

National Park Service
U.S. Department of the Interior
Gateway National Recreation Area



The Bright Side of Sandy: Shorebirds, Habitat and Hurricanes on NPS Rockaway Beaches

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Urban Resilience in an Era of Climate Change:
Global Input for Local Solutions
Brooklyn, NY
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Overview

- Impact of storm processes on shorebird nesting habitat in the Rockaways
- Where are we talking about?
- A bit about habitat – why so important?
- The species we manage and their habitat selection
- Sandy changes to shorebird nesting areas
- Shorebird habitat mapping project methods and preliminary data



Piping Plover Habitat - Breezy Point



Produced by Hanem Abouelezz, Biologist, DOI/NPS/GATE/JBU

January 2013

FILE: \resources\GIS\Endangered Species Habitat\Breezy Point.mxd

Habitat Importance

- Things to consider when thinking about habitat
 - Quantity
 - Arrangement
 - Patch size
 - Core areas
 - Edge areas
 - Habitat availability + Species preference
= Species selection

Habitat Importance

- Why are wildlife ecologists so obsessed with habitat?
 - No habitat = no critters!
- Suitable habitat is critical for:
 - Species survival
 - Reproduction
 - Dispersal
 - Population stabilization
 - Population recovery (T&E)
 - Maintaining and increasing biodiversity
 - Ecosystem health

Threatened and Endangered Species

“Our (NPS) mission is to reduce the risk of extinction of plants and animals in the parks, and to restore species that have occurred in parks historically but have been lost due to human activities.”



J. Portmann

The Shorebirds

- Piping Plover (Federally threatened)
- Least Tern (NY State threatened)
- Common Tern (NY State Threatened)
- American Oystercatcher (NY State Species of Greatest Conservation Need)
- Black Skimmer (NY State Species of Special Concern)



Shorebird Habitat Selection

- All these species utilize dynamic coastal beaches and nest in areas that typically display the following:
 - Gently sloping dunes
 - Storm over-wash areas that create
 - Blow-outs between dunes
 - Over-wash fans behind primary dunes



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Shorebird Habitat Selection

- Nest site selection
 - Open areas consisting of sand or shell scatter
 - Also found in sparse or moderate American beach grass/ seaside goldenrod plant community
 - Thick vegetation encroachment discourages shorebird nesting



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Sandy Changes to Shorebird Habitat

Date Taken:
10/22/2008



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Sandy Changes to Shorebird Habitat

Date Taken:

9/30/2013



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Sandy Changes to Shorebird Habitat

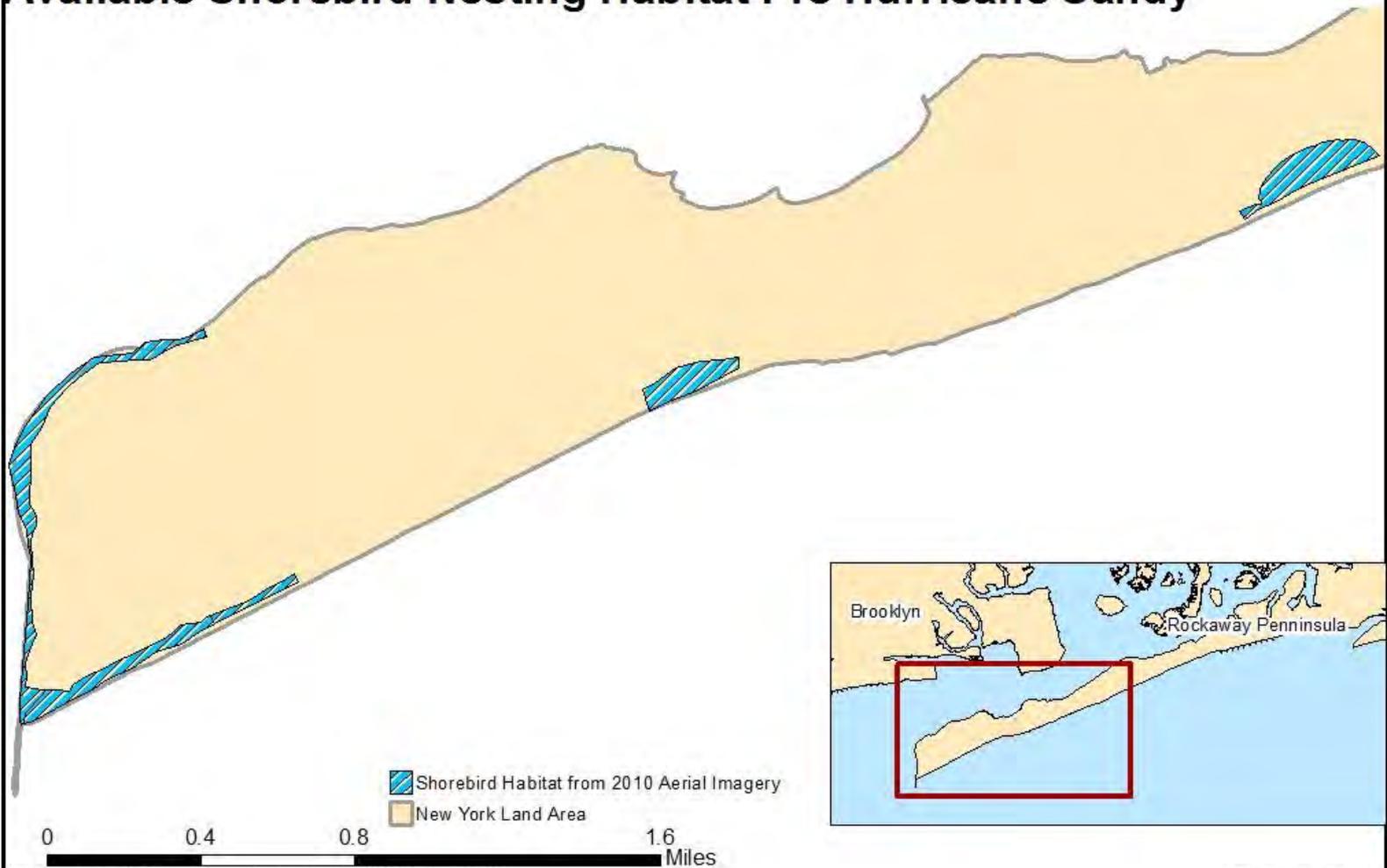
- Knocked back thick grasses and woody vegetation
- Flattened primary dune system
- Created sandy over-wash areas
- Deposited sand and shell scatter far back into maritime vegetation
- **All of this increased available nesting habitat**

Sandy Changes to Shorebird Habitat

- Digitized potential suitable shorebird nesting habitat from
 - Pre Sandy 2010 aerial imagery
 - Post Sandy November 2012 aerial imagery



Available Shorebird Nesting Habitat Pre Hurricane Sandy



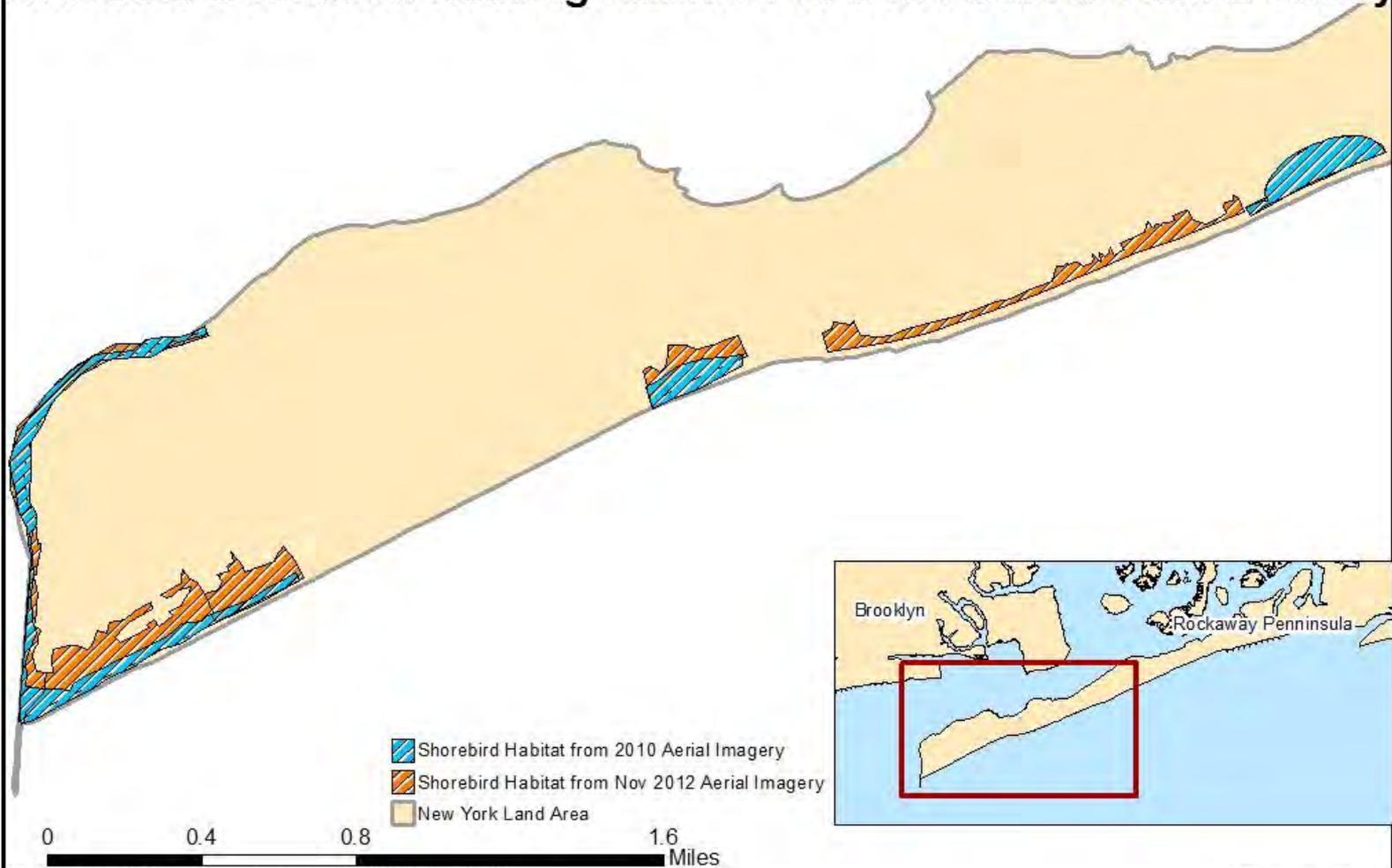
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FILE: Shorebird Habitat Mapping Project 2013.mxd



Available Shorebird Nesting Habitat Pre and Post Hurricane Sandy



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Sandy Changes to Shorebird Habitat

- Substantial increase in available habitat
 - 2010 – 253,421 meters sq
 - 2012 – 493,623 meters sq
 - 94.7% increase!

Sandy Changes to Shorebird Habitat

- That's not all – birds may be selecting habitat differently now that
 - more habitat is available for selection
 - The arrangement of habitat and microhabitat features have been altered



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Shorebird Response to New Habitat

- An example – the piping plover
 - Vegetation encroachment had pushed nests closer to the water
 - In 2012 (pre Sandy) 54% of PIPL eggs produced were lost to high tide flooding
 - Mean distance nests to mean high tide line = 33.4 meters
 - In 2013 (post Sandy) 0% of PIPL eggs produced were lost to flooding
 - Mean distance nests to mean high tide line = 83.9 meters
 - New habitat = the birds moved back = eggs saved!

Shorebird Habitat Mapping Project

- Ground effort mapping project conducted to document fine scale habitat characteristics of post-Sandy beaches
- Why?
 - Unique opportunity to document habitat succession over time following an extreme storm event
 - Document shorebird habitat selection changes as the habitat changes
 - Inform habitat restoration projects, invasive vegetation management and regulatory compliance

Shorebird Habitat Mapping Project

- Methods
 - Utilize Trimble GPS Units to create a 95% coverage map of all NPS shorebird nesting areas in Rockaway
 - Areas mapped according to
 - Land cover
 - (Clean Sand, Open Beach, Maritime Grass Scrub, Maritime Scrub Shrub, Sand Road, Shell Scatter G_50; Shell Scatter L_50)
 - Vegetation Density
 - Dominant Vegetation



Shorebird Habitat Mapping Project - Raw Data

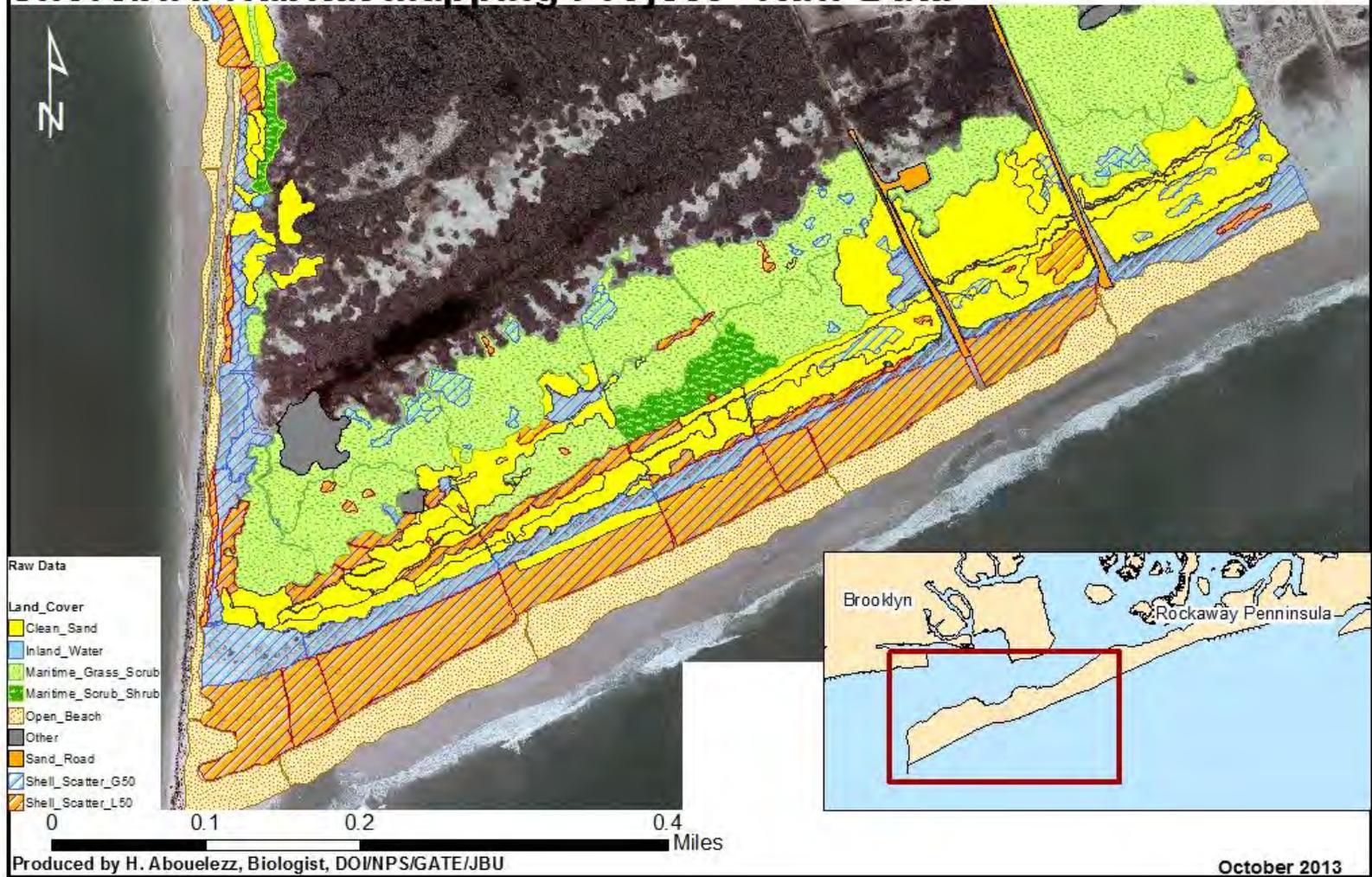


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Shorebird Habitat Mapping Project - Raw Data



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Discussion

- Storm events are a positive and necessary component of a functional coastal ecosystem
- Storm events may increase shorebird nesting habitat
 - May increase reproductive success
 - May contribute to the recovery of sensitive species

Discussion

- Does more habitat always equate to more birds?
 - Not necessarily (decrease in PIPL productivity in 2013)
 - Other critical factors influencing nest success
 - Anthropogenic disturbance
 - Predation
 - Weather
 - Coastal flooding during the nesting season



Discussion

- Will continue to document
 - Nest site selection
 - Productivity and other metrics associated with nesting success
 - Habitat succession over time via ground mapping efforts

Thank You

- Melissa Malloy – NPS Seasonal Biological Science Technician
- Brooke Costanza – NPS Seasonal Biological Science Technician
- Mark Christiano – GIS Specialist
- Doug Adamo – Chief of Natural Resources Management

Questions?



Michael Milicia
Solent News & Photo