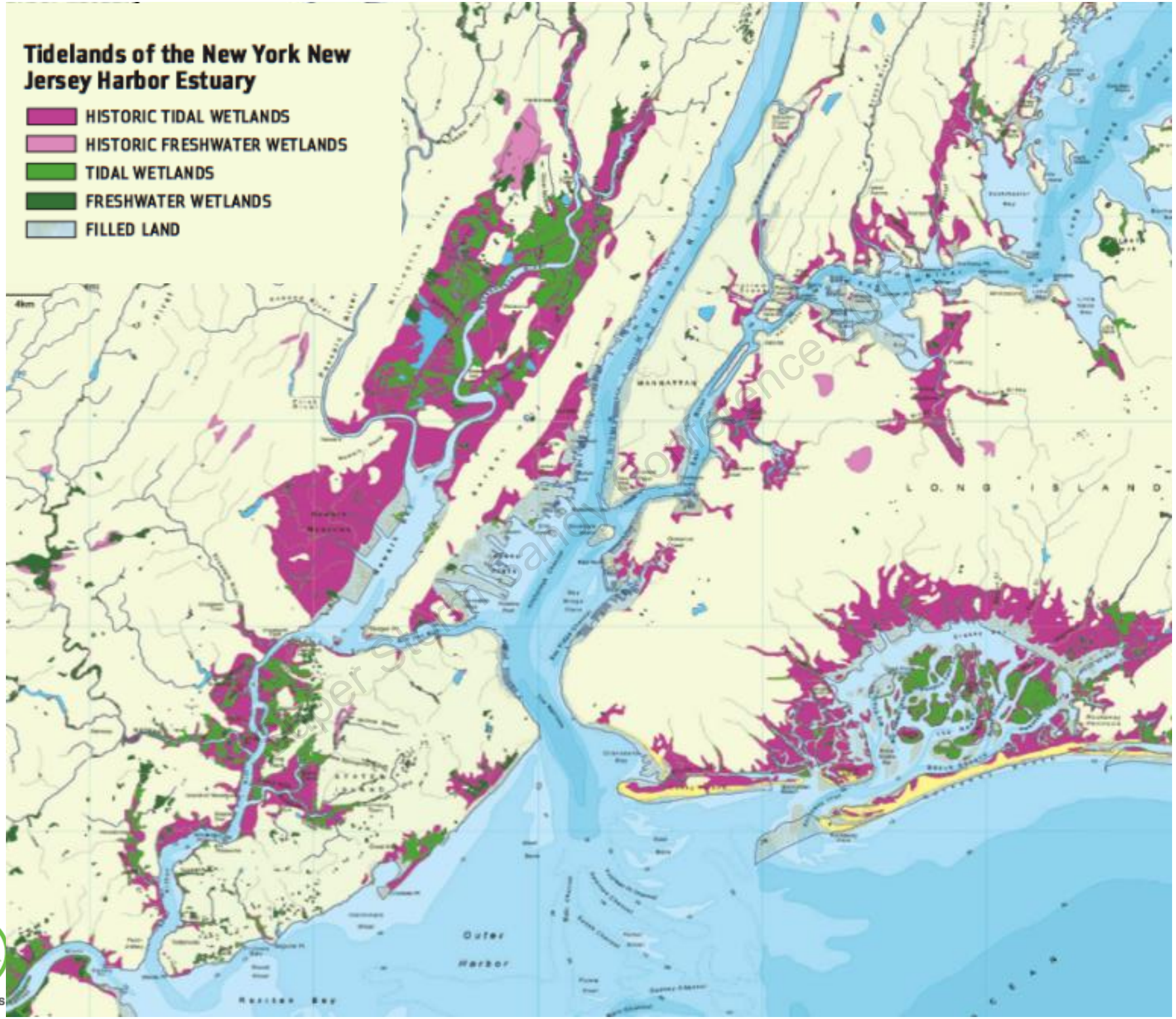
New York City Department of Parks & Recreation

Forestry, Horticulture, and Natural Resources

Parks

Super Storm Sandy: Five Years Later
Meadowlands Conference
October 26, 2017


Tidelands of the New York New Jersey Harbor Estuary
HISTORIC TIDAL WETLANDS
HISTORIC FRESHWATER WETLANDS
TIDAL WETLANDS
FRESHWATER WETLANDS
FILLED LAND
LONG ISLAND
Outer Harbor

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Urban Coastal Wetlands

- **Coastal wetlands are a critical part of a livable NYC**
  - Resilient coastal natural areas
  - Aesthetic, recreational and educational value
  - Ecosystem services (fisheries, bird communities, water quality)
- **Coastal wetlands are at risk**
  - Sea-level rise and storm surge
- **Planning, management and restoration can help protect our wetlands for the future**

Project Goals

- Assess current condition of natural marshes
- Evaluate vulnerability to sea-level rise (SLR)
- Identify opportunities for protection, conservation & restoration

Prioritize restoration & protection opportunities

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Ecological Assessment at 25 salt marshes across NYC

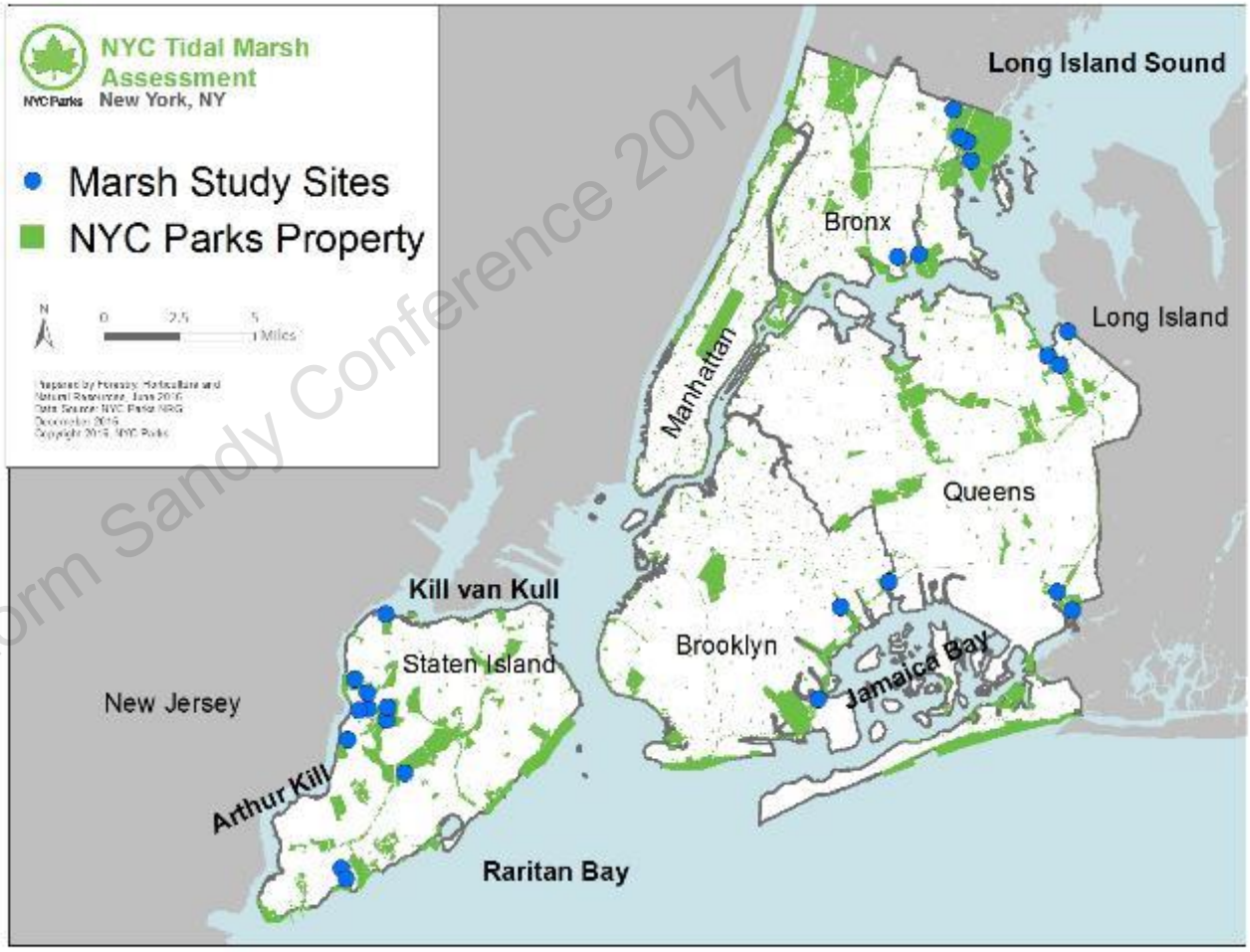
Desktop Analysis

- Historic Loss Analysis
- Sea Level Affecting Marshes Model (SLAMM)

Rapid Ecological Assessments

- Mid-Atlantic Tidal Rapid Assessment Method (MidTRAM)
- NAC Salt Marsh Assessment (NACSMA)

Conditions and vulnerability indices



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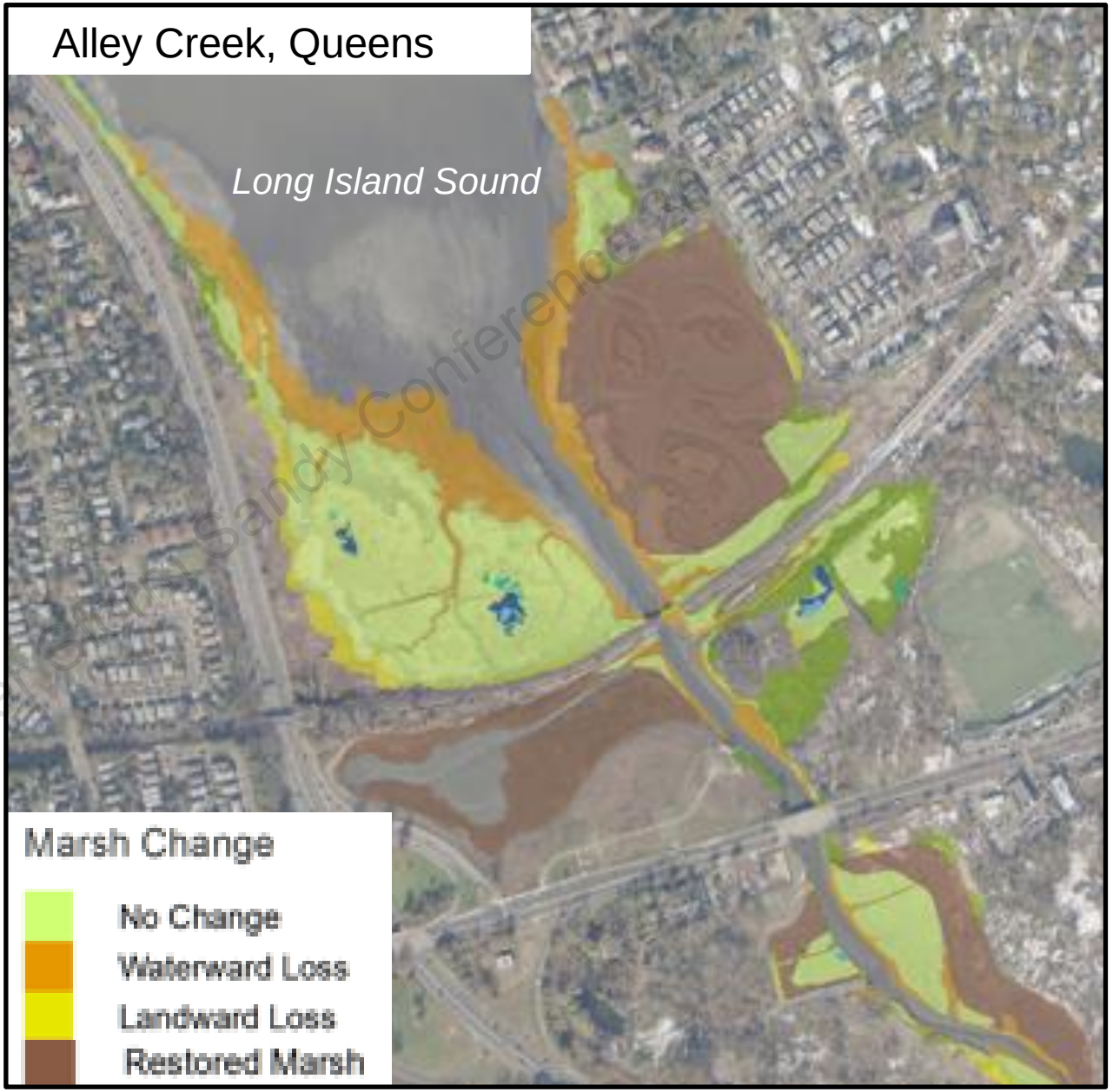
Marsh Loss Analysis

- **1,011 acres** were assessed
- **160 acres, or 18 percent** of salt marsh was lost in the waterward direction (shoreline, ditch, creek) between **1974-2012**
- Alley Creek lost **12 acres or 23%**



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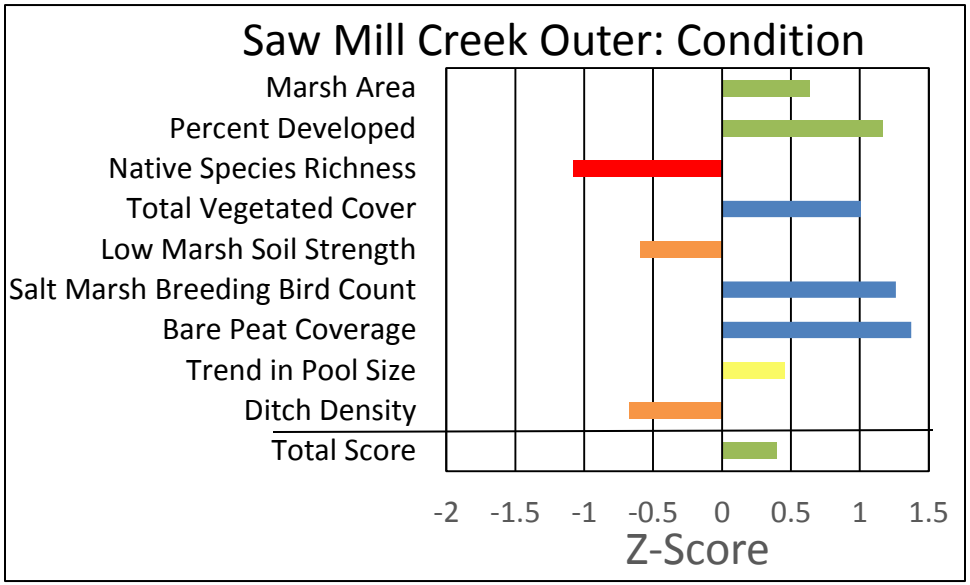
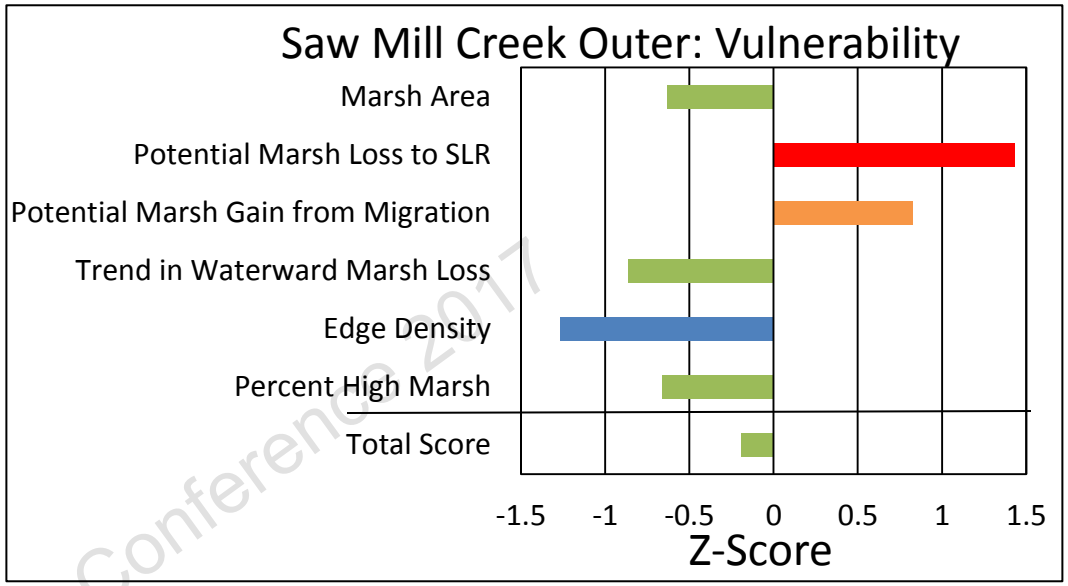
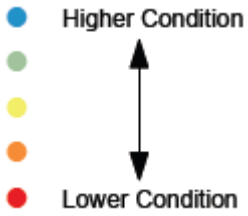
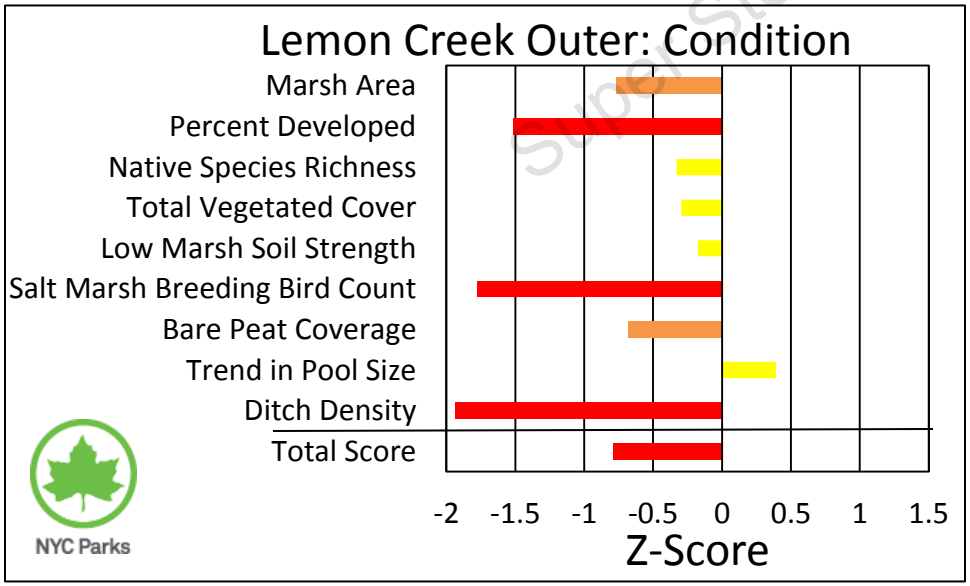
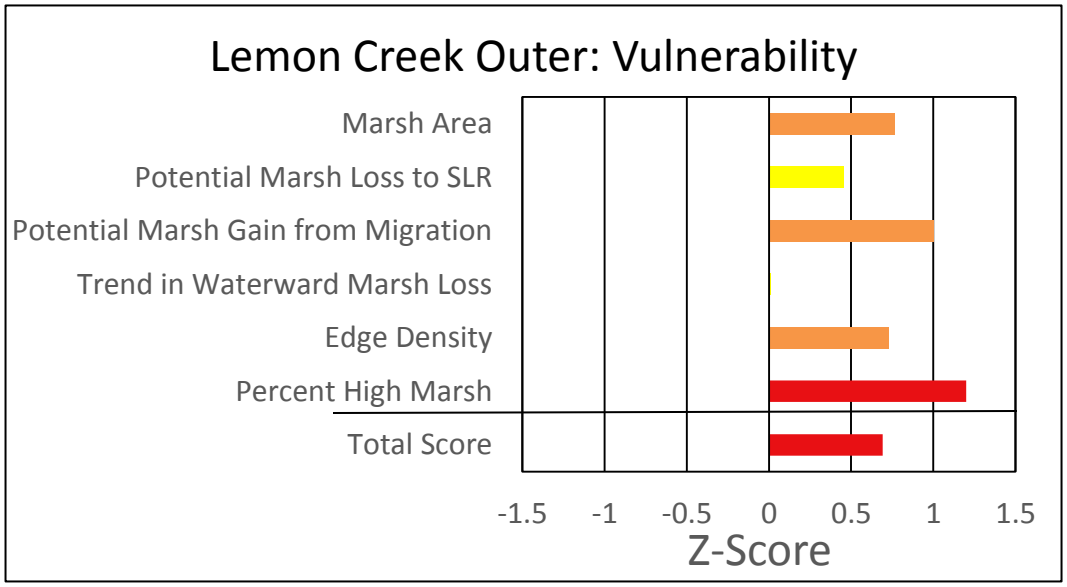
Site Scores: Condition and Vulnerability

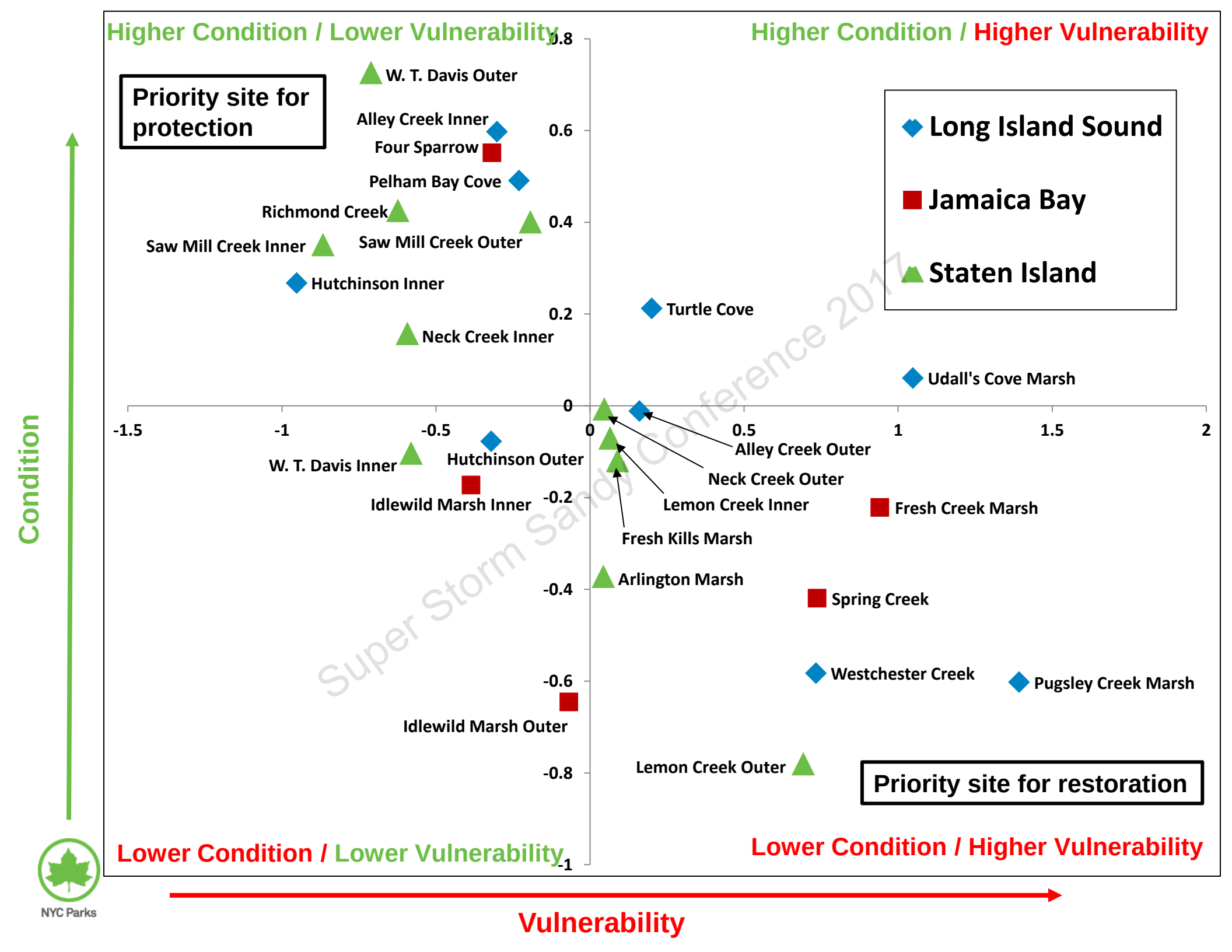











Higher Condition / Lower Vulnerability
Higher Condition / Higher Vulnerability
Priority site for protection
Long Island Sound
Jamaica Bay
Staten Island
W. T. Davis Outer
Alley Creek Inner
Four Sparrow
Pelham Bay Cove
Richmond Creek
Saw Mill Creek Outer
Saw Mill Creek Inner
Hutchinson Inner
Neck Creek Inner
Turtle Cove
Udall's Cove Marsh
Alley Creek Outer
Neck Creek Outer
Lemon Creek Inner
Fresh Creek Marsh
Fresh Kills Marsh
W. T. Davis Inner
Hutchinson Outer
Idlewild Marsh Inner
Arlington Marsh
Spring Creek
Westchester Creek
Pugsley Creek Marsh
Idlewild Marsh Outer
Lemon Creek Outer
Priority site for restoration
Lower Condition / Lower Vulnerability
Lower Condition / Higher Vulnerability
Condition
Vulnerability
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.5
-1
-0.5
0
0.5
1
1.5
2
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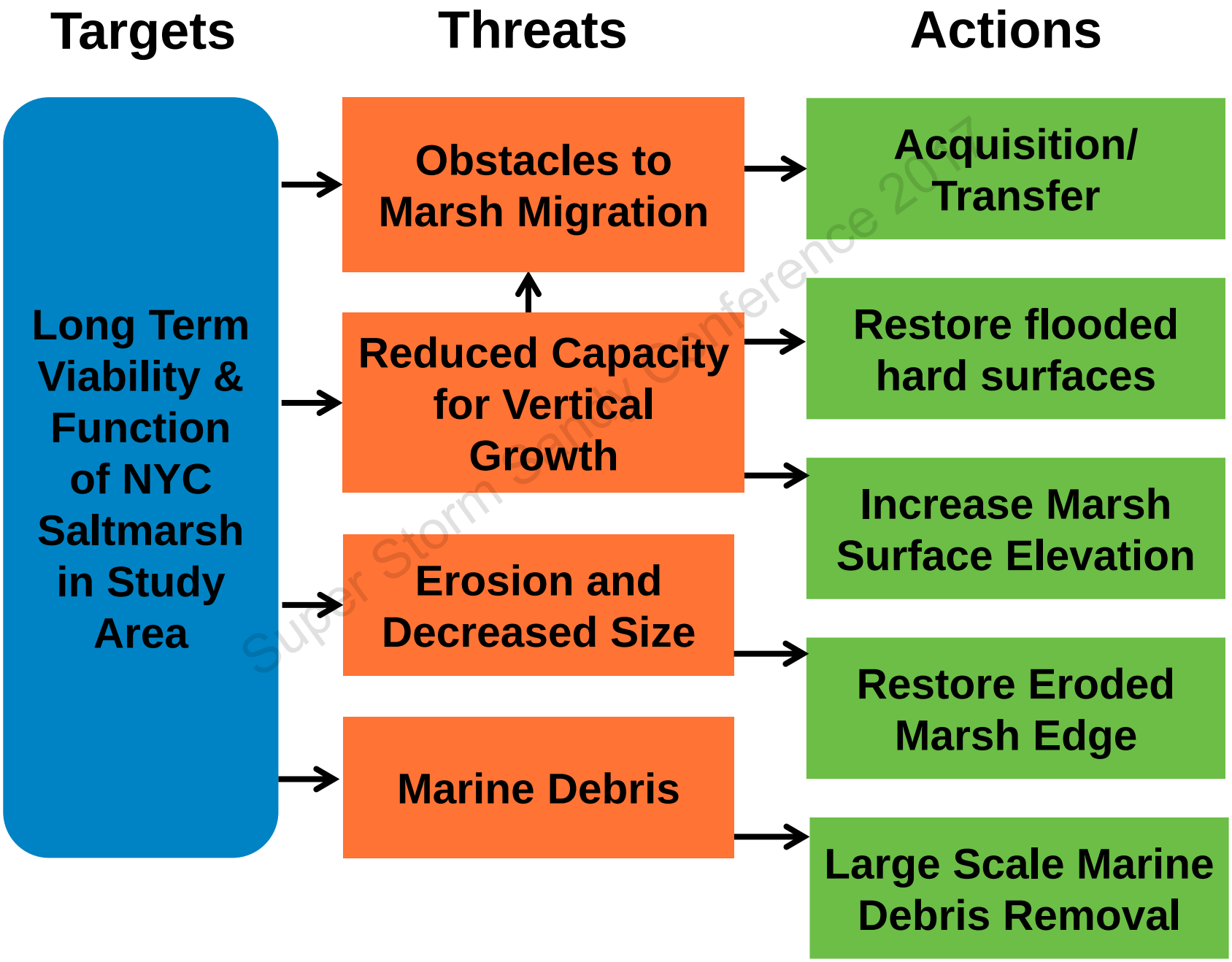
Opportunities for Restoration and Protection



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Acquisition/ Transfer

All Sites (25)

Owner	Current Marsh (ac)	Future Marsh (ac)
NYC Parks	864	+204
Private	21	+29
Other Govt.	37	+24

Restore flooded hard surfaces

Future flooded hard surfaces

Parking Lots* = 29 ac

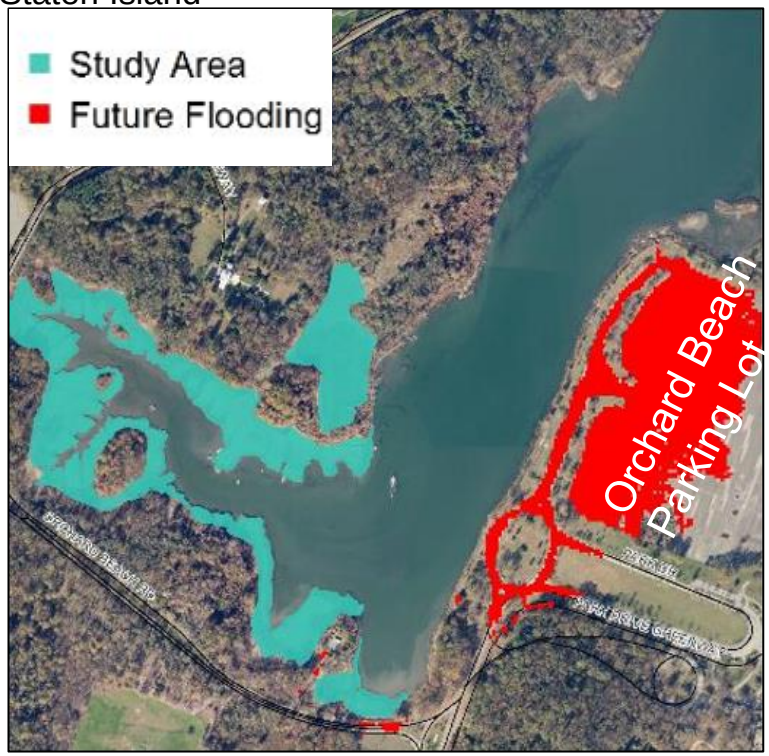
Roads** = 7 ac

Other Hard Surfaces = 6 ac

Total = 42 ac

* Mostly Orchard Beach parking lot in Pelham Bay Park

**Includes Brookville Blvd. in Queens and Travis Ave in Staten Island



Future flooding in Pelham Bay Park, Bronx

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Increase Marsh Surface Elevation

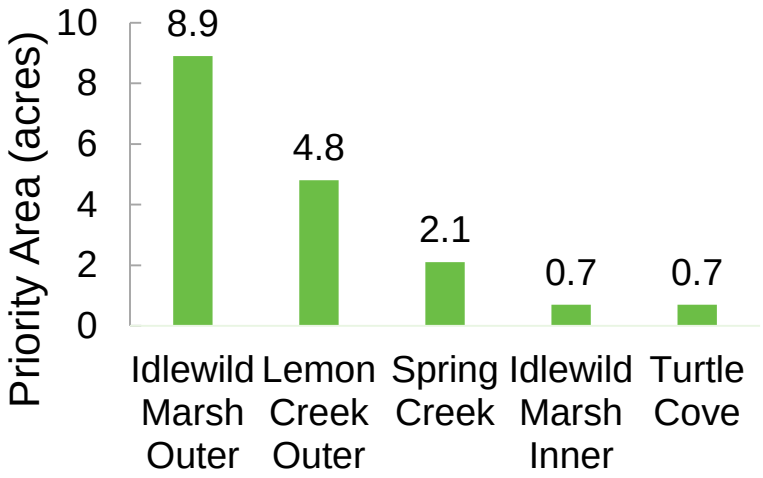


Photo: Patty Doer, TNC-NJ


Idlewild, Queens

Field Data

- % low marsh
- % bare ground
- Breeding birds

Desktop data:

- Future marsh loss (SLAMM)
- Accessible for sediment placement

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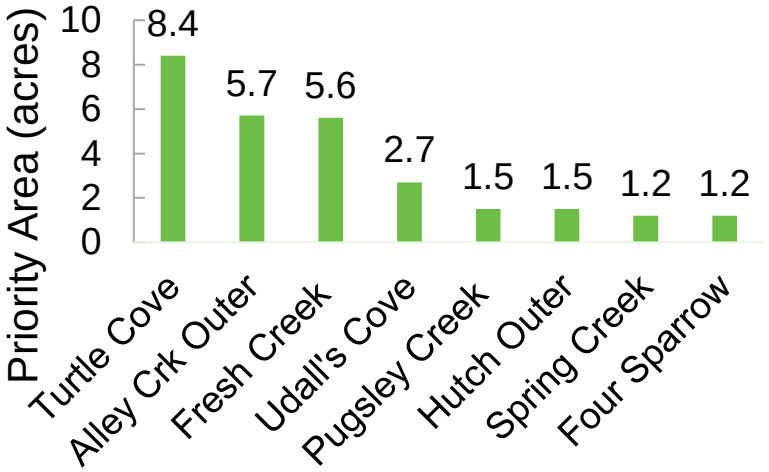
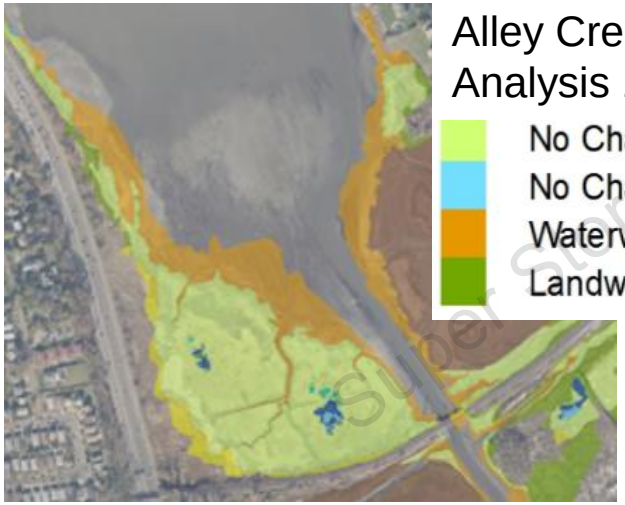
Restore Eroded Marsh Edge





Alley Creek, Queens

Desktop data:

- High area, width, and % marsh loss (1974-2012)
- Future marsh loss (SLAMM)
- Accessible for sediment placement

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Large Scale Marine Debris Removal

Example Site: Four Sparrow Marsh, Brooklyn

Before

After

Before

After

Recommendations

- Pilot new approaches to wetland protection and restoration:
  - ❑ Shoreline protection and waterward restoration
  - ❑ Elevation / sand enhancement
- Continue debris removal
- Protect future marsh migration areas (reduce impervious area in parks, use existing regulations, acquisition, easements)
- Expand assessment approach to include non-Parks properties

Marsh loss at Idlewild, Queens

Clean-up in Four Sparrow, Brooklyn

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Towards a Salt Marsh Management Report for NYC

- http://naturalareasnyc.org/in-print

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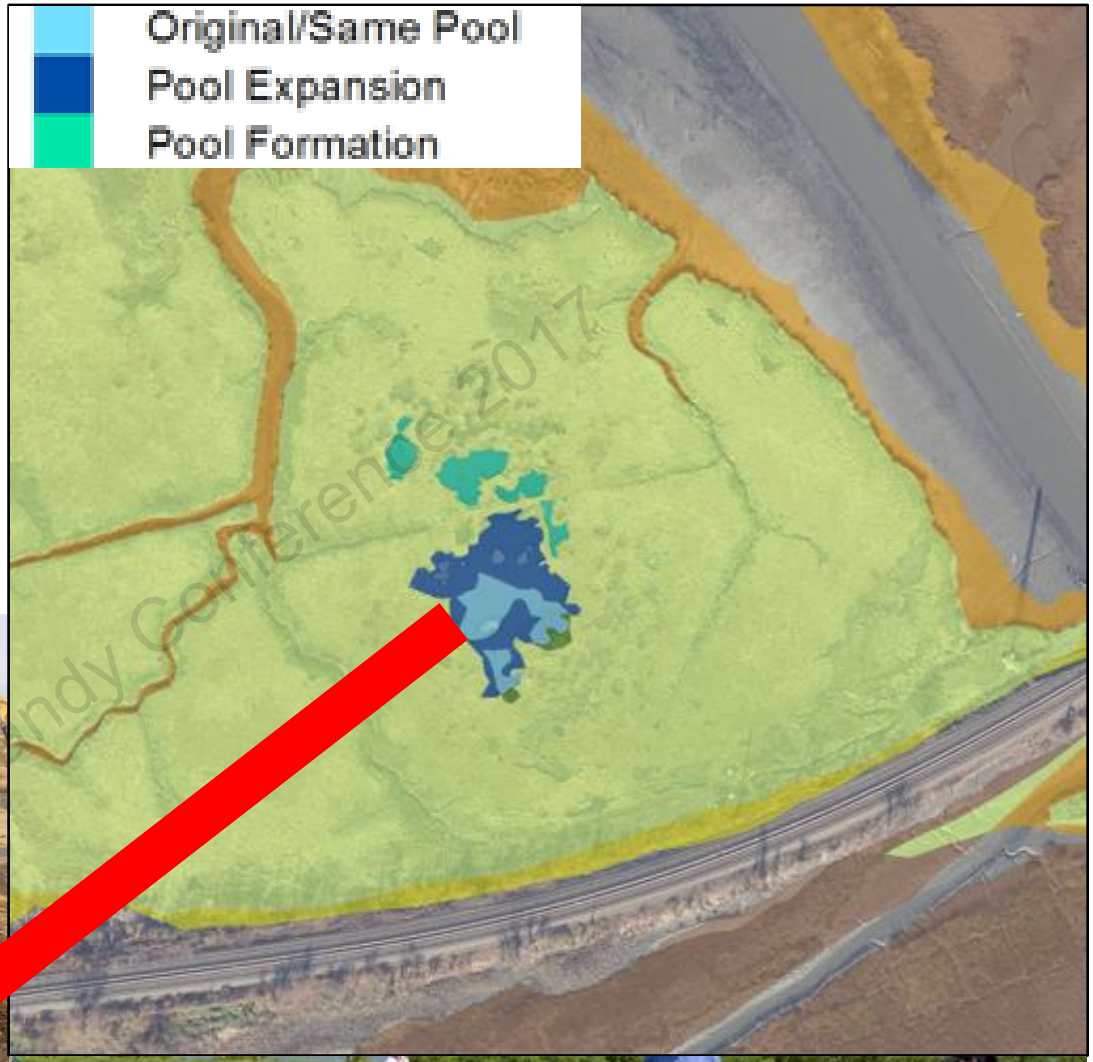
Interior Marsh Restoration in Alley Pond Park, Queens

Goal: Restore salt marsh area lost to interior marsh pond expansion

Approach:

- Coir logs placement to form new edge
- Sand placement behind coir into expanded pool
- Volunteer planting



Thin Layer Sediment Application in Idlewild Park, Queens

Goal: Increase salt marsh surface elevation to improve salt marsh sparrow habitat and resilience to SLR

Approach:

- Thin layer sediment application (10-20cm in depth) onto existing low marsh and depressions
- Monitor salt marsh sparrows

Reinforced Shoreline Project in Alley Pond Park, Queens

Goal: Restore eroded marsh and establish a reinforced shoreline edge

Approach:

- Sand placement and planting in eroded area
- Establish a front facing armored toe or breakwater structure on restored marsh edge (e.g. oyster castles, reef balls, coir log)

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