

# POST-HURRICANE SANDY TIDAL MARSH RESTORATION AT EDWIN B. FORSYTHE NWR

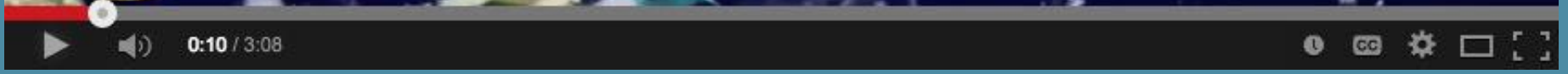
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June 3, 2015





# Strong After Sandy



**THE HURRICANE SANDY DISASTER RELIEF SUPPLEMENTAL APPROPRIATION ACT OF 2013, PUBLIC LAW 113-2.**

# Hurricane Sandy Recovery Funds for Infrastructure



# Hurricane Sandy Resilience Funds for Habitat

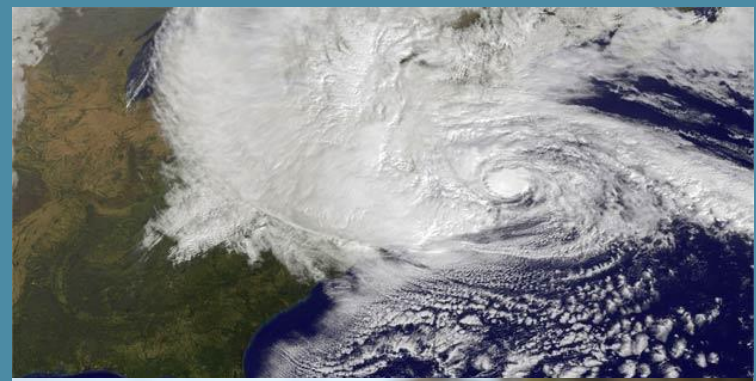


# Focus on Ecological Resilience

- *Amount of change or disturbance a system can withstand before shifting to another state with different structural and functional characteristics*
- *Refuge focus is on persistence of salt marshes, versus transition to mudflat, panne or open water habitat.*

# Hurricane Sandy Resiliency Timeline Summary

- *Hurricane Sandy: October 2012*
- *Announcement of Resiliency Funding: October 2013*
- *Funding to Refuge: early 2014*
- *Notice to proceed: January-May 2015*
- *Funds must be spent by: November 6<sup>th</sup> 2016*



# Resiliency Projects at Edwin B. Forsythe NWR

- Westecunk Creek Barrier Removal
- HQ Impoundments
- Marsh Restoration

## **Resiliency Partners (including Interagency Agreements, Cooperative Agreements, Contracts)**

AMEC

Barnegat Bay Partnership

Jacques Cousteau National Estuarine Research Reserve

NJ Conserve Wildlife Foundation

Ocean County Mosquito Control

Rutgers University

Stockton University

University of Delaware

U.S. Army Corps of Engineers- Engineer Research and Development Center

USGS –New Jersey Science Center

# Westecunk Creek Barrier Removal

- *Allows fish access to 10+km of upstream habitat*
- *Contractor: AMEC*
- *Partner: Barnegat Bay Partnership*





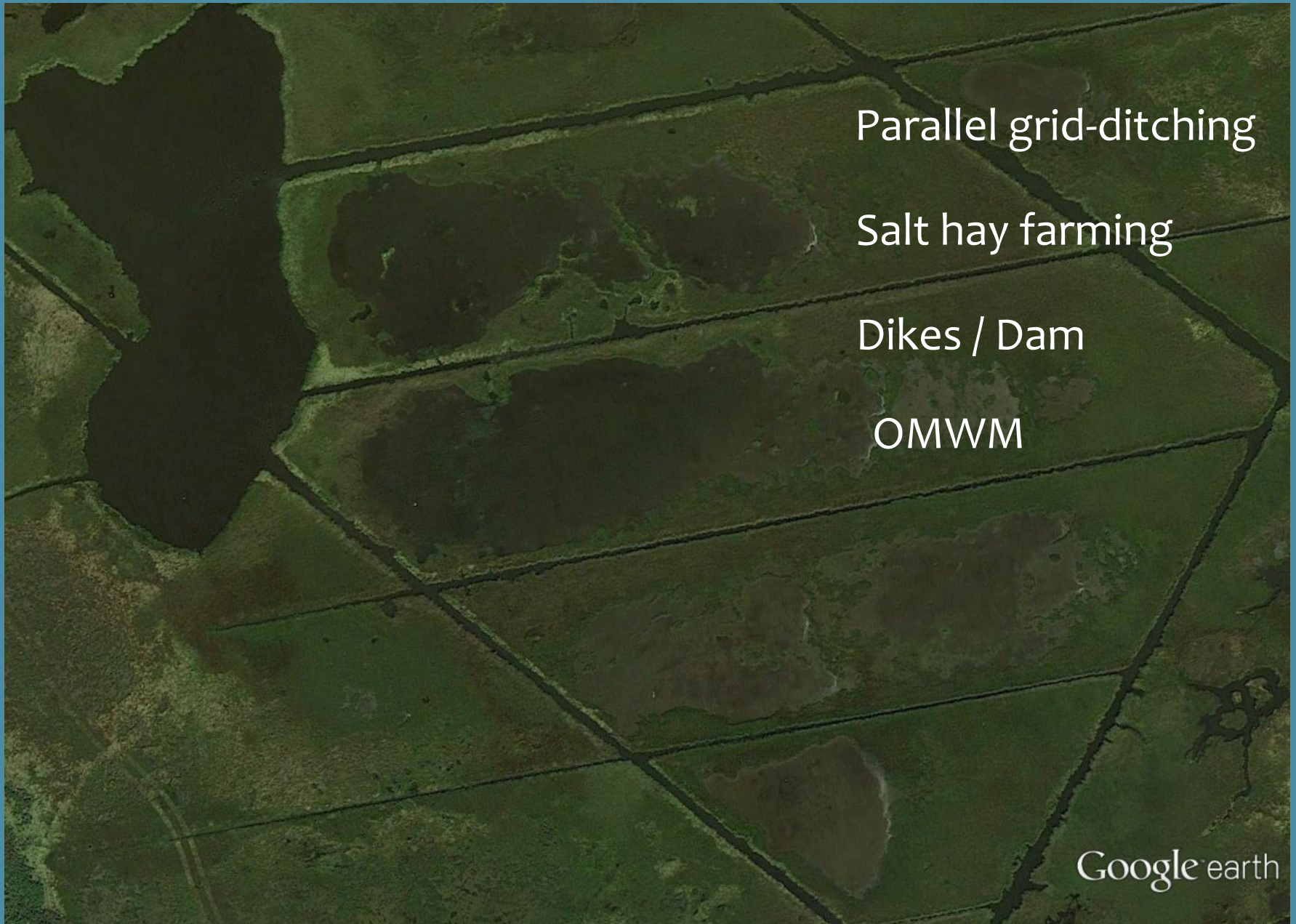
# HQ Impoundments

- *Make the system more resilient to SLR while still providing critical habitat to migratory species*
- *Implement a new water management plan*
- *Contractor: AMEC*
- *Partner: USGS -NJ Water Science Center*





# Anthropogenic Alterations to Salt Marshes



Parallel grid-ditching

Salt hay farming

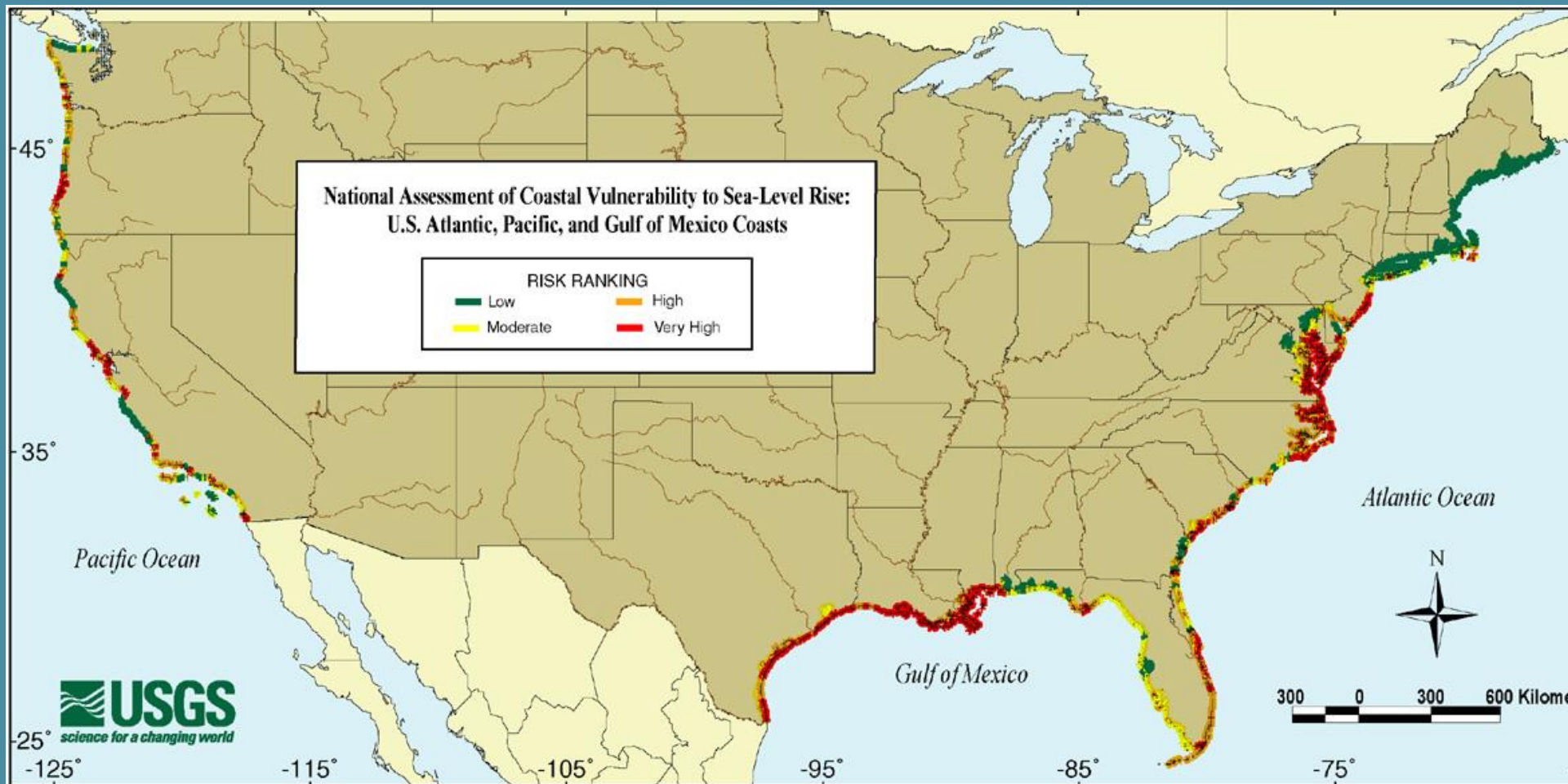
Dikes / Dam

OMWM

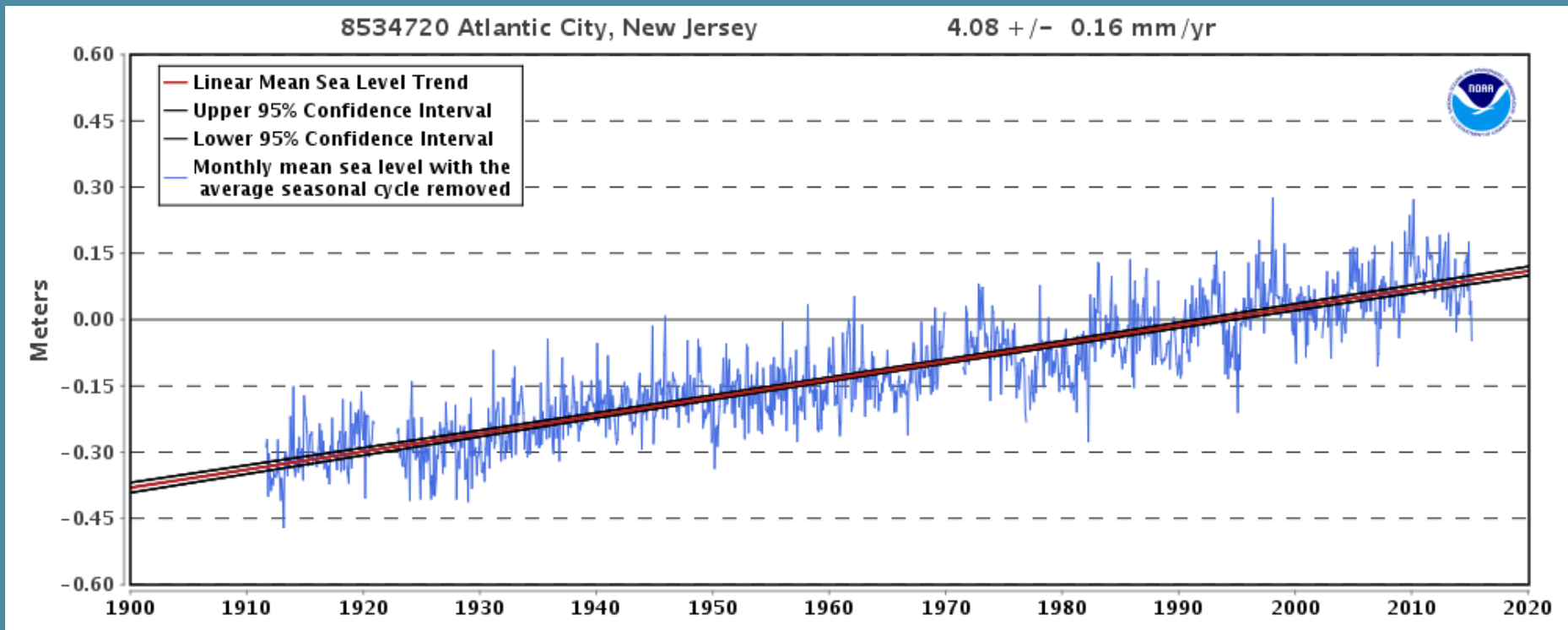


# National Assessment of Coastal Vulnerability to Sea-Level Rise

## U.S. Atlantic, Pacific, and Gulf of Mexico Coasts



# Accelerated Rate of Sea Level Rise



# Marsh Resilience- Project Area Decision Criteria

## Elevation

Vegetation-based assessment  
Fine scale elevation verification before restoration

## Anthropogenic Changes

Parallel ditched, salt hay farming, dikes/dams

## Marsh Migration Potential

Areas with less marine transgression higher priority

# Tidal Marsh Restoration

Sediment Enrichment

Tidal Flow Restoration

Pole Removal

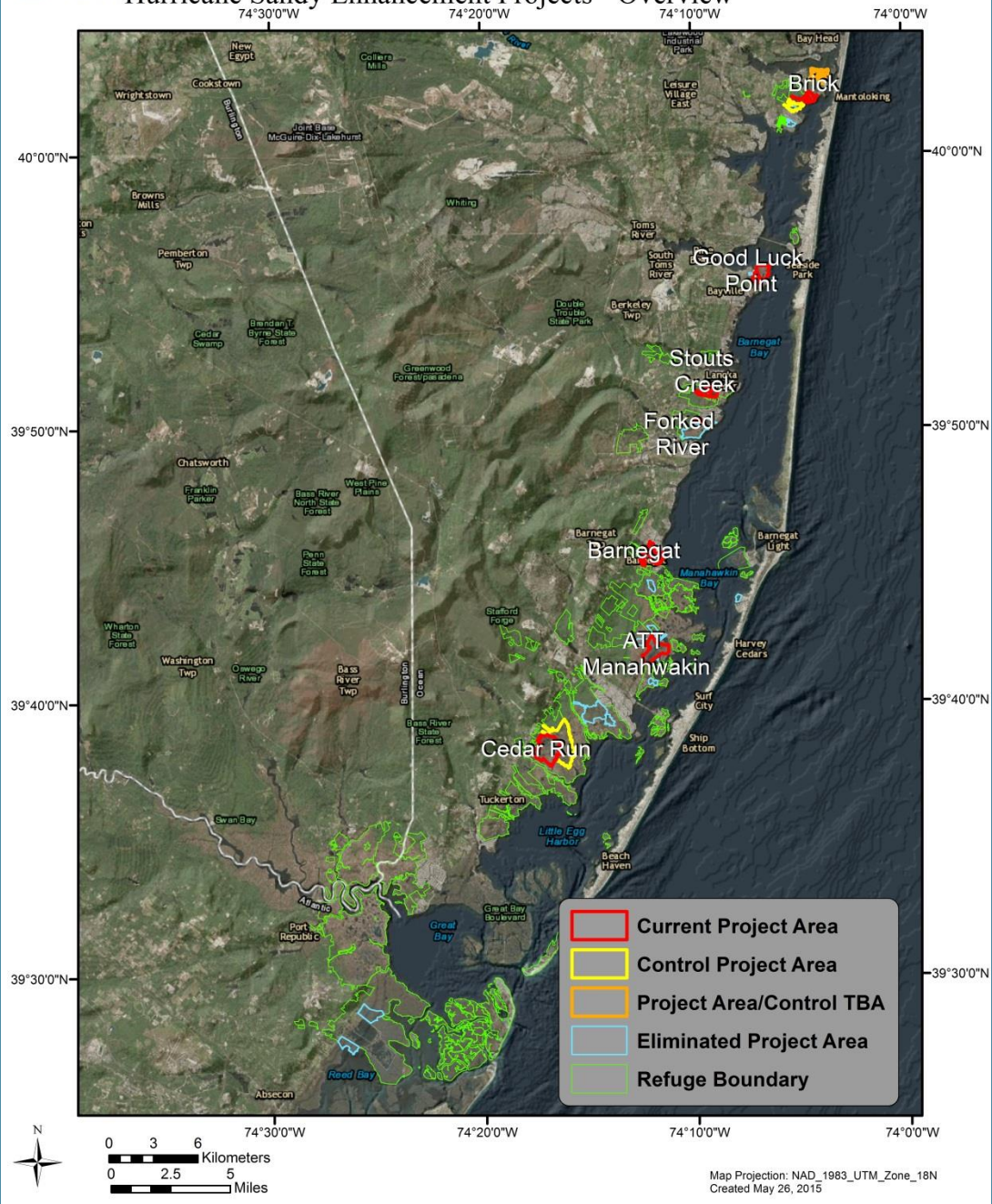
Restore multiple coastal impoundments to natural habitat



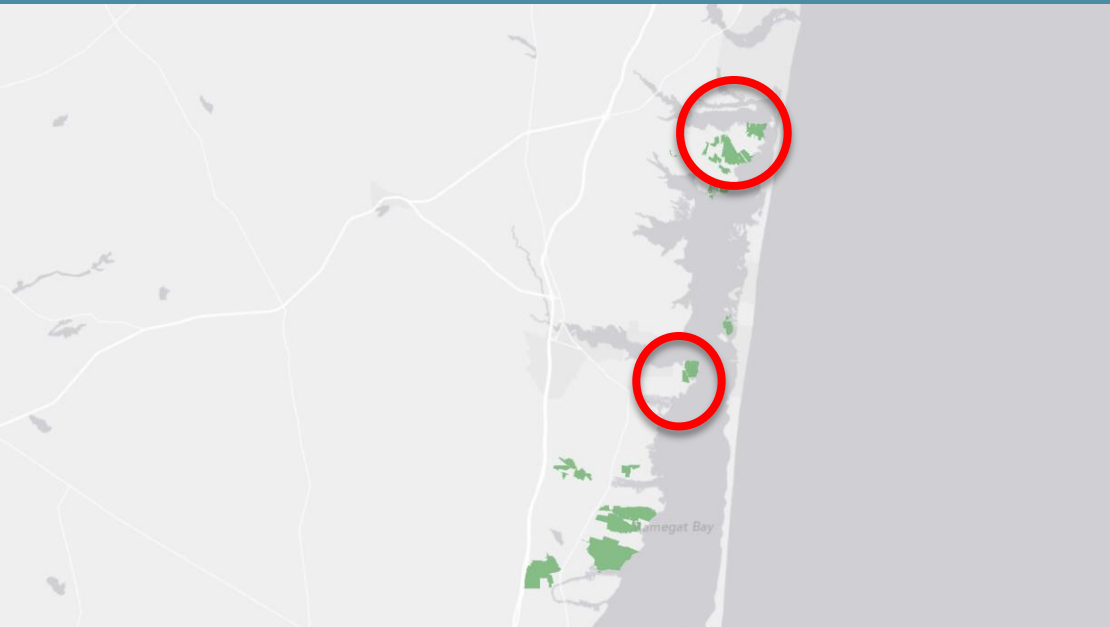
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Hurricane Sandy Enhancement Projects - Overview







# Sediment Enrichment

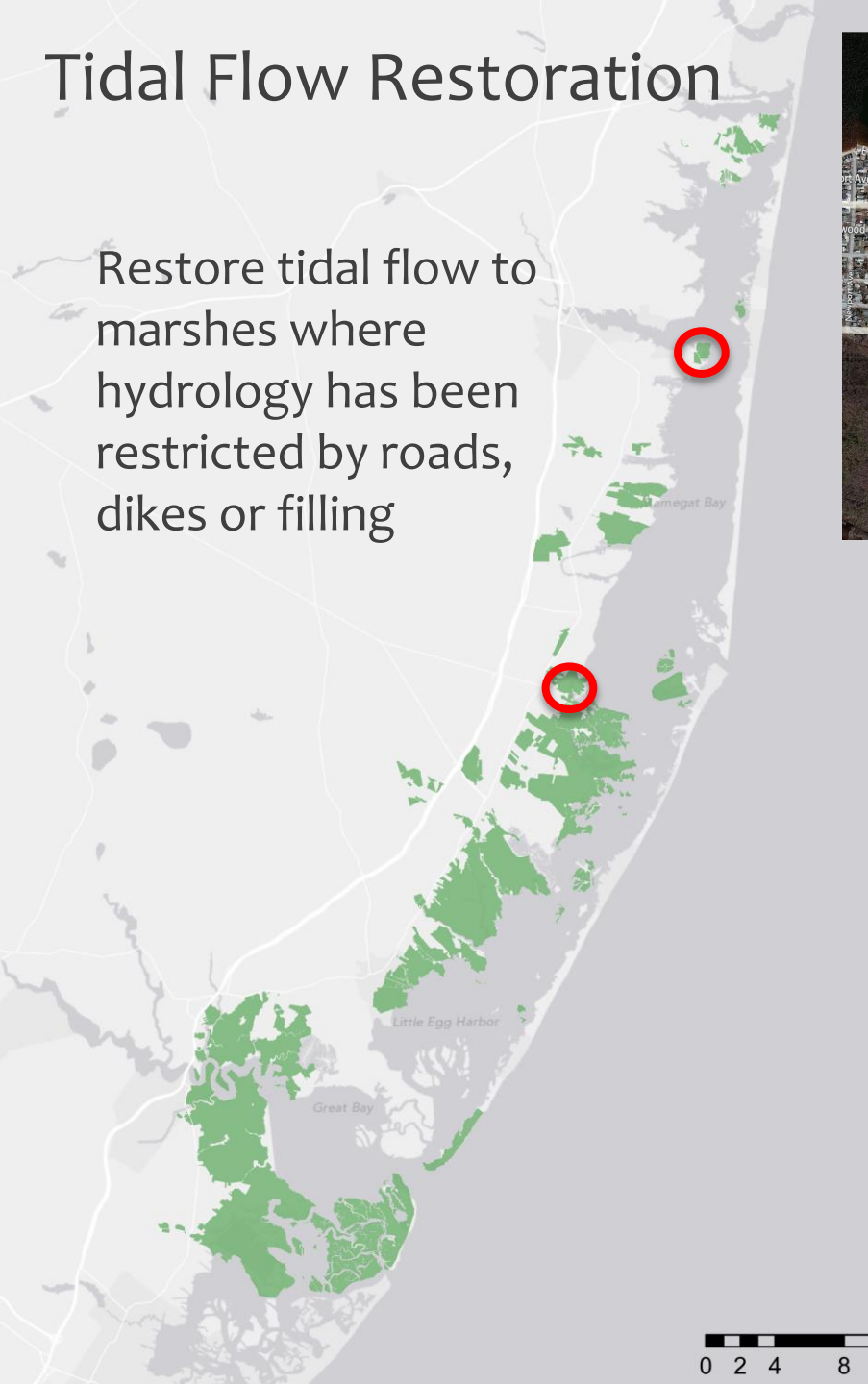
Former salt hay farms and ditched areas that are not accreting enough to keep up with sea level rise were identified for potential restoration

Thin layer deposition using clean dredged material to suitable depth



# Tidal Flow Restoration

Restore tidal flow to marshes where hydrology has been restricted by roads, dikes or filling



# Pole Removal

Two former trans-Atlantic communications sites

~1,000 Poles and associated wires, and cement anchors to be removed



# Restore Coastal Impoundments to Natural Habitats

Reestablish the conditions necessary to allow these former coastal wetlands to function as they should



# Use Strategic Habitat Conservation

- *Treats management actions or restorations experiments*
- *Uses outcome of actions to inform and improve future actions*



# BACI Design for Monitoring

## *Physical/chemical attributes*

- Elevation
- Sediment Supply
- Soil characteristics
- water logger probes

## *Biological information*

### *SHARP and SMI*

- Avian Community
- Vegetation
- Nekton
- SET's





U.S. Fish & Wildlife Service

E.B. Forsythe National Wildlife Refuge

Hurricane Sandy Enhancement - Brick Township Project

74°6'0"W 74°5'30"W 74°5'0"W 74°4'30"W 74°4'0"W 74°3'30"W 74°3'0"W

40°3'0"N

40°3'0"N

40°2'30"N

40°2'30"N

40°2'0"N

40°2'0"N

40°1'30"N






40°1'30"N

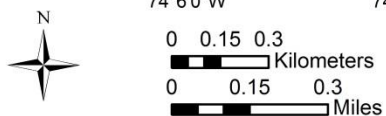
130 acres, 1/2 SE

88 acres, SE

55 acres, SE

106 acres

-  Project Area A\*
-  Project Area B
-  Control Project Area
-  Eliminated Project Area
-  Refuge Boundary



\* Control Determined After Study Report

Map Projection: NAD\_1983\_UTM\_Zone\_18N  
Created May 26, 2015







U.S. Fish & Wildlife Service

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Hurricane Sandy Enhancement - Good Luck Point Project

74°7'30"W

74°7'0"W

74°6'30"W

74°6'0"W

39°55'30"N

39°55'30"N



61 acres, poles, SE, tidal flow

161 acres, poles

- Current Project Area
- Eliminated Project Area
- Refuge Boundary

74°7'30"W

74°7'0"W

74°6'30"W

74°6'0"W



0 0.1 0.2 Kilometers

0 0.09 0.18 Miles





# E.B. Forsythe National Wildlife Refuge

## Hurricane Sandy Enhancement - Stouts Creek Impoundment Project

74°10'0"W      74°9'30"W      74°9'0"W      74°8'30"W



127 acres, tidal flow

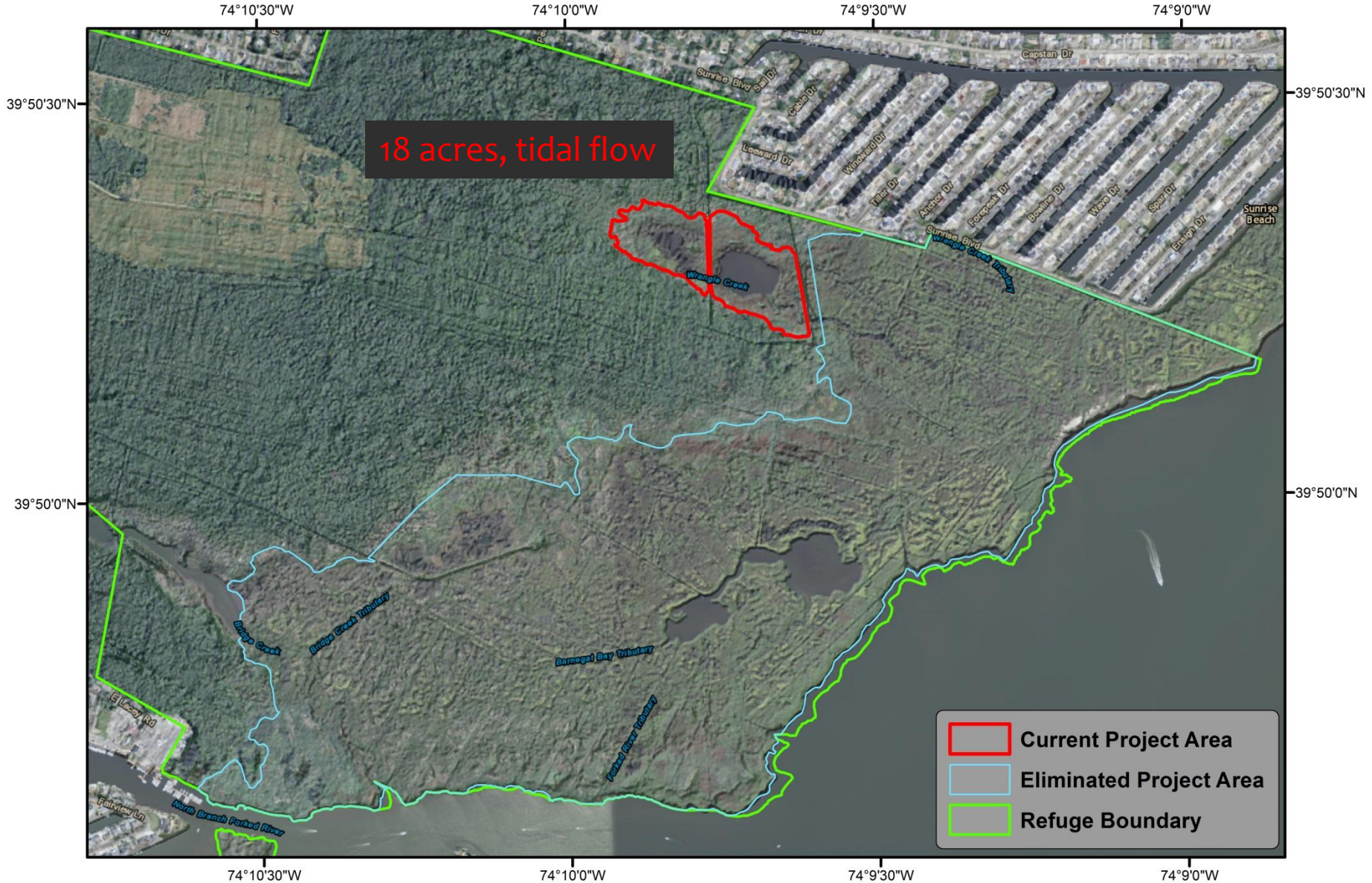
- Current Project Area
- Eliminated Project Area
- Refuge Boundary







# E.B. Forsythe National Wildlife Refuge Hurricane Sandy Enhancement - Forked River Project



18 acres, tidal flow

- Current Project Area**
- Eliminated Project Area**
- Refuge Boundary**





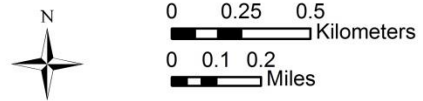


74°13'30"W 74°13'0"W 74°12'30"W 74°12'0"W 74°11'30"W 74°11'0"W 74°10'30"W 74°10'0"W



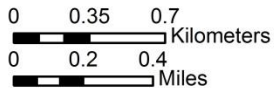
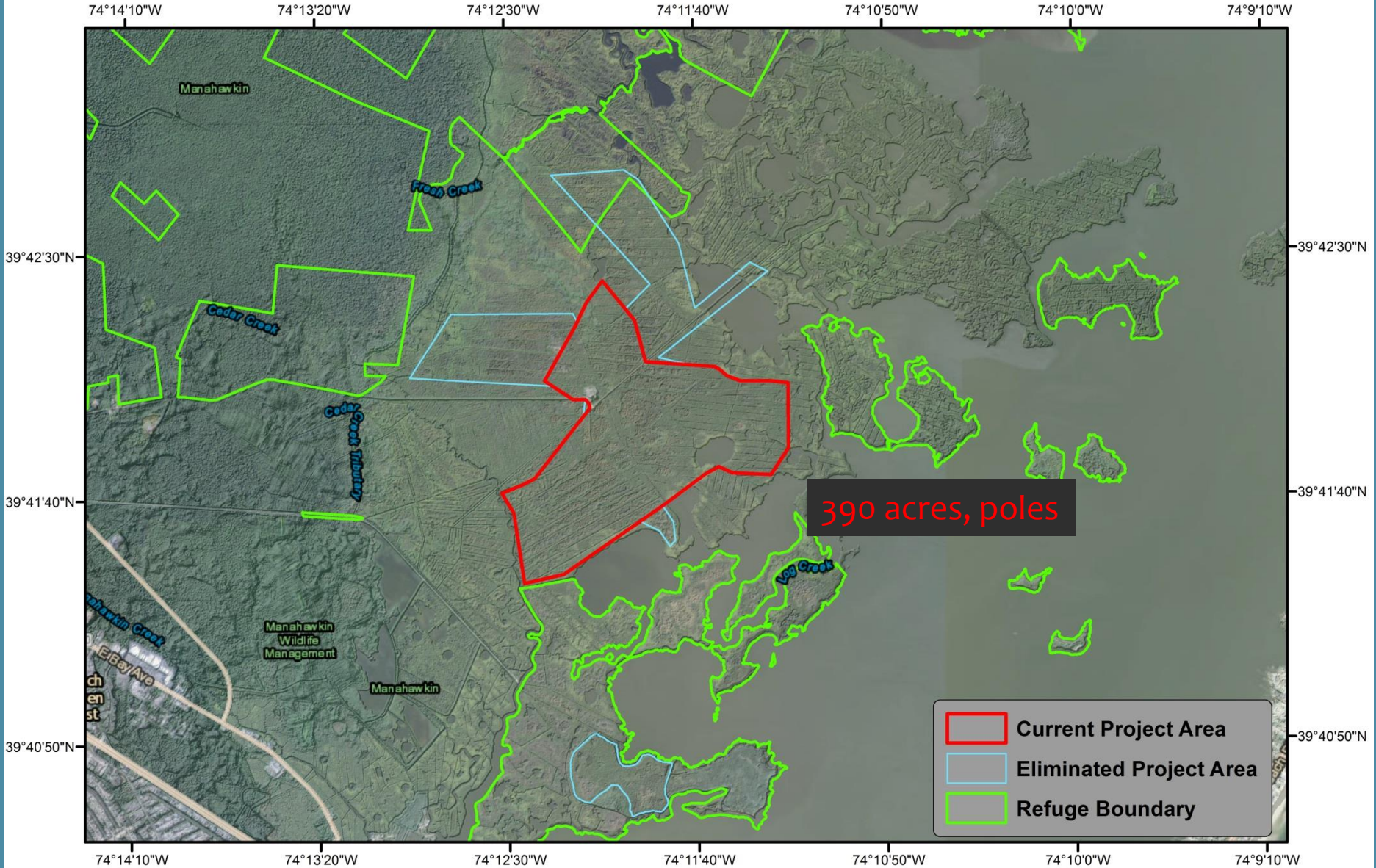
238 acres, tidal flow SE (design only)

- Current Project Area**
- Eliminated Project Area**
- Refuge Boundary**





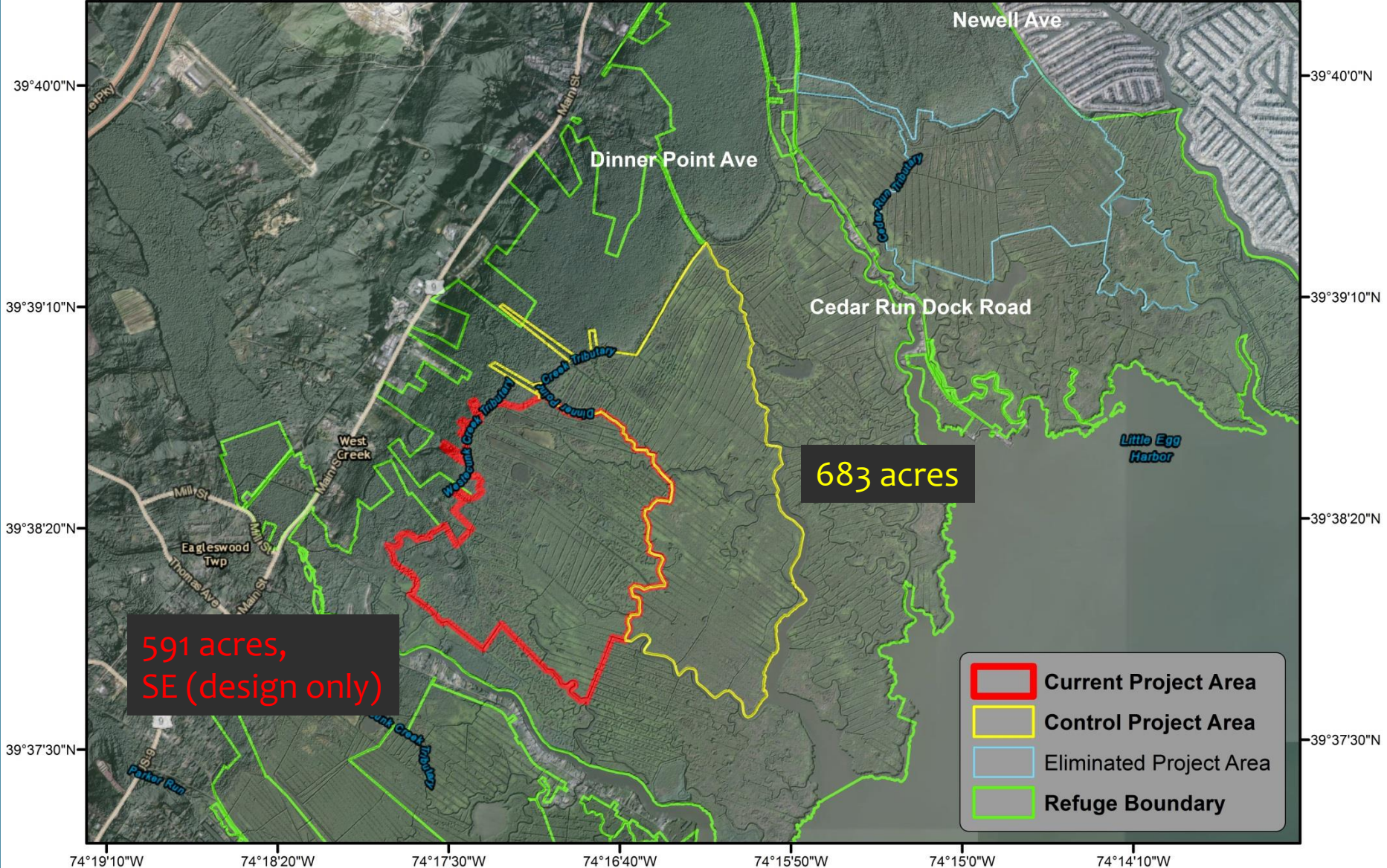








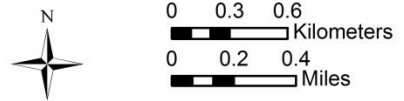
74°19'10"W 74°18'20"W 74°17'30"W 74°16'40"W 74°15'50"W 74°15'0"W 74°14'10"W 74°13'20"W



591 acres, SE (design only)

683 acres

	<b>Current Project Area</b>
	<b>Control Project Area</b>
	<b>Eliminated Project Area</b>
	<b>Refuge Boundary</b>



# QUESTIONS?

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