Appendix A

American Littoral Society
Proposal for Hurricane Sandy Coastal Resilience Competitive Grants
Creating a Resilient Delaware Bay Shoreline in Cape May and Cumberland Counties (NJ)
submitted to National Fish and Wildlife Foundation
Federal Financial Assistance Grant Number: 43429

Grant Information

Title of Project
Creating Resilient Habitats and Communities on Delaware Bay

Total Amount Requested	$ 4,750,000.00
Matching Contributions Proposed	$ 254,468.00
Proposed Grant Period	06/02/ 2014 - 05/30/ 2016

Project Description
We will restore 6 Delaware Bayshore sites, making habitats and towns more resilient to future storms and impacts of climate change. Our innovative techniques will promote long-term sustainability.

Project Abstract
We propose to restore six interrelated Delaware Bayshore sites in Cape May and Cumberland Counties, New Jersey. Each site is an integral unit of the Western Hemisphere Shorebird Reserve Network, a known spawning beach for horseshoe crabs, and a major stopover point for northbound migrant shorebirds. These natural areas and small, rural communities adjacent to them are experiencing the impacts of climate change and sea level rise. Sites include both the natural and built communities at Gandy's/Money Island Beach, Roadway Beach between Fortescue and Oyster Creek, East Point Lighthouse Beach, and Moores/Thompsons Beach in Cumberland Cty, and South Reeds, Cooks, and North Pierces Point Beaches in Cape May Cty.

Activities: Restore 5.73 miles of beach, some with locally dredged sand
Restore 50 acres of coastal wetlands using locally dredged silt
Employ 6 local earth moving companies and 5 oystermen
Provide employment and valuable training to 10 local veterans
Educate at least 1,000 students about project impacts and engage 250 in gathering data
Complete 8 supportive studies to be used by our partners and others
Develop 2 plans that will inform future action

Outcomes: This work will improve horseshoe crab spawning in the Delaware Bay and annual stopovers of northbound migrant shorebirds (especially the red knot); ecological and economic resilience of Delaware Bayshore communities; and sustainability of this work by innovative methods.

Organization and Primary Contact Information

Organization	American Littoral Society
Organization Type	Non-profit Corporation 501(c)(3)
Organization Web Address	www.littoralsociety.org/
Organization Phone	732-291-0055
Street Line 1	Building 18, Sandy Hook
Street Line 2	18 Hartshorne Dr Ste 1

City, State, Country, Postal Code	Highlands,New Jersey,North America - United States07732
Region (if international)	
Organization Congressional District	District 2 (NJ)
Primary Contact	Mr. Alek Modjeski
Position/Title	Habitat Restoration Program Director
Street Line 1	18 Hartshorne Drive, Suite #1
Street Line 2	
City, State, Country, Postal Code	Highlands, New Jersey, North America - United States, 07732
Region (if international)	
Phone and E-mail	732-291-0055 x ; alek@littoralsociety.org
Keywords	Conservation Threat; Major Habitat Type; Other; Species
Sub-keywords	Bird - Shorebird - Calidris canutus (Red Knot); Bird - Shorebird - Haematopus palliatus (American Oystercatcher); Coastal - Coastal beaches, dunes and shoreline; Coastal - Estuaries and Bays; Other; Species - Bird; Species - Invertebrate
Other Keyword(s)	Invertebrate-Horseshoe Crab - Limulus polyphemus

Project Location Information

Project Location Description	Gandy's/Money Island Beach, Roadway Beach, East Point Lighthouse Beach, Moores/Thompsons Beach (Cumberland Cty); Reeds Beach/Pierces Point, South Reeds/Cooks/North Pierces Point Beaches (Cape May Cty)
Project Country(ies)	North America - United States
Project State(s)	New Jersey
Project Congressional District(s)	District 2 (NJ)

Permits and Approvals

Permits/Approvals Description:	Bidwells Creek Marsh and reed beach restoration from dredging: Thin Layer application of silt on damaged marsh and sand to damaged beach both from the dreding of Bidwells Creeks by NJ Department of Transportation. Estimated volumn of silt=20k cubic yard Estimated Sand=30k cubic yards NJDEP Individual Permit for Waterfront Development including a Water Quality Certificate (WQC)& Sediment Mgmt Plan
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	NJDEP - Mark Davis
Permits/Approvals Submittal-Approval Date:	9/15/2014 12:00:00 AM

Permits/Approvals Description:	Site: Bidwells Creek Marsh and reed beach restoration from dredging Need: ACOE Individual Permit for Wetland Restoration Activities Thin Layer application of silt on damaged marsh and sand to damaged beach both from the dredging of Bidwells Creeks by NJ Department of Transportation. Estimated volume of silt=20k cubic yard Estimated Sand=30k cubic yards
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	USACE - Sam Reynolds
Permits/Approvals Submittal-Approval Date:	9/15/2014 12:00:00 AM

Permits/Approvals Description:	Pierces to Reeds Beach Restoration NJDEP Need Modification to existing Permit for emergency restoration Complete the restoration of beaches started in spring 2013. We will add 20k cubic yards of sand to South Reeds, Cooks, Kimbles and Pierce Point Beach to complete profiles establish though beach surveys
Permits/Approvals Status:	Application Submitted
Permits/Approvals Agency-Contact Person:	NJDEP: Christopher Dolphin/Colleen Keller
Permits/Approvals Submittal-Approval Date:	3/15/2014 12:00:00 AM

Permits/Approvals Description:	Pierces to Reeds Beach Restoration USACE- extension to existing NWP 27 for enhancement of aquatic resources Complete the restoration of beaches started in spring 2013. We will add 20k cubic yards of sand to South Reeds, Cooks, Kimbles and Pierce Point Beach to complete profiles establish though beach surveys
Permits/Approvals Status:	Application Submitted
Permits/Approvals Agency-Contact Person:	USACE - Sam Reynolds
Permits/Approvals Submittal-Approval Date:	3/15/2014 12:00:00 AM

Permits/Approvals Description:	EXPERIMENTAL SAND HARVESTING ON DELAWARE BAY CAPE SHORE BAY BEACHES Permit: Individual Permit NJDEP Experiment with harvesting sand from the intertidal flat off the lower Cape May Peninsula beaches. We have two potential sites in Middle Township and will partner with both Middle township and Cape May county mosquito commission and the county government. We expect to harvest about 30k but the cost will be calculated based on time.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	Christopher Dolphin or Colleen Keller
Permits/Approvals Submittal-Approval Date:	8/1/2014 12:00:00 AM

Permits/Approvals Description:	Moores Beach NJDEP -Modification to existing Permit for emergency restoration Complete the beach profile developed in the spring 13 project which will extend the recovered beach by another 1000ft. The total sand will be approx. 15,000
Permits/Approvals Status:	Application Submitted
Permits/Approvals Agency-Contact Person:	NJDEP - Coleen Keller
Permits/Approvals Submittal-Approval Date:	3/15/2014 12:00:00 AM

Permits/Approvals Description:	Moores Beach USACE- extension to existing NWP 27 for enhancement of aquatic resources Complete the beach profile developed in the spring 13 project which will extend the recovered beach by another 1000ft. The total sand will be approx. 15,000
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	USACE - Sam Reynolds
Permits/Approvals Submittal-Approval Date:	3/15/2014 12:00:00 AM

Permits/Approvals Description:	Thompsons Beach njdep -Modification to existing INDIVIDUAL Permit for road and beach improvements Design and Restore Beaches for Shorebirds, Horseshoe Crabs and Coastal Resiliency / Storm Protection with 45k. The beach has already been cleaned of most rubble by the NJDEP. Road work will be necessary.
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	NJDEP - Colleen Kellery
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM

Permits/Approvals Description:	Thompsons Beach usace- extension to existing NWP 27 for enhancement of aquatic resources Design and Restore Beaches for Shorebirds, Horseshoe Crabs and Coastal Resiliency / Storm Protection with 45k. The beach has already been cleaned of most rubble by the NJDEP. Road work will be necessary.

Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	Sam Reynolds
Permits/Approvals Submittal-Approval Date:	7/1/2014 12:00:00 AM
Permits/Approvals Description:	Gandy's and Money Island: Restore Beach / Marsh Using Dredge Material NJDEP: Individual Permit for Waterfront Development including a Water Quality Certificate (WQC)& Sediment Mngmt Plan
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	Mark Davis/Colleen Keller
Permits/Approvals Submittal-Approval Date:	3/15/2015 12:00:00 AM
Permits/Approvals Description:	Gandy's and Money Island: Restore Beach / Marsh Using Dredge Material NJDEP: Individual Permit for Waterfront Development including a Water Quality Certificate (WQC)& Sediment Mngmt Plan
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	USACE: Sam Reynolds
Permits/Approvals Submittal-Approval Date:	3/15/2015 12:00:00 AM
Permits/Approvals Description:	Reeds Community Beach This project will be included in the permitting for Bidwells (above) so they are the same req.
Permits/Approvals Status:	Application Submitted
Permits/Approvals Agency-Contact Person:	NJDEP: Colleen Keller USACE: Sam Henderson
Permits/Approvals Submittal-Approval Date:	9/15/2014 12:00:00 AM
Permits/Approvals Description:	Eastpoint Lighthouse Beach NJDEP - Individual Permit for Waterfront Development, incl. WQC USACE - Individual Permit for beach restoration & shoreline protection activities
Permits/Approvals Status:	Intend to Apply

Permits/Approvals Agency-Contact Person:	usace -j. smith and sam reynolds njdep - mark davis and colleen keller
Permits/Approvals Submittal-Approval Date:	3/15/2015 12:00:00 AM
Permits/Approvals Description:	Fortescue NJDEP: Individual Permit for Waterfront Development including a Water Quality Certificate (WQC)& Sediment Mngmt Plan ACOE: Individual Permit for Wetland Restoration Activities We already have the dredging permit from NJDEP
Permits/Approvals Status:	Intend to Apply
Permits/Approvals Agency-Contact Person:	usace - sam reynolds njdep / njdot - mark davis
Permits/Approvals Submittal-Approval Date:	6/1/2014 12:00:00 AM

Salaries and Benefits

	Units	Cost Per Unit	Total
Habitat Restoration Program Director	2	$45,000.00	$90,000.00
Habitat Restoration Coordinator	2	$43,200.00	$86,400.00
Communications Coordinator	2	$15,000.00	$30,000.00
Part-time Restoration Assistant	2	$20,125.00	$40,250.00
Financial Manager	2	$13,440.00	$26,880.00
Veteran Interns	10	$5,000.00	$50,000.00
Deputy Director/QA/QC Officer	2	$18,000.00	$36,000.00
Executive Director	2	$11,280.00	$22,560.00
Outreach Coordinator	2	$10,800.00	$21,600.00

Total Salaries and Benefits			**$403,690.00**

Salary costs shown include 20% fringe comprising employee health insurance, payroll taxes, FICA, workers' comp., and other statutory taxes and insurance. 1)Restoration Prog. Dir.:60% over 2 years @ 75K per year + 20% Fringe. Serve as overall project manager, partner/contractor coordination/management; scientific and logistical expertise and support; permit development and management; fiscal oversight, document review. Restoration/Education Coord.: 87% over 2 years @ $50K per year + fringe. Provide local logistical support and task mgmt; prepare documentation; GIS support; support educational outreach and volunteer coordination. Communications Coord.: 25% over 2 years @ $50K + fringe; Handle print media, web site, public relations; social networking; and production of printed materials and signage. Part-time Assistant: 100% over 2 years @ $20,125/yr. Assist in onsite tasks, education program, data entry and other general project tasks. Vet. Interns: 5 Interns per project year @ $5K each + 0% fringe; Assist with pre and post project monitoring,data gathering, work on oyster reefs and restoration tasks. Dep. Director-QA/QC Officer: 20% over 2 years @ 75K per year + 20% fringe. Serve as QA/QC officer, review project documentation. Exec. Director: 10% over 2 years @ 94K per year + fringe. Core PM Team/Press events.Finance Mgr: 20% per year at $56K + fringe. Budget QA/QC, Actuals/Budget Outreach Coord.: 20% over 2 years at $45k + fringe. Manage/create Outreach Programs/events.

Equipment

	Units	Cost Per Unit	Total

Total Equipment			**$0.00**

Contractual Services

	Units	Cost Per Unit	Total
Larry Niles and Associates, LLC	1	$851,944.00	$851,944.00
Richard Stockton College Coastal Research Center	1	$435,431.00	$435,431.00
Partnership for Delaware Estuary	1	$30,502.00	$30,502.00
Delaware Bayshore Oystermen	5	$28,000.00	$140,000.00
Earthwork Restoration Companies TBD	1	$2,337,255.40	$2,337,255.40
Conserve Wildlife Foundation	1	$193,444.00	$193,444.00
Rutgers Haskins Shellfish Research Laboratory	2	$5,000.00	$10,000.00
Litwin and Provence	2	$2,400.00	$4,800.00
Bus Contractor	1	$5,000.00	$5,000.00
Graphic Subcontractor TBD	2	$2,500.00	$5,000.00
Interpretive Signage Contractor TBD	6	$1,200.00	$7,200.00

Total Contractual Services			**$4,020,576.40**

Larry Niles & Associates LLC: project design, local field oversight, permit and compliance support, engineering design review, adaptive management monitoring and public engagement; Richard Stockton College, CRC: beach engineering and design, materials assessment; beach profile, overview mapping and other material necessary for permits. Conduct baywide survey of sand movement and major influences that carry sand from one beach to another; repeated beach profiles for the monitoring of restored beaches; bathymetry surveys for amounts of sand and silt in thin layer and sand harvesting projects.Partnership for the Del. Estuary: Provide historical assessment data for specific marsh areas; assist in design and implementation of Wetland Monitoring Programs.Earthwork Restoration Companies:6 companies to transport habitat grade sand to restoration sites from upland sources and grade according to specs.,spread sand to engineered profiles; harvest sand in lower Cape Shore project.Oyster Reef Contractors:contract with local oystermen with shellfish leases to create protective oyster reefs.CWF: local project management at 4 state-owned sites including public outreach.
Haskins Shellfish Research Lab: Assist with oyster education/outreach.Litwin & Provence:legal document review inc.subcontracts/regulations. Bus Contractor: student transportation to horseshoe crab field sites and shell transport. Graphic Sub-Provide quality grade design Interpretive sign - create site specific educ. signs

Supplies and Materials

	Units	Cost Per Unit	Total
laptops	2	$825.20	$1,650.40
Educational Consummables	2	$2,500.00	$5,000.00
Folding Hand Carts	2	$125.00	$250.00
Office Supplies	2	$1,000.00	$2,000.00
Thin spray nozzle	2	$4,500.00	$9,000.00
Anchors and straps for barge	2	$400.00	$800.00
12ft 10" Divers Pipe	2	$4,250.00	$8,500.00
Pipe Diffuser	1	$1,200.00	$1,200.00
coir logs to bound marsh/erosion control	480	$70.00	$33,600.00
chest waders	10	$95.00	$950.00
straw wattles for erosion control	12	$400.00	$4,800.00
wood stakes	432	$5.00	$2,160.00

	Units	Cost Per Unit	Total
rope	35	$10.00	$350.00
Geotube material per yard	3524.42	$30.00	$105,732.60

Total Supplies and Materials			**$175,993.00**

1) 2 laptops for field use by interns, volunteers, staff
2) Educational Consummables - supplies for horseshoe crab education/monitoring program including portable touch tanks, paper, photocopying, small stopper bottles, test tubes, rulers, calipers, clipboards, food coloring, test kits
3) folding hand carts for moving equipment and supplies from vehicles into schools and onto field sites
4) Office Supplies - project related including printer ink, paper, binders, postage, pens, staples, memos, file holder stands
5)Nozzle - design/fabricate for spreading silt on salt marsh
6)Anchors/Straps - secure barge to project sites
7)Divers Pipe for underwater restoration operations
8) Coir logs, straw wattles, geotube material, stakes, rope, flags etc. to protect marsh restoration sites from losing recently applied silt
9)chest waders for 10 veteran interns and /or volunteers

Printing

	Units	Cost Per Unit	Total
Education and Outreach Materials	5000	$0.89	$4,450.00
Public Outreach Fact Sheets	6000	$1.01	$6,060.00

Total Printing			**$10,510.00**
Fact Sheets about horseshoe crabs, red knots, and habitat; link between resilience and habitat restoration			Fact sheets/cards about each of the 6 projects

Travel

	Units	Cost Per Unit	Total
Habitat Restoration Program Director	2	$5,790.00	$11,580.00
Restoration/Education Coordinator	2	$1,612.80	$3,225.60
Part-time Restoration Assistant	2	$3,040.00	$6,080.00

	Units	Cost Per Unit	Total
Veteran Interns	1	$4,045.00	$4,045.00

Total Travel			**$24,930.60**

1) Habitat Restoration Director - Mileage reimbursement for use of personal Auto –
Sandy Hook to Cape May = 125 miles RT = 250 miles
X .56 = $140 Tolls = $3.75 RT = $7.5 = 1 RT = $147.50 @ 2 per month = $295 x 24 = $7,080
Lodging – For overnight stays at local area hotel during times of heavy local project activity (Less expensive to stay over 1 night per month than to reimburse for mileage) Winter averages 100/night @ 1 per month X 6 months = $600 Summer averages $275 @ 1/month x 6 months = 1,650
$2,250 per year x 2 = $4,500
Total lodging $4,500 + Mileage/tolls $7,080 = $11,580 fro 2 years
2)Restoration/Education Coordinator
Reimbursement for use of personal auto
Millville to Cape May = 40 miles RT = 80 Miles x .56 - $44.80 @ 3 per month = $134.40 X 24 $ 3,225.60
3)Part-time Restoration Assistant - Mileage reimbursement for use of personal Auto – Sandy Hook to Cape May = 125 miles RT = 250 miles X .56 = $140 Tolls = $3.75 RT = $7.5 = 1 RT = $147.50 @ 2 per month (for 20 1/2 months) = $295 x 20 trips = $6,080 (includes approx. 320 miles for local trips needed for supply pick up, and project associated errands.
4)Veteran Interns = 107 miles r/t from various locations not to exceed a 54 mile radius from project site x 10 interns x 6 trips over two years each = $3,595.20 + tolls r/t $7.50 x 10x 6 = $450 for a total of 4,045.00

Other

	Units	Cost Per Unit	Total
Permit Fees	2	$20,000.00	$40,000.00
Lab Analysis	1	$40,000.00	$40,000.00
19' skiff rental	8	$1,800.00	$14,400.00
GPS Base Station and Rover Rental	8	$1,800.00	$14,400.00
20X10 Barge Rental	1	$5,500.00	$5,500.00

Total Other			**$114,300.00**

1) Permit fees for up to 2 sites that may not receive federal consistency based on applicant; all other include State of NJ as a partner and thus permit fees will be waived 2) Lab analysis of sediments for contaminants as per condition of permits to use sediment for restoration 3) 19' skiff rental for monitoring and oyster reef/marsh restoration for 4 months per year for 2 years 4)GPS base station and rover rental to monitor thin layer application for 4 months per year over 2 years 5)20 X 10 barge rental for reef restoration and monitoring

Budget Grand Total			**$4,750,000.00**

Matching Contributions

Matching Contribution Amount:	$1,000,000.00
Type:	Cash
Status:	Pledged
Source:	US Fish and Wildlife Service
Source Type:	Federal
Description:	We are currently working with FWS to develop a cooperative agreement through which FWS will invest 1,000,000 in expanding the restoration of horseshoe crab habitat and other important habitats in New Jersey's Delaware Bayshore.

Matching Contribution Amount:	$129,468.00
Type:	In-kind
Status:	Pledged
Source:	Volunteer Labor
Source Type:	Non-Federal
Description:	ALS Horseshoe Crab Census - 250 volunteers X 4 hours @ 25.91 X 2 years - $51,820 ALS Oyster Reef Project - 50 volunteers X 6 hours @ 25.91 x 2 years = 15,460 CWF Shorebird Stewards - 100 volunteers @ 24 hours X 25.91 = 62,184

Matching Contribution Amount:	$75,000.00
Type:	Cash
Status:	Pledged
Source:	NJ Recovery Fund
Source Type:	Non-Federal
Description:	Via CWF for habitat restoration

Matching Contribution Amount:	$26,000.00
Type:	Cash
Status:	Pledged
Source:	US Fish and Wildlife Service
Source Type:	Federal
Description:	Pledged to CWF for Delaware Bayshore habitat restoration

Matching Contribution Amount:	$50,000.00
Type:	In-kind

Status:	Pledged
Source:	Larry Niles & Associates, LLC
Source Type:	Non-Federal
Description:	Value of scientists and field workers banding and assessing shorebird populations in Delaware Bay during Spring 2014 and 2015

Total Amount of Matching Contributions	$1,280,468.00

Activities and Outcomes

Funding Strategy: Capacity, Outreach, Incentives
Activity / Outcome: Sandy - Economic benefits - # jobs created
Description: Enter the number of jobs created
Required: Recommended
jobs created - Current: 0
jobs created - Grant Completion: 20
Notes: To our knowledge, this project will not create permanent, long-term jobs. During the course of the project, however, it will provide significant work for local earth moving firms and oystermen, who will be employed over a two-year period. In addition, our proposed veterans internship program will provide short-term employment and training in such skills as surveying, monitoring, and restoring habitats including using GPS equipment and interpreting data. Finally, the implementation of a dredge recycling program in which sand and silt from rivers and streams can be re-used locally, will make more regular dredging possible due to reduced costs, thus creating additional local work and improved navigation and cost savings for oyster fishermen.

Funding Strategy: Habitat Restoration
Activity / Outcome: Sandy - Beach habitat quality improvements - Miles restored
Description: Enter the number of miles restored
Required: Recommended
Miles restored - Current: 0
Miles restored - Grant Completion: 5.73
Notes: We will restore 5.73 miles of beach habitat destroyed by Hurricane Sandy at multiple sites in Cape May and Cumberland County. This will result in improved spawning habitat for horseshoe crabs, higher egg densities and, consequently, improved stopovers for migrating shorebirds, especially the red knot. In addition, the wider beaches will result in improved resilience of the coastal landscape and increased protection of nearby communities. Resilience of the built and natural landscape will be increased.

Funding Strategy: Capacity, Outreach, Incentives
Activity / Outcome: Sandy - Outreach/ Education/ Technical Assistance - # people reached
Description: Enter the number of people reached by outreach, training, or technical assistance activities
Required: Recommended
people reached - Current: 0.00
people reached - Grant Completion: 2000.00
Notes: During the course of the project, we anticipate reaching the following people
1,500 middle school and high school students through horseshoe crab education program

500 middle school students through our partnership with Rutgers Haskins Shellfish Research Lab's oyster education program

Funding Strategy: Capacity, Outreach, Incentives
Activity / Outcome: Sandy - Volunteer participation - # volunteers participating
Description: Enter the number of volunteers participating in projects
Required: Recommended
volunteers participating - Current: 0.00
volunteers participating - Grant Completion: 700.00
Notes: Horseshoe Crab Surveys: 500 We anticipate that 500 students and their teachers and parents will volunteer in 2 annual horseshoe crab surveys/data collection -- 250 per year -- after receiving training in our horseshoe crab education program.
Oyster Reef Construction: 100 volunteers working approximately 6 hours each

Funding Strategy: Planning, Research, Monitoring
Activity / Outcome: Sandy - Management or Governance Planning - # plans developed
Description: Enter the number of plans developed that had input from multiple stakeholders
Required: Recommended
plans developed - Current: 0
plans developed - Grant Completion: 2
Notes: During the course of the project, we will develop 2 management plans:

Cox's Meadow Beach and Marsh Restoration
Bidwell's Creek Marsh Restoration

Funding Strategy: Planning, Research, Monitoring
Activity / Outcome: Sandy - Research - # research studies completed
Description: Enter the number of research studies completed
Required: Recommended
research studies completed - Current: 0
research studies completed - Grant Completion: 1
Notes: We will complete a comprehensive scientific evaluation of sediment behavior along the Bayshore that will support the restoration work.

Funding Strategy: Habitat Restoration
Activity / Outcome: Sandy - Wetland restoration - Acres restored

Description: Enter the number of acres restored
Required: Recommended
Acres restored - Current: 0.00
Acres restored - Grant Completion: 50.00
Notes:

Funding Strategy: Habitat Restoration
Activity / Outcome: Sandy - Erosion control - # structures installed
Description: Enter the number of structures installed, replaced, upgraded or repaired to reduce erosion or wetland/marsh lost.
Required: Recommended
structures installed - Current: 0
structures installed - Grant Completion: 2
Notes:

Hurricane Sandy Coastal Resiliency Competitive Grants Program
Full-proposal Project Narrative
American Littoral Society -Creating Resilient Habitats and Communities on Delaware Bay

Introduction

Hurricane Sandy destroyed nearly 70% of horseshoe crab habitat on the New Jersey side of Delaware Bay. This imperiled not only the horseshoe crabs that spawn on the storm-ravaged beaches, but also the shorebirds that stop there each spring to refuel before making the final leg of their journey from Tierra del Fuego to their nesting grounds in the Canadian Arctic. Immediately after the hurricane, a team led by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey successfully restored just over a mile of damaged horseshoe crab habitat, avoiding a natural catastrophe for northbound migrant shorebirds that depend on building weight from horseshoe crab eggs. Herein, we propose to expand that work to six other, interrelated Bayshore sites and restore the beaches and marshes most important to the survival of the horseshoe crab and migrant shorebirds. This work will also increase the resilience of nearby communities and demonstrate the value of adopting a nature-based response as we move forward from the storm.

A. Geographic Context:

We propose to restore beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May and Cumberland Counties, New Jersey. While not all contiguous, each site is an integral unit of the Western Hemisphere Shorebird Reserve Network, a known spawning beach for horseshoe crabs, and a major stopover point for northbound migrant shorebirds. In addition, both the natural areas and small, rural communities adjacent to them are experiencing the impacts of climate change and sea level rise. The Delaware Estuary is also recognized as an *Estuary of International Importance* by the Ramsar Convention on Wetlands of International Importance. The sites include both the natural and built communities at 1) Gandy's/Money Island Beach (Cumberland County), 2) Roadway Beach between Fortescue and Oyster Creek (Cumberland County); 3) East Point Lighthouse Beach (Cumberland County); 4) Moores/Thompsons Beach (Cumberland County); 5) Reeds Beach Beach and Pierces Point (Cape May County); and 6) South Reeds, Cooks, and North Pierces Point Beaches (Cape May County). Detailed spatial information and aerial photographs of each site is provided in the attachments submitted with this proposal.

B. Project Narrative:

Project Goals: Our overarching goals are to increase the success of horseshoe crab spawning in the Delaware Bay and the annual Bayshore stopovers of northbound migrant shorebirds (especially the red knot) and resilience of Delaware Bayshore communities. We wish to strengthen an irreplaceable natural system and reduce the vulnerability of rural Bayshore communities that was so clearly exposed by the impacts of Sandy. To advance these goals, we propose to restore and enhance the most important beaches which comprise critical habitat for shorebirds and horseshoe crabs. Restored beaches have been demonstrated to contribute to mitigating storm hazards. We will also restore adjacent saltmarshes for their value as habitat for other wildlife, and their potential role in hazard mitigation. The restoration of these areas will increase resilience of the rural Delaware Bayshore communities situated close to them through the addition of demonstrated, nature-based approaches to storm hazard reduction in communities which don't currently have them. We will design and implement a sustainable program of using Bay sediments to restore and maintain these natural features. As we create local

and environmentally beneficial opportunities for the disposal of channel dredge materials, we will resolve long standing impediments to the economic well-being and resiliency of Bayshore communities. This work will be supported by comprehensive scientific evaluation of sediment behavior along the Bayshore. We will also create oyster reefs and compatible aquaculture operations as critical parts of the storm mitigation work and strengthening the conditions related to recovered beaches. This will also expand the economic resiliency of the communities by supporting local, bay related industry. We will engage members of the community in various elements of our work to promote understanding of the link between habitat restoration and coastal resilience and increase public support for these and future coastal habitat restoration efforts.

Success will be measured by increased numbers of shorebirds on the designated project beaches in the 2014, 2015, and subsequent stopovers; by increased numbers of crabs and egg densities on the designated horseshoe crab beaches during the 2014, 2015, and subsequent spawning seasons; reduced wave action and resulting erosion at designated beaches; successful engagement of youth, veterans, and other community members in learning about and volunteering in project elements in their communities. Specific metrics and targets are provided in our activities and outcomes document submitted as an attachment to this proposal.

Specific outputs and outcomes are:
Site 1: Gandy's Beach Money Island Beach –
Outputs: Barrier island beach and eroded salt marsh restored using dredged material from Nantuxent Creek; creation of storm protection through wave-attenuating oyster reefs
Outcomes: Improved habitat for horseshoe crabs and increased egg densities to better support more shorebirds; more regular dredging (due to nearby use for dredge material) improves conditions for local oystermen and access to regional offloading facility

Site 2: Roadway Beach between Fortescue and Oyster Creek
Outputs: Rubble removed from beach, sand replenished and protected with geotubes and dredged sand.
Outcomes: Increased use by horseshoe crabs; increased egg densities to better support shorebirds; road protected, public access to recreational beach enhanced increasing local economic activity

Site 3: East Point Lighthouse Beach- use
Outputs: Beaches restored with dredge material from Maurice River
Outcomes: Improved horseshoe crab habitat, historic lighthouse protected

Site 4: Moores Beach/Thompson's Beach
Outputs: 8000 cubic yards disbursed onto beach, completing restoration begun in 2013 and halted due to arrival of horseshoe crabs
Outcomes: Earlier project finalized and 1500 feet of additional horseshoe crab spawning habitat provided, shorebirds better supported

Site 5: Reeds Beach and Pierces Point
Outputs: Horseshoe crab beaches restored using dredge sand from nearby Bidwell Creek; damaged bulkhead material removed; optimal sources of sand identified
Outcomes: Crab impingement eliminated; crab spawning habitat improved and expanded; more shorebirds supported; cost of Bidwell Creek dredge reduced due to local use for sand and silt; resiliency increased by continuous re-use of sand

Site 6: South Reeds, Cooks, and North Pierces Point Beaches
Outputs: Horseshoe Crab beaches fully restored; creek mouths restored
Outcomes: Improved habitat for horseshoe crabs and increased egg densities to better support more shorebirds

In addition to the "on the ground" benefits at each of these critical sites, our project will create and establish processes and programs which will contribute to the management of the Bayshore region in a way that will support long-term community and economic resiliency. We will advance a sub-regional sediment management system, informed by science about sediment transport within this section of the Bay, and pilot a process to sustainably maintain navigational channels and create an ongoing dredged materials beneficial reuse program for benefit of shorebirds, beach nourishment and marsh restoration. It will directly speak to the issue of maintaining navigational channels important to commercial and recreational fishing operations.

Output: Scientific investigations supporting a subregional sediment management plan related to navigational maintenance and beneficial reuse
Outcome: Long-stalled maintenance of navigable channels resolved; access to bay related marine industry facilities restored and businesses supported

Priority:

We have selected the project areas based on the ecological value of each section to horseshoe crabs and shorebirds, and opportunities to enhance community resiliency. The beaches' importance for shorebirds is based on shorebird and horseshoe crab usage and occurrence data collected over the last three years. The communities selected reflect local recovery planning prioritization by the communities themselves.

Further, the value of our strategy of beach nourishment for horseshoe crab and shorebird habitat restoration is a proven approach. Our proposal will build upon investments made by USFWS, NFWF and private foundations in the immediate aftermath of Hurricane Sandy which produced outstanding results in both utilization by horseshoe crabs for spawning and by shorebirds during the spring migratory stopover.

National and state plans prioritizing the restoration and protection of Delaware Bay beaches for shorebird conservation include: NJ State Wildlife Action Plan, USFWS Atlantic Flyway Shorebird Plan, Red Knot Status Assessment, Red Knot Conservation Plan (Manomet Center for Conservation Sciences). Within the ***Atlantic Flyway Shorebird Business Strategy,*** seven key strategies were developed to characterize core conservation activities necessary to address threats that reduce shorebird populations. Given limited resources, the key strategies focus on actions that will have concrete and measurable outcomes on population growth and sustainability: In that plan, Strategy 2 "Manage and Protect Habitat" recognized the need to protect shorebird habitat from threats such as development, and to effectively manage habitat to meet shorebird needs, as well as the need to create more habitat to recover shorebird populations.

Botton, et al. (1988) conducted beach surveys on approximately 80 kilometers of beach along the New Jersey side of the Delaware Bay and categorized approximately 10.6 percent (8.5 kilometers) as providing optimal spawning habitat and 21.1 percent (17.0 kilometers) as suitable spawning habitat. The Atlantic States Marine Fisheries Commission (1998) concluded that optimal spawning beaches may be a limiting reproductive factor for the horseshoe crab population.

While the status of Delaware Bay's intertidal beaches are critical to both shorebirds and horseshoe crabs, it should be noted that Burger et al. (1997) documented that migrating shorebirds, including the red knot, move actively between Delaware Bay's various habitats with changes in tidal cycle. The shorebirds use all these

various habitats for foraging, resting and other behaviors depending on location, seasonal date, time of day, tide and species. Though the beaches are of critical importance; during high tide, the beaches are often too narrow for foraging, and the birds go elsewhere. Burger et al. (1997) suggest that in addition to the massive food resource provided by spawning horseshoe crabs, Delaware Bay's complex mosaic of coastal habitat types of mudflats, beaches, tidal creeks and salt marshes is essential to maintain the large migrant shorebird population.

Only 41% of the optimal beach habitat in Delaware and 37% in New Jersey (or 39.5% combined) are in some form of conservation protection (i.e., federal, state, public utility or non-governmental organization). While significant stretches of the optimal beach habitat is protected in some form of conservation ownership, there are key sections of optimal habitat that remain unprotected.

The high-quality central portion of the Cape May peninsula on the New Jersey side has been the focus of land conservation acquisition as part of the Cape May National Wildlife Refuge, though the map shows that there are significant gaps in the existing refuge boundaries. Likewise, there are small pockets of optimal/suitable habitat along the northern Delaware Bayshore of the New Jersey side (e.g., Fortescue and Gandy's Beaches) that are largely unprotected.

The unprotected status of these areas minimizes the likelihood that the habitats there will be actively managed for their resource values, and necessitates a greater focus of conservation and restoration efforts to maintain those values. These "conservation gaps" are included in our proposal.

The selected beach restoration sites were all identified and evaluated in a 2008 study done for the American Littoral Society by Rutgers University.

From a perspective of increasing community resilience, the restoration sites are adjacent to hard-hit communities along the Bayshore. Each was identified as a priority area for measures to increase protection from future storms through a FEMA sponsored Long Term Recovery Team program. Significant damages were incurred, highlighting the need for measures and approaches to ameliorate the vulnerability of the communities, and encourage approaches to adapt to increased future stressors, particularly from sea level rise.

Providing increased resiliency to the habitats and enhancing the role of beach and tidal wetland environments in contributing to reducing community vulnerability relies on a sustainable approach to nourishing the beaches and marshes. Each of the proposed restoration sites was identified, in part, due to its proximity to a sediment source in the form of navigation channels or other watercourses, as is discussed further in the next section.

Sustained Benefits

The restoration of critical habitat utilized by migratory shorebirds has been identified by the leading resource agencies and researchers as a key part of the recovery strategy for threatened species such as the red knot. Our work on the stopover beaches of Delaware Bay last spring established the value of this strategy, as beaches destroyed by the storm that we restored were heavily used by spawning horseshoe crabs and migrating shorebirds. The value of this work was directly measured by shorebird biologists from, among others, the USFWS last spring. As this work contributes to the overall recovery and stabilization of both the horseshoe crab and shorebird populations, it provides a clearly measurable and sustainable benefit to priority species.

The vulnerability of Bayshore communities has been a known issue for many years, one which has been brought into stark relief by the impact of Hurricane Sandy. One of the lessons throughout the storm-impacted region was that the presence of robust beach berms and dune systems helped to minimize damage to adjacent communities. Despite the long-standing vulnerability of these rural communities, historically there have been no federally supported beach nourishment projects, as seen along New Jersey's Atlantic Coast. A measurable

benefit of our proposal is that in addition to its habitat restoration benefits it will also make hazard reduction available to the Bayshore towns where it has been never been provided before.

The communities of the Delaware Bayshore are tied to the Bay, both culturally and economically. Significant businesses still ply the waters in traditional pursuits of fishing and commercial shellfisheries. These businesses are dependent upon navigable waterways providing access to and from their home ports to the Bay: Fortescue, Bivalve, and Money Island. As in the case of beach nourishment priorities, the rural and far away location of the bay's rivers and communities often leaves them at the end of the funding priorities when it comes to maintaining non-federal channels, despite the importance of these to the economic resiliency of the towns. This is further compounded by the traditional complexity and difficulty of siting disposal facilities or opportunities for the dredged material. By effectively providing for beneficial reuse opportunities, our proposal will directly strengthen the economic recovery and resiliency of the Bayshore communities and businesses by facilitating necessary maintenance of the navigation channels. The New Jersey Department of Transportation, which manages the dredging of state navigation channels, has expressed support for our proposal. Their active participation provides a tremendous opportunity for the development of a lasting program.

The tidal salt marshes of the Delaware Bay provide critical habitat for multiple estuarine species, improve water quality, and as demonstrated by Hurricane Sandy provide additional storm hazard reduction benefits to coastal communities. However, these valuable resources are threatened by inundation due to sea level rise and subsidence, and erosion from coastal storm damage and the loss of fronting beach berms and dune systems. Our project, through the beneficial reuse of dredge materials, will help to offset these stressors on the tidal marshes at the project sites. Restoring the marshes will provide a substantial benefit, both ecologically and by advancing the use of nature-based approaches to community resiliency.

Each of our restoration projects will include a feasible method to sustain the restoration projects, requiring minimal future investment and thus create a more resilient shoreline, capable of responding to increasing environmental stresses being currently observed and felt. As introduced above, the proposed project will advance two new approaches to enhancing both natural and community resiliency. By linking restoration projects to dredging activities on the Bay's five navigable waterways, these projects will create a regular input of sand and silt to maintain restoration achievements. The approach will also support a key economic need: the maintenance of navigable channels in support of the Bayshore's recreational and commercial fishing industries and communities. A current impediment to maintenance of navigation channels is that locations to place dredged materials must lie within a cost-effective distance from the dredging site. Under a traditional model in which this part of dredging is considered "disposal," this becomes an often insurmountable hurdle particularly when coupled with the environmental issues associated with traditional disposal practices. We include in our proposal a new method of beneficial use of silts to facilitate dredging projects, often stalled by the lack of safe disposal sites. With thin layer application of silts we can restore marshes damaged by the effects of sea level rise and abandonment of salt hay impoundments, as well as facilitate the restoration and maintenance of navigable channels which provide critical infrastructure for local industries.

A second practice to promote resiliency will be created through the use of oyster beds and cultivated oyster structures to reduce wave impacts on the horseshoe crab beaches and communities. Oyster reefs can serve as nature-based breakwaters that reduce erosion of both sandy and peat shorelines along the Delaware Bay and can help protect restoration investments. By utilizing oyster aquaculture structures in concert with restored reefs, the project will produce marketable oysters and will be maintained by oysterman to ensure long-term sustainability of structures, as well as leverage their interest to maintain the ecological and resiliency benefits of the project. The engagement of the local oysterman will directly aid in the economic resiliency of the region, as the cultivation of oysters for ecological and community resiliency benefits open new markets to an industry suffering from the impacts of disease, historic overharvest and environmental degradation of the Bay.

In the immediate aftermath of Hurricane Sandy, the National Fish and Wildlife Foundation, the US Fish and Wildlife Service, and private foundations from New Jersey, Philadelphia and elsewhere, as well as national conservation organizations invested in the emergency restoration of the horseshoe crab and shorebird beaches, to great success; the American Littoral Society and Conserve Wildlife Foundation managed those efforts. That investment restored fully destroyed beaches to amazing habitat quality and productivity. However, the restoration was not comprehensive, due in part to limited funding and in part due the short time frame prior to the arrival of the horseshoe crabs and the red knots: it was truly a race against nature's clock. This proposal, if successful, will allow us to build on the investments to date, and extend the successes of last spring to a more comprehensive reach of critical habitats and vulnerable communities.

Leveraging: Through its internal DOT Mitigation Funding, the USFWS has committed resources to the restoration of migratory shorebird beaches on the Delaware Bay. We have been working in close consultation with the Service to coordinate that project with those included in this proposal. The coordination of the work will extend the area of habitat restored significantly. Further, our proposal to establish an ongoing program of utilizing dredged material to re-nourish the horseshoe crab beaches will support the federal investment in the beach habitats beyond the period of this grant.

The impacted communities are aggressively seeking measures to both help them recover, physically and economically, from Hurricane Sandy. Our proposal has been developed in conversation with them, and will provide added elements of resiliency to future strategies and approaches.

Establishing a beneficial reuse of dredged materials will support the efforts to restore economic vitality to the bay industries in the impacted ports. Projects proposed for the near future will benefit from short-term opportunities to integrate the end use of their materials into the habitat restoration projects.

Speed to Functionality:

Our successful restoration of the Reeds Beach-Pierce's Point section of the Bayshore last spring demonstrated that we are able to bring these projects on-line quickly, backed by the support of the relevant resource and regulatory agencies. Dependent on the availability of funding, we are prepared to begin work rebuilding and expanding these sections this spring.

The New Jersey Department of Transportation, which manages the dredging of the state's navigational channels, estimates that should this proposal be successful, and appropriate beneficial use site characterization completed, projects in several locations could start in the fall of 2014.

C. Youth and/or Veteran Engagement

To ensure that people of the Delaware Bayshore understand how this project will increase community resiliency, we propose an education and outreach program focused on three key bayshore species: horseshoe crabs, shorebirds and oysters. To accomplish this, we proposed to expand and adapt our existing education programs to engage Delaware Bayshore youth and veterans.

For the past 5 years, the American Littoral Society has partnered with Rutgers University's Haskins Shellfish Lab on this project that provides education about oysters and their importance to the environment, economy, and history of the Delaware Bayshore. We propose to update the existing curriculum with information about the proposed wave attenuation reef at Moore's Beach and to provide opportunities to help build the reef.

We will deliver a complementary program focused on horseshoe crabs that combines hands-on, classroom based and field-based activities. The new "trainees" will then participate in the horseshoe crab spawning surveys.

The Delaware Bayshore region has a very strong Veteran culture. In fact, the Littoral Society's own Bayshore conservation coordinator served with the U.S. Army Rangers prior to joining our staff. We propose to offer part-time internships to local veterans, assisting with the surveying and monitoring components of the project. Prior to beginning the program, each intern will attend a workshop about the benefits of the projects in which they will work to the community, habitats, and wildlife of the Delaware Bayshore.

Through our project partner, the Conserve Wildlife Foundation, we propose to expand the state's Shorebird Stewards program – which recruits, trains, and coordinates seasonal volunteers for Delaware Bayshore shorebird banding and public restrictions from sensitive beaches. CWF has managed the State's Shorebird Stewards program for the past decade. We would design the expansion to enlist students in active and hands-on roles within the project and in community interaction.

We will undertake a Community Engagement campaign that educates, informs, and engages local Delaware Bayshore residents in support of our team's restoration initiatives. This will include hosting a public event, inviting key audiences within the Delaware Bay communities and educating residents on issues like beach restoration, ecological resiliency, and long-term challenges to the Bayshore.

D. Collaboration and Partnerships

Stakeholders have been extensively involved in discussions which supported this proposal. We have met directly with, and gained support from a wide range of resource agencies, local community leaders and leading academic institutions. Of note is the direct involvement of the New Jersey Department of Environmental Protection, the NJ Department of Transportation and the US Fish and Wildlife Service. Project partners include Larry Niles & Associates, LLC; Conserve Wildlife Foundation; Partnership for the Delaware Estuary, Richard Stockton College; New Jersey Institute of Technology (NJIT); Rutgers University, Manomet Center for Conservation Sciences, many of whom are providing significant in-kind support and cash match.

E. Work Plan & Logistics

The project team includes the same biologists, coastal geologists and contractors responsible for the restoration of five beaches funded by NFWF in 2013. American Littoral Society staff (Tim Dillingham, Renee Brecht, Al Modjeski), will provide overall supervision of the project, including management of expenses, contractors, permitting and educational and community outreach programs . LJ Niles Associates (Lawrence Niles PhD, Dianne Daly and Joseph Smith PhD) will develop the justification and materials for permits, develop project designs, execute each project in the field and conduct the follow up assessment of each project. This work will be supported by Stephen Hafner and Stew Farrell PhD from Stockton College's Coastal Research Center providing coastal engineering, survey and designs. Conserve Wildlife Foundation of New Jersey (David Wheeler, Ben Wurst, Larissa Smith) will provide restoration and management support on select beaches within the project, as well as developing the Shorebird Steward Expansion program and the Community Engagement initiative. Biologists from the NJ Division of Fish and Wildlife (Amanda Dey in the Endangered and Nongame Species Program and Jason Herrin in the Bureau of Shellfisheries) will integrate the project into existing state efforts. The NJDOT will manage the operational aspects of the dredging projects and beneficial use of silt and sand, and remove rubble from the beach in Fortescue. Staff from Partnership for Delaware Estuary (Jen Atkins and Danielle Kreeger) will assist in assessing the thin layer application of silts to damaged marshes. Bart Wilson, working on the restoration of damaged marshes in Delaware will supervise the thin layer application of silt. Scientists from NJ Institute of Technology (Nancy Jackson PhD), USGS (David Smith PhD), Stockton

University (Dan Barone PhD) and Rutgers University (Dave Bushek PhD, Joanna Burger PhD) will conduct projects on the movement of sand, construction of oyster reefs, evaluate progress and outcomes. Barney Hollinger, oysterman and a member of the Shellfisheries Council of NJ, will undertake the aquaculture construction.

b. Work Plan

Once awarded, the project will begin on or about May 1, 2014. All restoration work will be completed on or about April 30, 2016.

Beach/Marsh Restoration Projects work plan

The comprehensive nature of this project makes the interrelationships between work plans for each of the interrelated sites complex. However, each restoration site will follow a similar work plan, modified as appropriate for the specific site conditions and goals (responsible party in parentheses):

Property surveys, engineering designs and permit applications (ALS): Each restoration site will be assessed to determine property ownership and boundaries in relationship to the work area. Land owners will be contacted and permission secured to work on the site. We have already developed optimal beach profiles for the majority of the sites, working with Stockton College. The beach profile designs account for our knowledge of optimal conditions for horseshoe crab spawning. Additionally, we have post construction surveys from our work last spring which will inform both the design and the permitting. Engineering designs will be prepared in consultation with our state and federal partners and, to the extent necessary, permit applications developed and reviewed jointly.

Site demolition and preparation (rubble removal) (ALS, State of NJ)

The Fortescue Beach site has extensive rubble on the beach. The NJ Department of Transportation has agreed to remove this in conjunction with post storm rebuilding of an adjacent roadway. To the extent there are structures or materials that would interfere with the restoration or utilization by the crabs, we will remove with partners: either volunteers or municipal/county authorities.

Sand placement and grading (ALS)

Regional sand and gravel contractors will deliver the sand to the restoration sites, and mechanically spread in accordance with the beach profile designs. The onsite spreading will be supervised by Stockton College staff to insure the design elevations and profile are achieved.

Dredge mobilization and channel dredging; placement on beach and marsh (NJ Department of Transportation)

Dredging of the identified channels, and the placement of the materials either on the beach restoration sites (sand) or on marsh restoration sites (silts) will be provided by the NJDOT, in accordance with design plans developed by our partnership.

Post construction monitoring (Partnership for the Delaware Estuary/Stockton College/NJIT)

The physical aspects, as well as biological metrics, will be monitored by the Partnership for the Delaware Estuary (marsh restoration sites) and Stockton College/NJIT (beach restoration and sediment movement). Monitoring reports will be developed at regular intervals following data collection, and used to assess the

success of the projects.

Oysters:

Oyster reef site survey, permit applications (ALS)

The reef restoration site is located on an existing oyster harvest lease area, and we are working directly with the lease holder. We will work within the boundaries of his existing permits to the extent possible, and develop designs for the placement, elevation and distribution of added shell collaboratively

Shell purchase/collection/placement on reef site (ALS)

Shell for the reef will be acquired through a variety of approaches including commercial purchase and donation. It will be placed on the reef through a combination of commercial operator and volunteer efforts.

Aquaculture structure placement: permitting (if any), construction (ALS)

The proposed aquaculture structures will be placed adjacent to already permitted structures, and should be accommodated within those permitted sites.

Proposed Schedule

KEY PROJECT ELEMENTS/MILESTONES *Trucked/Barged **Dredged ***Harvested	**Year 1** May 2014– April 2015				**Year 2** May 15 – April 16			
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
*South Reeds - Pierces Point Site 20,000 cubic yards sand applied			■					
*Moores Beach – 15,000 cubic yards sand applied			■					
*Thompsons Beach – 45,000 cubic yards sand applied			■					
*East Point Lighthouse – 32,000 cubic yards sand applied					■			
*Fortescue Beach Rubble Removal	■							
*Fortescue Beach Restoration – 55,000 cubic yards sand applied					■			
*Reeds Community Beach – 10,000 cubic yards sand applied							■	
**Bidwells Creek (Beach & Marsh Restoration) 25k cu yds sand/20 cu yds silt				■				
***Lower Cape Shore 30,000 cubic yards sand applied					■			
**Gandys Beach/Money Island – 20K cu yds sand/20K cu yds silt								■
Cox Meadow Restoration Plan and Design								■
Egg Island Restoration Plan and Design								■

c. Monitoring and Measuring Performance:

In addition to measuring outcomes of beach restoration mileage and acreage of salt marsh and oyster restoration, we will incorporate a suite of measures within each restoration project that will allow for robust assessment of project achievements (see table). These measures will also provide a basis for adaptive management that can improve the performance of in-progress and future restoration projects. All monitoring will incorporate before-after control-impact experimental design which maximizes the insights gained by incorporating time and treatment controls into project monitoring. For beach restoration, these measures include monitoring beach profiles to examine sand gains and losses before and at several intervals after restoration. We will measure shorebird activity, horseshoe crab spawning activity, egg abundance and egg development at each beach. We will develop quality assurance protection plans (QAPPs) for monitoring components as required. Because we are working at numerous beaches and we are examining bay-wide sand movement patterns, the insights gained from our monitoring will be the basis for strategic beach habitat management well into the future. In addition to the above metrics, experimental sand harvesting will incorporate careful assessment of the impact of intertidal harvesting on benthic invertebrates. Salt marsh restoration projects will have a similar suite of metrics. We will measure elevations before and at several intervals after thin-

spread application of dredge material. Biological response to restoration will be measured by examining plant species composition, plant density, above and below ground biomass, and invertebrate monitoring. All monitoring results will be summarized quarterly and will be reported to the project steering committee in order to make adaptive management decisions for ongoing and future projects. The results of the monitoring regime will inform the methodological approach of the two restoration planning projects in our proposal (Cox Meadow and Egg Island).

d. Return on Investment: The return on investment for this project will affect every community along the Delaware Bayshore from Gandy's Beach in Cumberland County to Villas in Cape May County both economically and ecologically. The restoration of horseshoe crab habitat will speed the restoration of crabs thus providing a long term economic gain for the ecotourism economy ($35, 000,000 with multipliers) and the lysate industry ($200,000,000 estimated). The restoration of community beaches will help reduce the risks to millions of dollars of potential damage. Facilitating the dredging of creeks will create a firmer footing for the oyster industry and recreational and commercial fishing fleets. Finally, the beach restored in this project will add a new economic gain because they will be available for resident and tourist use outside the period necessary for shorebird sand horseshoe crab use. The most immediate economic impact of our work will come from the nearly $4 million in contracts to local companies creating many local machine operator and trucking jobs, not a small influence in the poorest county in NJ.

The ecological return on investment for this bay-wide restoration program will be incalculable. Directly we will hasten the restoration of the critically endangered red knot and damaged population of horseshoe crabs. In a draft business plan done for NFWF by red knot biologist from the entire flyway, the restoration of the Delaware Bay was seen as the most important of all actions that could occur in the birds 10000 mile long migratory journey. Our project will restore stable ecological function to over 10 miles of bayshore habitat including repairing damaged beaches and marshes that are fundamental to the long term productivity of the bay. Restoring ecological function to the bay will help underpin all resource related economic activities.

e. **Risk**
Because of the nature of the projects (beach nourishment, marsh restoration, oyster reef construction), there is little risk of failure that would create conditions potentially more dangerous than the status quo.

f. Permits and Approvals: Design and Permitting
Designs and engineering documents required for permitting for five sites have already been completed including: South Reeds –Pierce's Point, Moore's Beach, Thompsons's Beach, East Point Light House Beach and Fortescue Beach.

Design and engineering documents for Reeds's Community, Bidwells Creek Dredging, Gandy's - Money Island Beach and Marsh Restoration and South Cape Shore Sand Harvesting project will begin in June –August 2014 and be completed within 6 months.

Design and permitting requirements for Cox Meadow and Egg Island will be in June 2015.

Safety: Staff, youth, veterans, and volunteers will follow local, State and Federal (including DOI) safety standards and will be equipped with standard safety equipment and personal protective equipment; Additionally Job Hazard Analysis will guide on-the job training needs, and needed training will be provided (OSHA, CPR, First AID, etc.).

GANDYS BEACH
&
MONEY ISLAND
FORTESCUE
EGG ISLAND
EAST POINT
THOMPSONS
BEACH
REEDS BEACH
MOORES BEACH
NEW
JERSEY
Map area
REEDS BEACH
PIERCES POINT
CAPE SHORES
OVERVIEW OF RESTORATION SITES
DELAWARE BAY OF NEW JERSEY
Cape May and Cumberland Counties, New Jersey
Salt marsh restoration area
Beach restoration area
Dredging for navigation

Map area
GANDY'S BEACH AND MONEY ISLAND
Downe Township
Cumberland County, New Jersey
Beach and salt marsh restoration area
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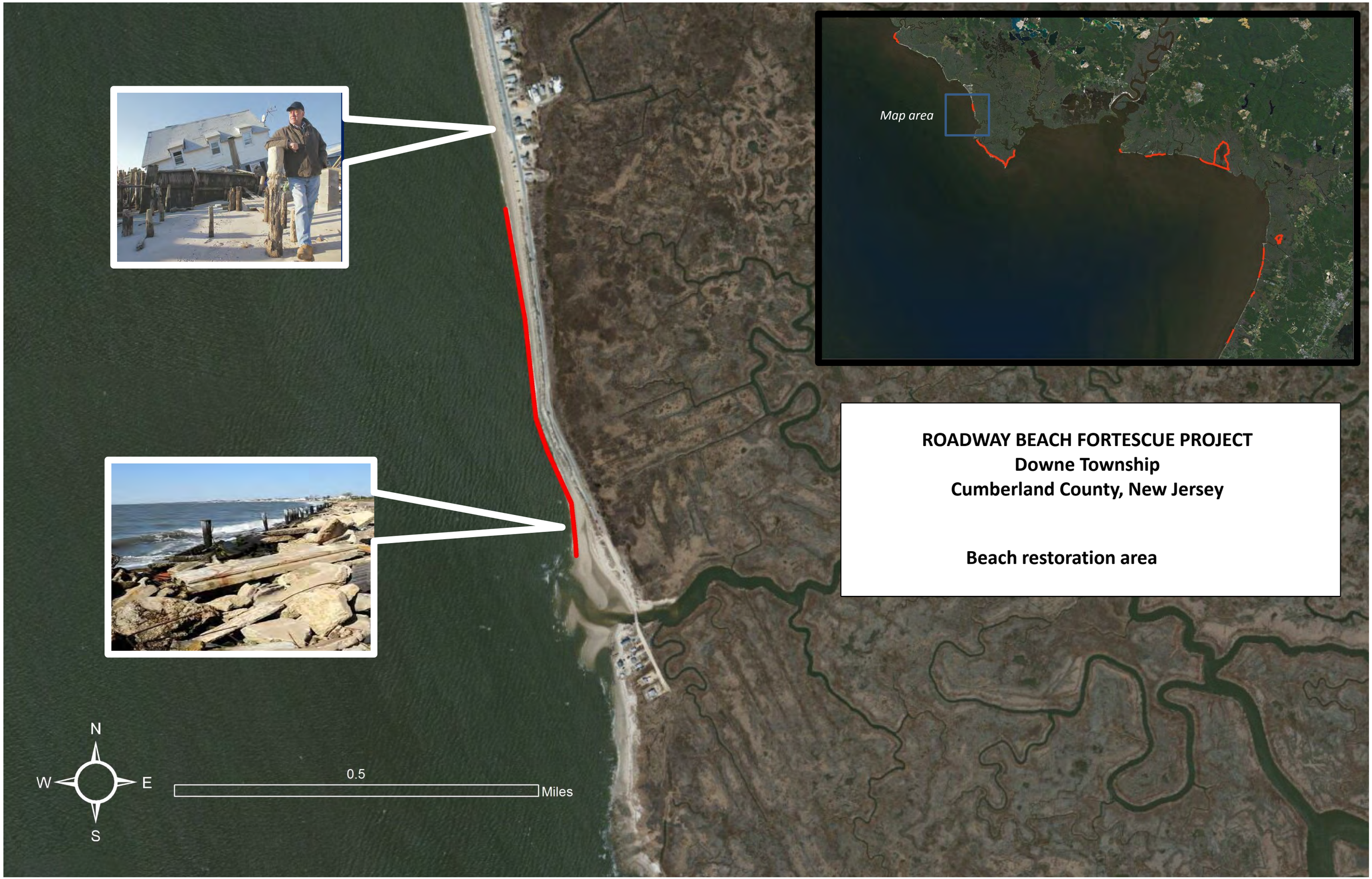

ROADWAY BEACH FORTESCUE PROJECT
Downe Township
Cumberland County, New Jersey

Beach restoration area

EGG ISLAND PROJECT
Downe Township
Cumberland County, New Jersey

- 1930 shoreline
- 1970 shoreline
- 1995 shoreline

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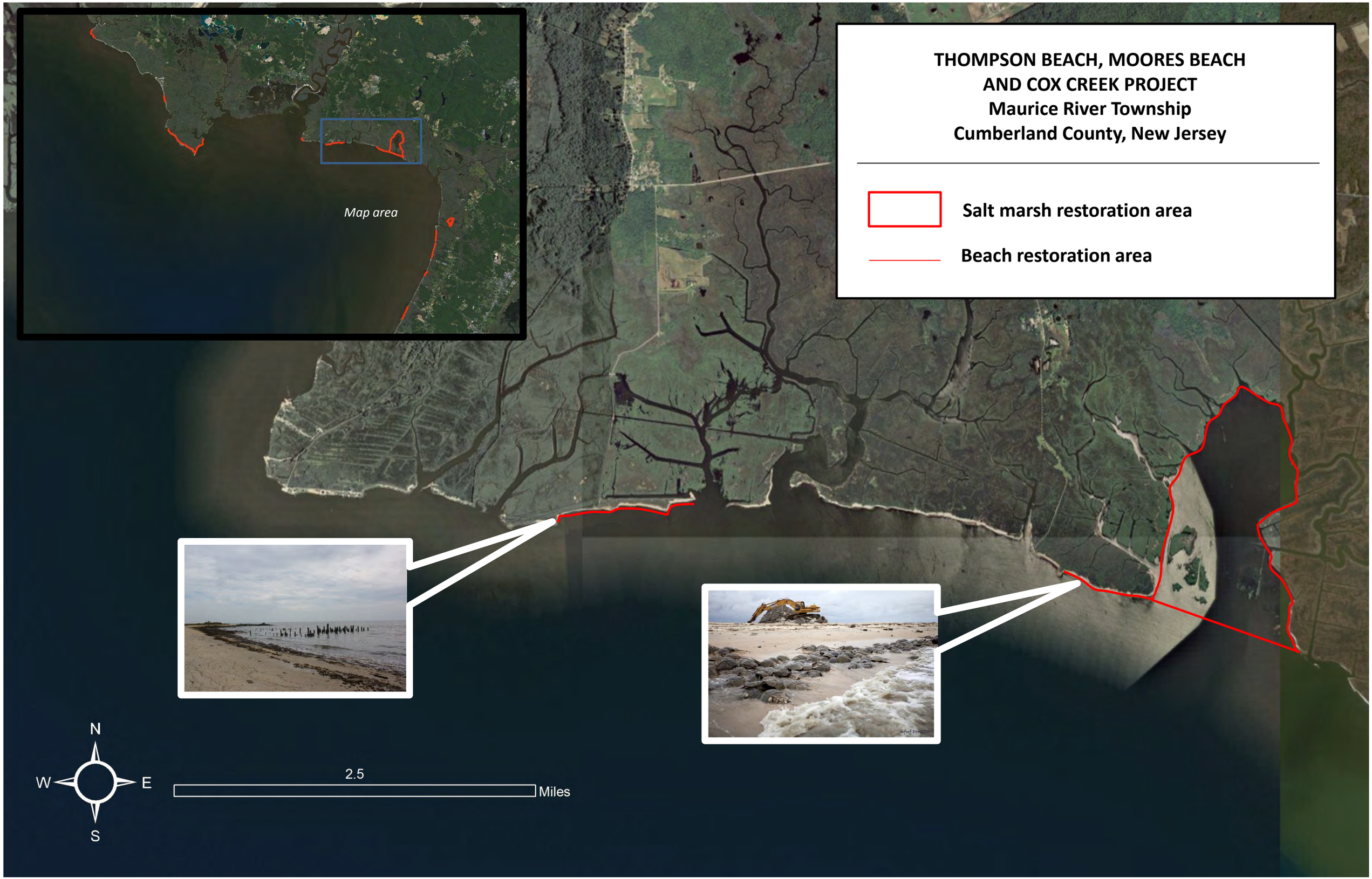
THOMPSON BEACH, MOORES BEACH
AND COX CREEK PROJECT
Maurice River Township
Cumberland County, New Jersey
Salt marsh restoration area
Beach restoration area
Map area
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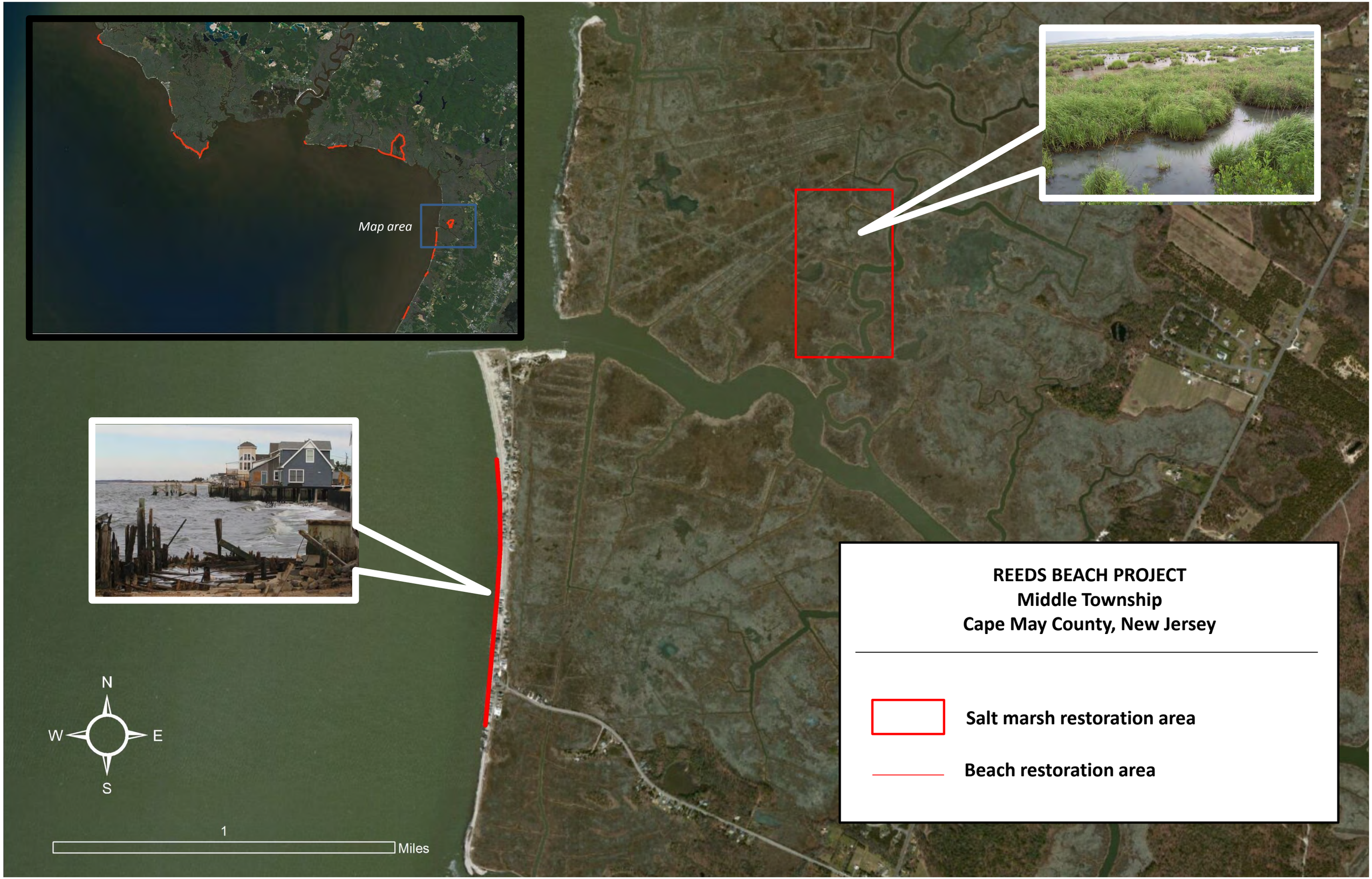
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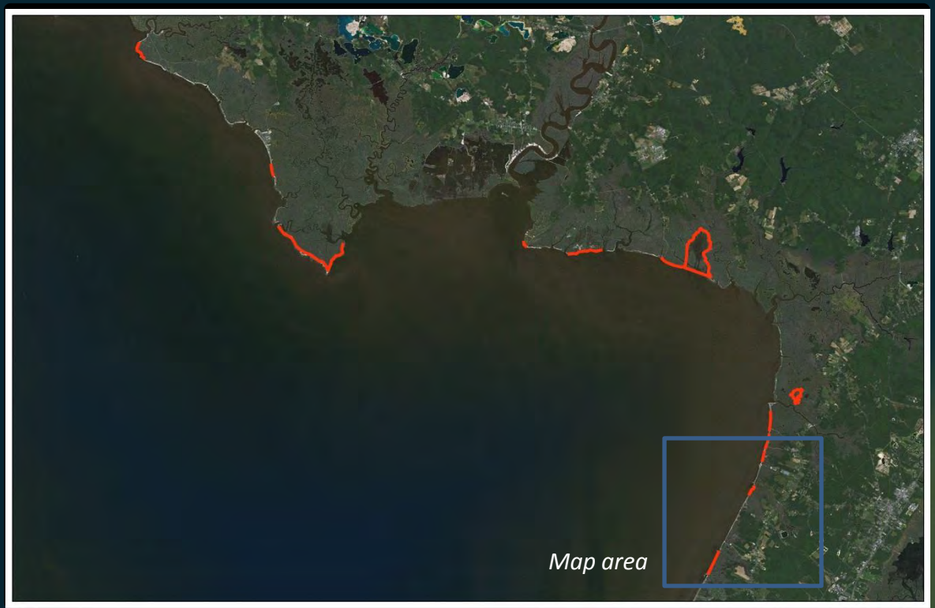
REEDS BEACH PROJECT
Middle Township
Cape May County, New Jersey
Salt marsh restoration area
Beach restoration area



S. REEDS BEACH, COOKS BEACH, KIMBLES BEACH AND PIERCES POINT
PROJECT AREA
Middle Township
Cape May County, New Jersey

Salt marsh restoration area

Beach restoration area

AMERICAN LITTORAL SOCIETY

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Letters of Support
Creating Resilient Habitats and Communities on Delaware Bay

Senator Robert Menendez
Congressman Frank LoBiondo
NJ Senator Jeff Van Drew
Assemblyman Sam Fiocchi
Director Joseph Derella, Cumberland County Board of Chosen Freeholders
Robert G. Brewer, Cumberland County Planning Department
Elizabeth Semple, Manager, Division of Coastal & Land Use Planning, NJ DEP
Russell J. Fumari, Chair, NJ Corporate Wetlands Restoration Partnership
Jennifer A. Adkins, Executive Director, Partnership for the Delaware Estuary
Robert Campbell, Mayor, Downe Township
Resolution 29-2014 Enacted by Maurice River Township
Middle Township
Elder Point Oyster Company
Citizens United to Protect the Maurice River and Its Tributaries
Eric Schrading, Field Supervisor, US Fish and Wildlife Service

ROBERT MENENDEZ
NEW JERSEY

COMMITTEES:
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FINANCE
FOREIGN RELATIONS

United States Senate

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January 29, 2014

David O'Neill
Vice President, Conservation Programs
National Fish & Wildlife Foundation
1133 15th Street NW #1100
Washington, D.C. 20005

Dear Mr. O'Neill:

The American Littoral Society and the Conserve Wildlife Foundation of New Jersey are submitting an application for funding from the National Fish & Wildlife Foundation's Hurricane Sandy Coastal Resiliency Competitive Grant Program. I write to you to offer my strong support for their proposal and respectfully request that you give due consideration to their application.

If funded, the American Littoral Society and the Conserve Wildlife Foundation of New Jersey plan to conduct a Delaware Bayshore Beach Restoration Project. This project would focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in both Cape May County and Cumberland County. The proposed project is an expansion of emergency beach restoration that was undertaken in 2013 along New Jersey's battered Delaware Bayshore. The proposed funding would be critical for not only restoring the vitality of the region's natural habitat for shore birds and breeding horseshoe crabs, but it would also help to reinforce a unique natural system which helps to protect New Jersey's rural Bayshore communities.

Hurricane Sandy hit New Jersey's coastline and natural habitats hard. The previous project was able to restore over a mile of beaches which had been stripped of sand and littered with debris and waste. The proposed funding from the Hurricane Sandy Coastal Resiliency Competitive Grants Program would allow the Delaware Bayshore Beach Restoration Project to refurbish even more of New Jersey's natural habitat that is so critical to wildlife. The funding would also help protect rural communities, as the beaches act as a natural barrier against future storms. Without the proposed funding, the New Jersey Delaware Bayshore would be at an increased risk from storms and suffer both short and long-term ecological detriment. It is therefore of serious importance that the restoration process continues as the future of the Delaware Bayshore region is tied to the health and ecological diversity of the Delaware Bay and its Coast.

For these reasons, I strongly support the Delaware Bayshore Beach Restoration Project's proposal for funding from the Hurricane Sandy Coastal Resiliency Competitive Grant Program. I thank you in advance for giving the American Littoral Society and the Conserve Wildlife Foundation's application its due consideration.

Sincerely,

ROBERT MENENDEZ
United States Senator

FRANK A. LOBIONDO
2ND DISTRICT, NEW JERSEY

TRANSPORTATION AND INFRASTRUCTURE
CHAIRMAN, AVIATION
COAST GUARD AND MARITIME TRANSPORTATION
HIGHWAYS AND TRANSIT

Congress of the United States
House of Representatives
Washington, DC 20515–3002

ARMED SERVICES
TACTICAL AIR AND LAND FORCES
READINESS

HOUSE PERMANENT SELECT COMMITTEE ON INTELLIGENCE
TECHNICAL AND TACTICAL INTELLIGENCE
TERRORISM, HUMINT, ANALYSIS AND COUNTERINTELLIGENCE (THACI)

January 28, 2014

Mr. David O'Neill, Vice President
Conservation Programs
National Fish & Wildlife Foundation
Attn: Hurricane Sandy Coastal Resilience Competitive Grants Program
1133 15th Street, NW #1100
Washington, D.C. 20005

Dear Mr. O'Neill:

I am pleased to write this letter of support on behalf of the American Littoral Society and the Conserve Wildlife Foundation of New Jersey's application for funding under the Hurricane Sandy Coastal Resilience Competency Grants Program.

It is my understanding the restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May and Cumberland Counties. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore birds while also strengthening an irreplaceable natural system which helps protect rural Bayshore communities.

The proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware Bayshore in an effort to repair the devastation left by Hurricane Sandy. This project prepared the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the Bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoecrab's breeding season.

It is important this restoration process continues as the future of the Delware Bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent and focused effort at restoration the shoreline will suffer long term ecological detriment, Bayshore communities will be at increased risk from storms, and local industries will suffer financially.

Sincerely,

Frank A. LoBiondo
Member of Congress

FAL:cm:ml

MAYS LANDING OFFICE:
5914 MAIN STREET, SUITE 103
MAYS LANDING, NJ 08330-1746
PHONE: (609) 625-5008
PHONE: (800) 471-4450
FAX: (609) 625-5071

WASHINGTON OFFICE:
2427 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-3002
PHONE: (202) 225-6572
FAX: (202) 225-3318
www.lobiondo.house.gov

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21 North Main Street
Cape May Court House, NJ 08210
Phone: (609) 465-0700
Fax: (609) 465-4578

1124 N. High Street
Millville, NJ 08332
Phone: (856) 765-0891
Fax: (856) 765-0897

DR. JEFF VAN DREW
SENATOR
First Legislative District
SenVanDrew@njleg.org

SGT. BOB ANDRZEJCZAK
ASSEMBLYMAN
First Legislative District
AsmAndrzejczak@njleg.org

Date 1/30/2014

David O'Neill, Vice President, Conservation Programs
National Fish & Wildlife Foundation
Attn: Hurricane Sandy Coastal Resiliency Competitive Grants Program
1133 15th St NW #1100
Washington, DC 20005

Re: Letter of Support Regarding the Delaware Bayshore Beach Restoration Project

Dear Mr. O'Neill,

The First Legislative District supports the Bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey for funding through the Hurricane Sandy Coastal Resiliency Competitive Grant Program. This restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore birds while also strengthening an irreplaceable natural system which helps protect rural Bayshore communities.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware Bayshore in an effort to repair the devastation left by Hurricane Sandy. This project prepared the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the Bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoe crab's breeding season.

It is of paramount importance that this restoration process continues as the future of the Delaware Bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent and focused effort at restoration the shoreline will suffer long term ecological detriment, Bayshore communities will be at increased risk from storms, and local industries will suffer financially.

Sincerely,

Jeff Van Drew
Senator First Legislative District

January 30, 2014

National Wildlife Foundation
Attn: Renee Brecht

Re: Letter of Support Regarding the Delaware Bayshore Beach Restoration Project

To whom it may concern:

Sam Fiocchi supports the bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey. This restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore birds while also strengthening an irreplaceable natural system which helps protect rural Bayshore communities.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware bayshore in an effort to repair the devastation left by Hurricane Sandy. It was a project intended to prepare the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoecrab's breeding season.

It is of paramount importance that this restoration process continues as the future of the Delaware bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent and focused effort at recovery and restoration of the bayshore coastline the bay will suffer long term detriments ecologically, bayshore communities will be at increased risk from storms, and local industries will suffer financially.

Sincerely,

Assemblyman Sam Fiocchi
First Legislative District

The Board of Chosen Freeholders
County of Cumberland
State of New Jersey

790 East Commerce Street
Administration Building
Bridgeton, New Jersey 08302

Phone: (856) 453-2125
Fax: (856) 451-8243

Joseph Derella, Director
Douglas M. Long, Esq., Deputy Director
Darlene Barber, Freeholder
Carol Musso, Freeholder
James Sauro, Freeholder
Thomas L. Sheppard, Freeholder
Tony Surace, Freeholder

Ken Mecouch, Co. Administrator,
Clerk to the Board
Kimberly E. Wood, Deputy Co. Administrator

Theodore E. Baker, Co. Counsel

January 29, 2014

Ms. Mandy Chesnutt
National Fish & Wildlife Foundation
1133 Fifteenth St., NW Suite 1100
Washington DC 20005

Dear Ms. Chesnutt:

On behalf of the Cumberland County Board of Chosen Freeholders I am pleased to support the bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey.

This proposed project expands on earlier efforts from 2013 when an emergency beach restoration project was undertaken along New Jersey's Delaware bayshore. The project was implemented in an effort to repair the devastation left by Hurricane Sandy. This project was intended to prepare the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the bayshore region to feed on the horseshoe crab eggs. Due to the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoe crab's breeding season.

It is very important that this restoration process continues. Without a consistent and focused effort to restore the bayshore coastline, the bay will suffer long term detriments ecologically, and the bayshore communities will be at risk from storms which will ultimately impact the local businesses and industry located in the area.

As a result of the above mentioned information, the County of Cumberland wholeheartedly supports this application and would greatly appreciate any and all consideration you may provide to same.

Sincerely,

Joseph Derella,
Director

JD:kew
Cumberland County Board of Chosen Freeholders

COUNTY OF CUMBERLAND
DEPARTMENT OF PLANNING
790 EAST COMMERCE STREET
BRIDGETON, NEW JERSEY 08302

Kimberly E. Wood
Deputy County Administrator

Robert G. Brewer P.P., AICP
Planning Director

Mandy Chesnutt
National Fish and Wildlife Foundation
1133 Fifteenth St., N.W., Suite 1100
Washington, D.C. 20005

January 29, 2014

Re: Letter of Support Regarding the Delaware Bayshore Beach Restoration Project

Dear Ms. Chesnutt:

I am writing to support the bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey. This restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County – East Point, Gandys Beach, Money Island, Moores Beach, Reeds Beach and Pierces Point. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore birds while also strengthening an irreplaceable natural system which helps protect rural Bayshore communities.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware bayshore to repair the devastation left by Hurricane Sandy. That project prepared the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoe crab's breeding season.

It is of paramount importance that this restoration process continues as the future of the Delaware bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent effort focused on recovery and restoration of the bayshore coastline, the bay will suffer long term ecological damage; bayshore communities will be at increased risk from storms; and local industries will suffer financially.

It is my hope that the National Fish & Wildlife Foundation will respond favorably to the American Littoral Society's proposal.

Respectfully,

Robert G. Brewer

Phone: (856) 453-2175
Fax: (856) 453-9138
www.co.cumberland.nj.us

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF COASTAL AND LAND USE PLANNING
P.O. Box 420, 401 East State Street
Mail Code 401-07B
Trenton, New Jersey 08625-0420
Telephone: (609) 984-0058
Fax: (609) 633-0750

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

David O'Neill, Vice President
National Fish & Wildlife Foundation
Conservation Programs
1133 15th St NW #1100
Washington, DC 20005
Attn: Hurricane Sandy Coastal Resiliency Competitive Grants Program

Re: Letter of Support Regarding the Delaware Bayshore Beach Restoration Project

Dear Mr. O'Neill:

New Jersey Department of Environmental Protection, Office of Coastal and Land Use Planning supports the Bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey for funding through the Hurricane Sandy Coastal Resiliency Competitive Grant Program. This restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore birds while also strengthening an irreplaceable natural system which helps protect rural Bayshore communities.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware Bayshore in an effort to repair the devastation left by Hurricane Sandy. This project prepared the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the Bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoecrab's breeding season.

It is of paramount importance that this restoration process continues as the future of the Delaware Bayshore region is tied to the health and ecological diversity of the Delaware

Bay and its coast. Without a consistent and focused effort at restoration the shoreline will suffer long term ecological detriment, Bayshore communities will be at increased risk from storms, and local industries will suffer financially.

Sincerely,

Elizabeth Semple, Manager
Division of Coastal & Land Use Planning

NJCWRP
NEW JERSEY CORPORATE WETLANDS
— RESTORATION PARTNERSHIP —

c/o R. Furnari, PSEG
80 Park Plaza, MC – T17
Newark, NJ 07102

Corporate Members

PSEG, Chair
AECOM
Amy Greene Environmental
Anheuser-Busch
Arcadis
Bayshore Recycling
Burns & MacDonald
DuPont
Enviroscapes
ExxonMobil Corporation
First Energy (JCP&L)
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Louis Berger Group
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Association of NJ Environmental Commissions
Ducks Unlimited
NJ Audubon
NJ Conservation Foundation
Monmouth University UCI
Partnership for the Delaware Estuary
Richard Stockton College of NJ
Rutgers IMCS
The Conservation Fund
The Nature Conservancy
NJ Association of Aquatic Sciences/Adventure Aquarium - Camden

Government Agencies (Ex Officio)

DRBC
NJBPU
NJDEP
NOAA
NRCS
PA NY/NJ
USEPA
USF&WS

January 31, 2014

David O'Neill, Vice President, Conservation Programs
National Fish & Wildlife Foundation
Attn: Hurricane Sandy Coastal Resiliency Competitive Grants Program
1133 15th St NW #1100
Washington, DC 20005

Re: Letter of Support Regarding the Delaware Bayshore Beach Restoration Project

Dear Mr. O'Neill,

The New Jersey Corporate Wetlands Restoration Partnership (NJ CWRP) supports the Bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey for funding through the Hurricane Sandy Coastal Resiliency Competitive Grant Program. NJ CWRP is part of the Coastal America Foundation and the National Coastal America Partnership.

This restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore birds while also strengthening an irreplaceable natural system which helps protect rural Bayshore communities.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware Bayshore in an effort to repair the devastation left by Hurricane Sandy. This project prepared the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the Bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoe crab's breeding season. NJ CWRP has been involved with several projects in this area over the years and was proud to be one of these partners.

It is of paramount importance that this restoration process continues as the future of the Delaware Bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent and focused effort at restoration; the shoreline will suffer long term ecological detriment, Bayshore communities will be at increased risk from storms, and local industries will suffer financially.

Sincerely,

Russell J. Furnari
Chair, NJ CWRP

C: NJCWRP Membership

Partnership for the Delaware Estuary, Inc.

January 27, 2014

Mandy Chesnutt
National Fish and Wildlife Foundation
1133 Fifteenth St., N.W., Suite 1100
Washington, D.C. 20005

Subject: Hurricane Sandy Coastal Resiliency Competitive Grants Program – Creating Resilient Beach and Marsh on Delaware Bay for Shorebirds and Horseshoe Crabs

Dear Ms.Chesnutt:

On behalf of the Partnership for the Delaware Estuary (PDE), I'm pleased to provide this letter of support for the proposal "Creating Resilient Beach and Marsh on Delaware Bay for Shorebirds and Horseshoe Crabs" that is being submitted by American Littoral Society. As a regional non-profit organization leading science-based and collaborative efforts to improve the tidal Delaware River and Bay, we are extremely supportive of restoration projects that enhance the ecological integrity of coastal wetlands and Bayshore beaches while also building resilience. If this project is supported, we agree to provide a supportive role in characterizing baseline characteristics of the sites and then helping to monitor environmental responses to the project relative to baseline. Successful completion of this project will help advance our goals for clean water goals, healthy habitats, and resilient communities in and around the Delaware River and Bay.

As a National Estuary Program (NEP), PDE is charged with coordinating implementing of the 1996 "Comprehensive Conservation and Management Plan" (CCMP) for the Delaware Estuary". This is a guiding document that includes 77 actions, with a variety of subactions, for improving conservation and management of the Estuary. This project particularly relates to CCMP objectives surrounding land management and habitat and living resources goals. Additionally, PDE also recently completed a five-year strategic plan, which includes a set of goals for our organization over the next five years. One of our new priorities, Objective 1.1b, is to "facilitate or directly implement projects to protect and rebuild tidal wetlands and build coastal resilience in the face of climate change". Hence, this project would help PDE to implement shared goals.

PDE is uniquely positioned to provide expertise for this project, having worked to devise and implement relevant science-based programs such as the Delaware Estuary Living Shoreline Initiative (DELSI) and the Mid-Atlantic Coastal Wetland Assessment (MACWA). For these programs, which are described on our website (delawareestuary.org), PDE has worked with numerous partners to develop just the type of monitoring protocols needed to assess performance of living shoreline and sediment application projects. We also have baseline data and existing fixed stations for salt marsh monitoring that can serve as reference locations for the proposed marsh work

We appreciated the opportunity to express our support for this proposal for funding by the Hurricane Sandy Coastal Resiliency Competitive Grants Program.

Sincerely,

Jennifer A. Adkins
Executive Director

Partnership for the Delaware Estuary: *A National Estuary Program*
110 South Poplar Street, Suite 202, Wilmington, DE 19801
1-800-445-4935 • Tel: 302-655-4990 • Fax: 302-655-4991 • Website: *www.DelawareEstuary.org*

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DOWNE TOWNSHIP
MUNICIPAL COMPLEX

Established 1772

Nature lover's paradise

David O'Neill, Vice President, Conservation Programs
National Fish & Wildlife Foundation
Attn: Hurricane Sandy Coastal Resiliency Competitive Grants Program
1133 15th St NW #1100
Washington,DC 20005

Re: Letter of Support Regarding the Delaware Bayshore Beach Restoration Project

To whom it may concern:

The Township of Downe, Cumberland County supports the Bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey. This restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore bids while also strengthening an irreplaceable natural system, which helps protect rural Bayshore communities.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware Bayshore in an effort to repair the devastation left by Hurricane Sandy. This project prepared the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the Bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoe crabs breeding season.

It is of paramount importance that this restoration process continues as the future of the Delaware Bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent and focused effort at restoration, the shoreline will suffer long-term ecological detriment. Bayshore communities will be at increased risk from storms, and local industries will suffer financially.

Sincerely,

Robert Campbell, Mayor, Downe Township

288 MAIN STREET, NEWPORT, NJ 08345 • 856-447-3100, Fax: 856-447-3533

MUNICIPAL BUILDING, 590 MAIN ST., P.O. BOX 218, LEESBURG, NJ 08327
PHONE: (856) 785-1120 FAX: (856) 785-1974

January 17, 2014

Lawrence Niles PhD
LJ Niles Associates LLC
109 Market Lane
Greenwich, NJ 08323

RE: Resolution 29-2014 – Support of Creating Resilient beach and Marsh on the Delaware Bay for Shorebirds and Horseshoe Crabs

Dear Mr. Niles:

Please find enclosed a sealed copy of Resolution 29-2014 In Support of Creating Resilient Beach and Marsh on the Delaware Bay for Shorebirds and Horseshoe Crabs which was adopted by the Township Committee of Maurice River on January 16, 2014.

Sincerely,

Linda L. Costello

Linda L. Costello
Acting Municipal Clerk

LLC/dlp

cc: Township Committee

MAURICE RIVER TOWNSHIP

RESOLUTION NO. 29-2014

A RESOLUTION IN SUPPORT OF CREATING RESILIENT BEACH AND MARSH ON THE DELAWARE BAY FOR SHOREBIRDS AND HORSESHOE CRABS.

WHEREAS, shoreline restoration has been initiated along the Delaware Bay for the purpose of creating resilient beach and marsh for environmental habitats including shorebirds and horseshoe crabs, and

WHEREAS, the Township of Maurice River realizes salt marshes are a crucial part of our natural infrastructure, shielding communities from the effects of storms and providing vital ecological services, and

WHEREAS, on-going studies and replenishment projects are necessary to restore all of the important horseshoe crab and shorebird beaches in New Jersey and make them resilient to the natural forces of change, and

WHEREAS, recent cooperative efforts of multiple agencies including Conserve Habitat Management and Restoration LLC, American Littoral Society, Conserve Wildlife Foundation of New Jersey, NJ Division of Fish and Wildlife, and Richard Stockton University, Center for Coastal Research have successfully restored beaches damaged by Hurricane Sandy and said agencies propose to expand the project to six Bayshore sites over a four-year period, and

WHEREAS, proposed collaborative efforts include the long-term goal to restore the most important beach and marsh habitat by determining beaches that feed and receive sand, link restoration projects to dredging activities, creation of oyster beds and cultivated oyster structures, and create a more resilient Delaware Bay shoreline to combat the impacts of rising sea levels, and

WHEREAS, proposed projects include restoring sandy beach on Thompson's Beach and a feasibility study to restore Cox Creek mud flat in Maurice River Township to achieve goals of restoration, protection of communities and support for vital economic concerns.

NOW, THEREFORE, BE IT RESOLVED, THAT THE TOWNSHIP COMMITTEE OF MAURICE RIVER TOWNSHIP hereby acknowledges and supports the proposed study and restoration of the Delaware Bay shoreline including Thompson's Beach and Cox Creek mud flat, through collaborative efforts, cooperative studies and multi-level funding sources.

CERTIFICATION

I, Linda L. Costello, Deputy Municipal Clerk of Maurice River Township, a Municipal Corporation of the State of New Jersey, located in the County of Cumberland, do hereby certify that the foregoing is a true and accurate copy of a Resolution adopted by the Township Committee of Maurice River Township at a regular meeting held in the Municipal Building, Leesburg, New Jersey, on January 16, 2014 at 7:30 P.M.

SIGNED: Linda L. Costello

Linda L. Costello, Acting Municipal Clerk

Timothy Donohue
Mayor
Dan Lockwood
Deputy Mayor

Michael Clark
Committeeman
Constance A. Mahon
Business Administrator

MIDDLE TOWNSHIP
"A Safe and Clean Family Community"

January 27, 2013

David O'Neill, Vice President, Conservation Programs
National Fish & Wildlife Foundation
Attn: Hurricane Sandy Coastal Resiliency Competitive Grants Program
1133 15th St NW #1100
Washington, DC 20005

Re: Letter of Support Regarding the Delaware Bayshore Beach Restoration Project

Dear Mr. O'Neill,

The Township of Middle supports the Bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey for funding through the Hurricane Sandy Coastal Resiliency Competitive Grant Program. This restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore birds while also strengthening an irreplaceable natural system which helps protect rural Bayshore communities.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware Bayshore in an effort to repair the devastation left by Hurricane Sandy. This project prepared the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the Bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoecrab's breeding season.

It is of paramount importance that this restoration process continues as the future of the Delaware Bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent and focused effort at restoration the shoreline will suffer long term

33 Mechanic Street, Cape May Court House, New Jersey / (609) 465-8732 / Fax: (609) 465-4459
www.middletownship.com

ecological detriment, Bayshore communities will be at increased risk from storms, and local industries will suffer financially.

Sincerely,

Constance A. Mahon

Constance A. Mahon
Business Administrator

ELDER POINT OYSTER COMPANY

Farm Raised Oysters

Barney Hollinger
Elder Point Oyster Company
2802 High Street
Port Norris, NJ 08349

1/28/2014

David O'Neill, Vice President, Conservation Programs

National Fish & Wildlife Foundation

Attn: Hurricane Sandy Coastal Resiliency Competitive Grants Program

1133 15th St NW #1100

Washington, DC 20005

Re: Letter of Support Regarding the Delaware Bayshore Beach Restoration Project

Dear Mr. O'Neill,

Elder Point Oyster Co. supports the Bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey for funding through the Hurricane Sandy Coastal Resiliency Competitive Grant Program. This restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore birds while also strengthening an irreplaceable natural system which helps protect rural Bayshore communities.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware Bayshore in an effort to repair the devastation left by Hurricane Sandy. This project prepared the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the Bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoecrab's breeding season.

It is of paramount importance that this restoration process continues as the future of the Delaware Bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent and focused effort at restoration the shoreline will suffer long term ecological detriment, Bayshore communities will be at increased risk from storms, and local industries will suffer financially.

Sincerely,

Barney Hollinger

Barney Hollinger

CU CITIZENS UNITED
to Protect the Maurice River and its Tributaries, Inc.

January 29, 2014

Mandy Chestnutt
National Fish and Wildlife Foundation
1133 Fifteenth St., N.W., Suite 1100
Washington, D.C. 20005

Re: Letter of Support Regarding the Delaware Bayshore Beach Restoration Project

To whom it may concern:

Citizens United to Protect the Maurice River and Its Tributaries, Inc. supports the bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey. This restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shorebirds while also strengthening an irreplaceable natural system that helps protect rural Bayshore communities.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware bayshore in an effort to repair the devastation left by Hurricane Sandy. It was a project intended to prepare the beaches for the arrival of breeding horseshoe crabs and the many shorebirds that stopover in the bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches, which had been stripped of sand and littered with debris, were successfully restored just in time for the horseshoe crab's spawning season and the return of the migratory shorebirds.

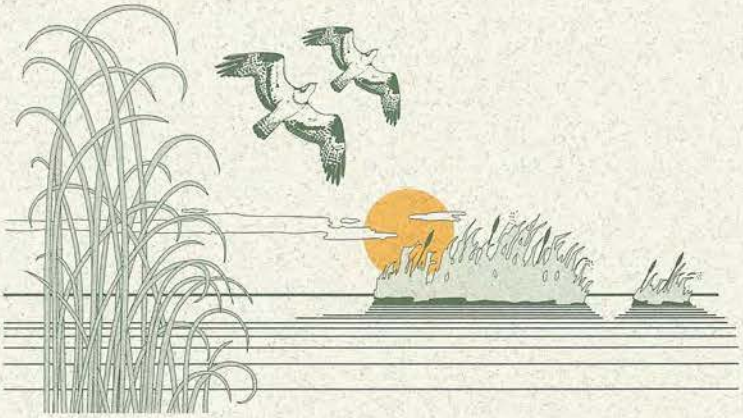
It is of paramount importance that this restoration process continue, as the future of the Delaware bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent and focused effort at recovery and restoration of the bayshore coastline, the bay will suffer long-term detriments ecologically, and local industries that rely on its natural resources will suffer financially.

Sincerely,

Lillian B. Armstrong
Executive Director

Jane Morton Galetto LBA

Jane Morton Galetto
Board President



P.O. Box 474 • Millville, New Jersey 08332
www.cumauriceriver.org

Founded for the Preservation of the Maurice River Valley in 1979.
Dedicated to the Wild and Scenic River System of the National Park Service, 1993.

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43429

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New Jersey Field Office
Ecological Services
927 North Main Street, Building D
Pleasantville, New Jersey 08232
Tel: 609/646 9310
Fax: 609/646 0352
http://www.fws.gov/northeast/njfieldoffice/

In Reply Refer To:

David O'Neill, Vice President for Conservation Programs
National Fish and Wildlife Foundation
Attn: Hurricane Sandy Coastal Resiliency Competitive Grants Program
113 15th St. NW #1100
Washington DC 20005

JAN 3 1 2014

Dear Mr. O'Neill:

The U.S. Fish and Wildlife Service (Service) is writing in support of the Bayshore beach and marsh restoration project being proposed by the American Littoral Society and the Conserve Wildlife Foundation of New Jersey for funding through the Hurricane Sandy Coastal Resiliency Competitive Grant Program. These comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Migratory Bird Treaty Act (16 U.S.C. 703-712, as amended; 40 Stat. 755).

The proposed restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May County and Cumberland County, New Jersey. The timely and successful implementation of this project will reestablish the vitality of important habitats used by horseshoe crabs (*Limulus polyphemus*) and shorebirds while also strengthening an irreplaceable natural system that helps protect rural Bayshore communities.

As you may know, the rufa red knot (*Calidris canutus rufa*),[1] was proposed for federal listing as threatened on September 30, 2013. Delaware Bay is the single largest spring stopover site for rufa red knots migrating to their Arctic breeding grounds, supporting an estimated 50 to 80 percent of red knots between May and early June. The Delaware Bay was recognized for its hemispheric importance to red knots and other shorebirds through designation as the first Western Hemisphere Shorebird Reserve.[2] The importance of Delaware Bay to shorebirds stems from the superabundance of horseshoe crab eggs that the birds use to fuel their migrations. Thus, the persistence of high-quality horseshoe crab spawning beaches is of utmost importance to the red knot and other shorebirds that depend on this food resource to complete their annual migration.

This proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware Bayshore in an effort to repair the damage caused

[1] http://www.regulations.gov/#!documentDetail;D=FWS-R5-ES-2013-0097-0004
[2] http://www.whsrn.org/site-profile/delaware-bay

by Hurricane Sandy. This earlier project prepared the beaches for the arrival of breeding horseshoe crabs and shorebirds. Because of the tremendous support from many partners, over a mile of beaches that had been stripped of sand and littered with debris were successfully restored in time for the horseshoe crab breeding season.

The proposed project is an important continuation of the restoration work that began last year. The proposal includes restoration of key habitats in the context of a proactive and adaptive regional plan that also addresses important needs of the local communities, particularly the need for improved coastal resiliency. The proposed project involves partnerships with all key stakeholders, both non-governmental and at all levels of government. For these reasons, the Bayshore beach and marsh restoration project has the full support of the Service.

The Service looks forward to continuation of our cooperative relationship with the American Littoral Society, the Conserve Wildlife Foundation, and other partners involved in the restoration and management of Delaware Bay habitats. We appreciate your consideration of this proposal to improve and maintain high-quality habitat at this site of hemispheric importance to red knots and other shorebirds. Please contact Wendy Walsh at (609) 383-3938, x 48, or Wendy_Walsh@fws.gov if you have any questions regarding this letter.

Sincerely,

Eric Schrading
Field Supervisor

cc via email:
David O'Neill, david.oneill@nfwf.org
Mandy Dey, amanda.dey@dep.state.nj.us
Larry Niles, larry.niles@gmail.com

FRANK A. LoBIONDO
2ND DISTRICT, NEW JERSEY

TRANSPORTATION
AND INFRASTRUCTURE
CHAIRMAN,
AVIATION
COAST GUARD AND MARITIME
TRANSPORTATION
HIGHWAYS AND TRANSIT

43429

Congress of the United States
House of Representatives
Washington, DC 20515–3002

ARMED SERVICES
TACTICAL AIR AND LAND FORCES
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HOUSE PERMANENT SELECT
COMMITTEE ON INTELLIGENCE
TECHNICAL AND TACTICAL INTELLIGENCE
TERRORISM, HUMINT, ANALYSIS AND
COUNTERINTELLIGENCE (THACI)

January 28, 2014

Mr. David O'Neill, Vice President
Conservation Programs
National Fish & Wildlife Foundation
Attn: Hurricane Sandy Coastal Resilience Competitive Grants Program
1133 15th Street, NW #1100
Washington, D.C. 20005

Dear Mr. O'Neill:

I am pleased to write this letter of support on behalf of the American Littoral Society and the Conserve Wildlife Foundation of New Jersey's application for funding under the Hurricane Sandy Coastal Resilience Competency Grants Program.

It is my understanding the restoration project will focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in Cape May and Cumberland Counties. The timely and successful implementation of this project will reestablish the vitality of critical habitats used by horseshoe crabs and shore birds while also strengthening an irreplaceable natural system which helps protect rural Bayshore communities.

The proposed project expands on earlier efforts from 2013 when emergency beach restoration was undertaken along New Jersey's Delaware Bayshore in an effort to repair the devastation left by Hurricane Sandy. This project prepared the beaches for the arrival of breeding horseshoe crabs and the many shorebirds which stopover in the Bayshore region to feed on the horseshoe crab eggs. Because of the tremendous support, both financially and participatory, from many partners, over a mile of beaches which had been stripped of sand and littered with debris were successfully restored just in time for the horseshoecrab's breeding season.

It is important this restoration process continues as the future of the Delware Bayshore region is tied to the health and ecological diversity of the Delaware Bay and its coast. Without a consistent and focused effort at restoration the shoreline will suffer long term ecological detriment, Bayshore communities will be at increased risk from storms, and local industries will suffer financially.

Sincerely,

Frank A. LoBiondo
Member of Congress

FAL:cm:ml

MAYS LANDING OFFICE:
5914 MAIN STREET, SUITE 103
MAYS LANDING, NJ 08330-1746
PHONE: (609) 625-5008
PHONE: (800) 471-4450
FAX: (609) 625-5071

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ROBERT MENENDEZ
NEW JERSEY

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United States Senate

WASHINGTON, DC 20510–3005

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208 WHITE HORSE PIKE
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BARRINGTON, NJ 08007
(856) 757–5353

January 29, 2014

David O'Neill
Vice President, Conservation Programs
National Fish & Wildlife Foundation
1133 15th Street NW #1100
Washington, D.C. 20005

Dear Mr. O'Neill:

The American Littoral Society and the Conserve Wildlife Foundation of New Jersey are submitting an application for funding from the National Fish & Wildlife Foundation's Hurricane Sandy Coastal Resiliency Competitive Grant Program. I write to you to offer my strong support for their proposal and respectfully request that you give due consideration to their application.

If funded, the American Littoral Society and the Conserve Wildlife Foundation of New Jersey plan to conduct a Delaware Bayshore Beach Restoration Project. This project would focus on the beach and wetland habitats of six interrelated Delaware Bayshore sites in both Cape May County and Cumberland County. The proposed project is an expansion of emergency beach restoration that was undertaken in 2013 along New Jersey's battered Delaware Bayshore. The proposed funding would be critical for not only restoring the vitality of the region's natural habitat for shore birds and breeding horseshoe crabs, but it would also help to reinforce a unique natural system which helps to protect New Jersey's rural Bayshore communities.

Hurricane Sandy hit New Jersey's coastline and natural habitats hard. The previous project was able to restore over a mile of beaches which had been stripped of sand and littered with debris and waste. The proposed funding from the Hurricane Sandy Coastal Resiliency Competitive Grants Program would allow the Delaware Bayshore Beach Restoration Project to refurbish even more of New Jersey's natural habitat that is so critical to wildlife. The funding would also help protect rural communities, as the beaches act as a natural barrier against future storms. Without the proposed funding, the New Jersey Delaware Bayshore would be at an increased risk from storms and suffer both short and long-term ecological detriment. It is therefore of serious importance that the restoration process continues as the future of the Delaware Bayshore region is tied to the health and ecological diversity of the Delaware Bay and its Coast.

For these reasons, I strongly support the Delaware Bayshore Beach Restoration Project's proposal for funding from the Hurricane Sandy Coastal Resiliency Competitive Grant Program. I thank you in advance for giving the American Littoral Society and the Conserve Wildlife Foundation's application its due consideration.

Sincerely,

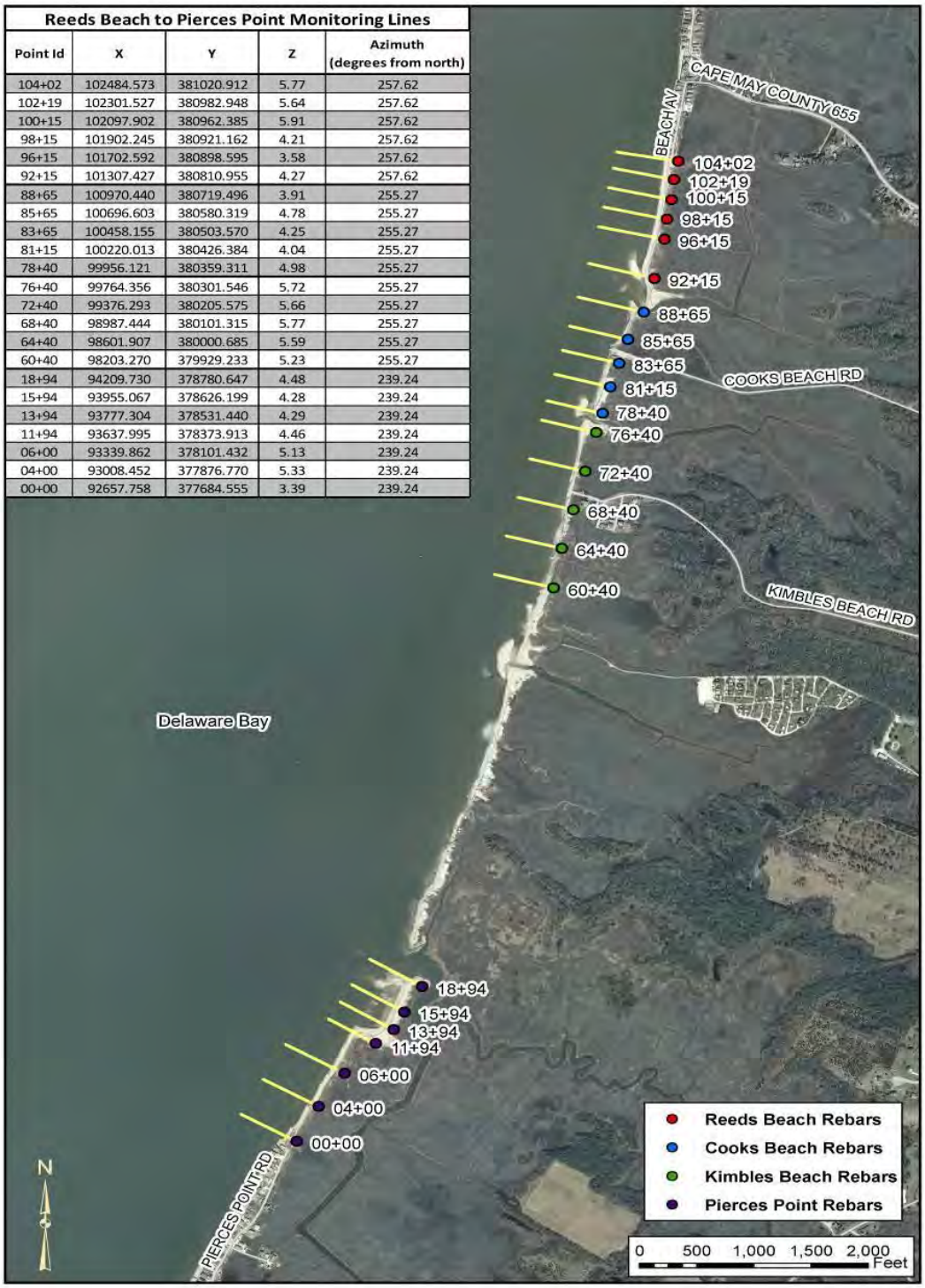
ROBERT MENENDEZ
United States Senator

Preconstruction Surveys
for
Proposed Delaware Bay Restoration Sites

PIERCES POINT TO SOUTH REEDS BEACH
BEACH PROFILE SURVEY LINES
Middle Township, NJ

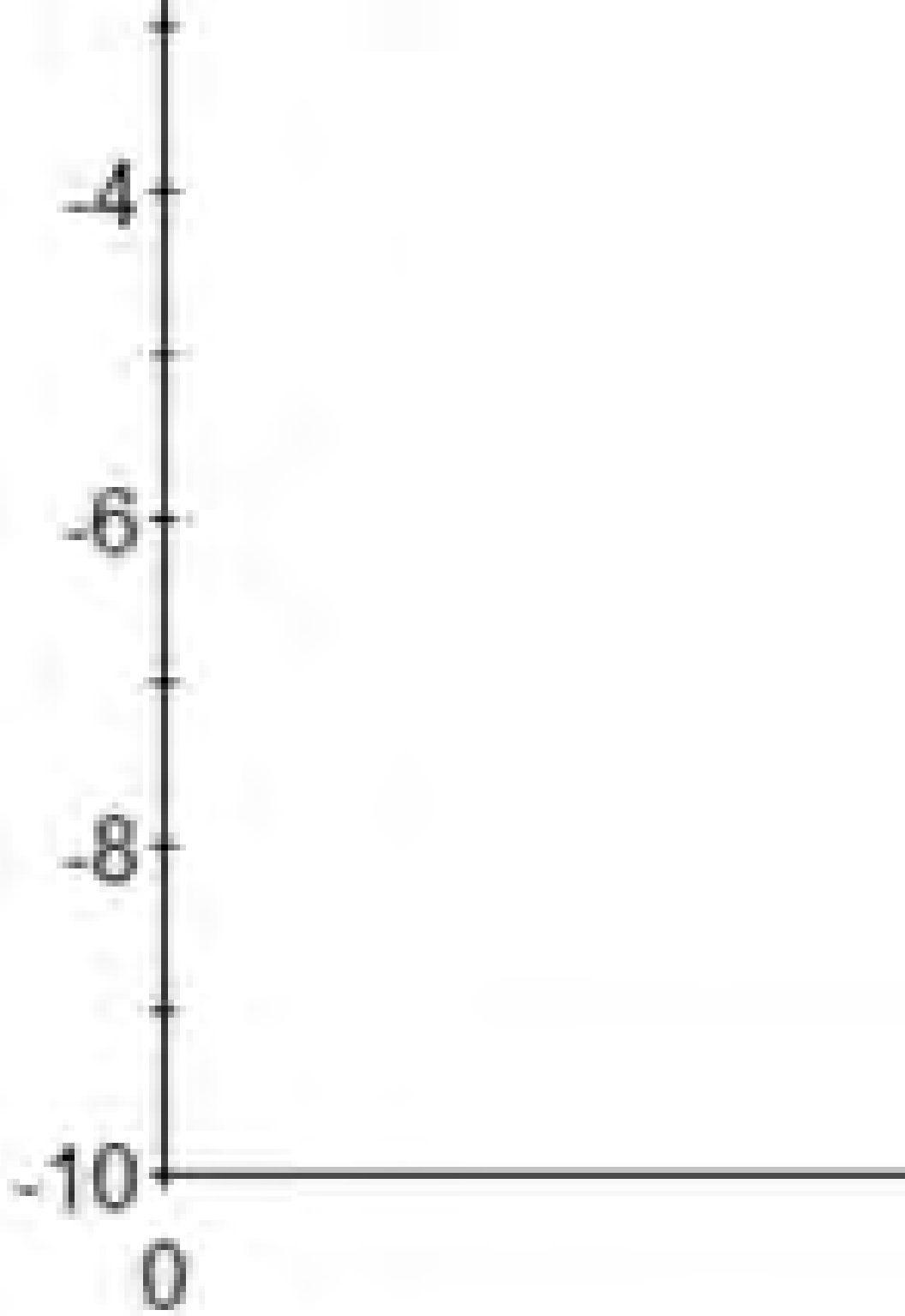
Reeds Beach to Pierces Point Monitoring Lines

Point Id	X	Y	Z	Azimuth (degrees from north)
104+02	102484.573	381020.912	5.77	257.62
102+19	102301.527	380982.948	5.64	257.62
100+15	102097.902	380962.385	5.91	257.62
98+15	101902.245	380921.162	4.21	257.62
96+15	101702.592	380898.595	3.58	257.62
92+15	101307.427	380810.955	4.27	257.62
88+65	100970.440	380719.496	3.91	255.27
85+65	100696.603	380580.319	4.78	255.27
83+65	100458.155	380503.570	4.25	255.27
81+15	100220.013	380426.384	4.04	255.27
78+40	99956.121	380359.311	4.98	255.27
76+40	99764.356	380301.546	5.72	255.27
72+40	99376.293	380205.575	5.66	255.27
68+40	98987.444	380101.315	5.77	255.27
64+40	98601.907	380000.685	5.59	255.27
60+40	98203.270	379929.233	5.23	255.27
18+94	94209.730	378780.647	4.48	239.24
15+94	93955.067	378626.199	4.28	239.24
13+94	93777.304	378531.440	4.29	239.24
11+94	93637.995	378373.913	4.46	239.24
06+00	93339.862	378101.432	5.13	239.24
04+00	93008.452	377876.770	5.33	239.24
00+00	92657.758	377684.555	3.39	239.24



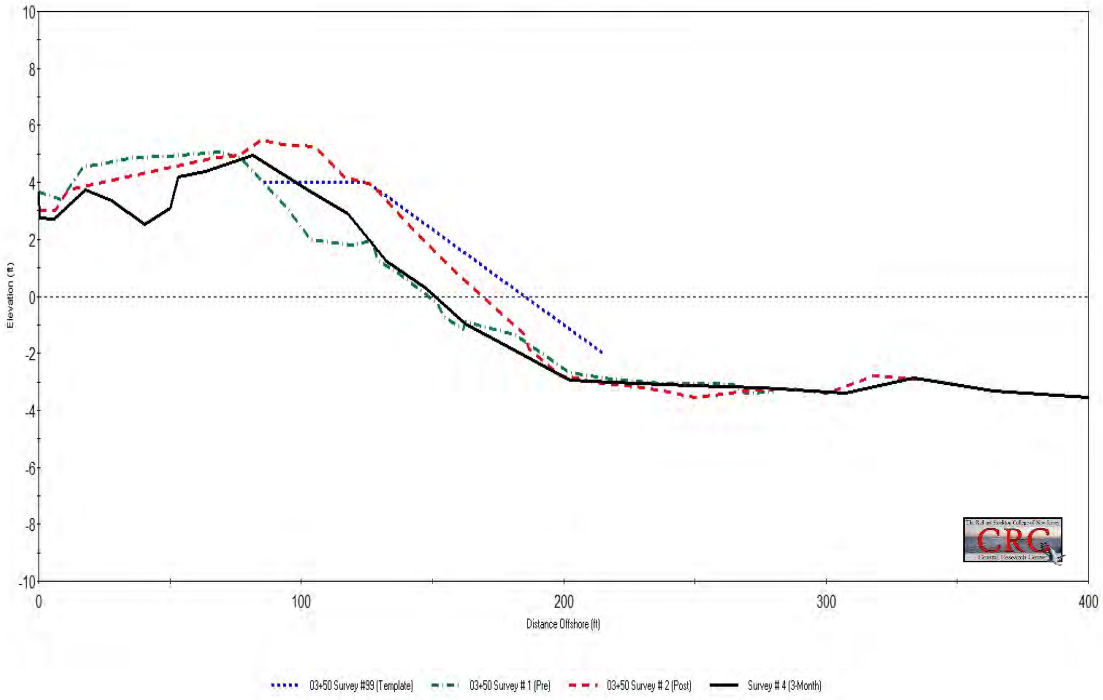
North Reeds
1 of 2

NORTH REEDS BEACH
HABITAT RESTORATION AND SHORELINE PROTECTION,
Middle Township, Cape May County, NJ.

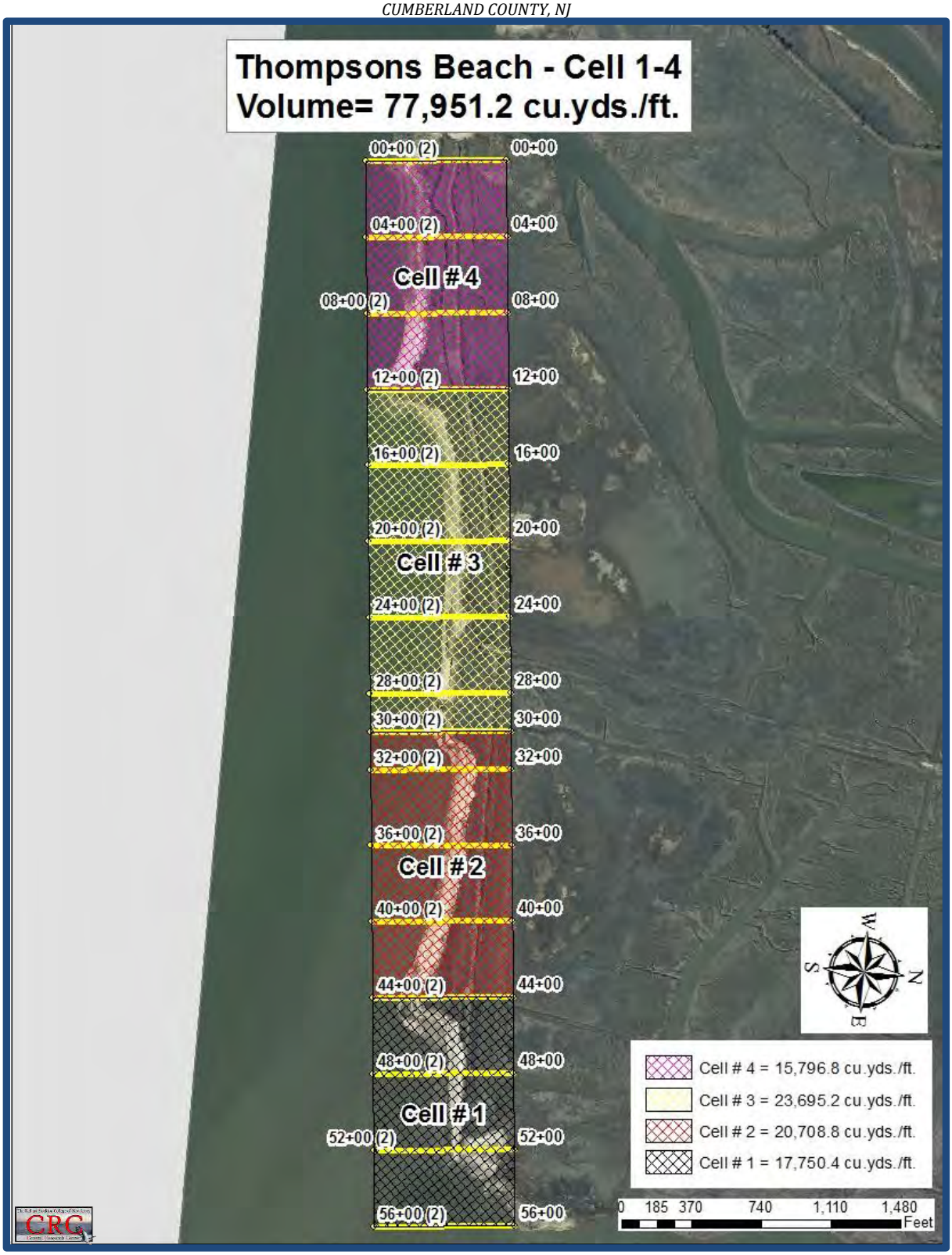

-4
-6
-8
-10
0

MOORES BEACH
HABITAT RESTORATION AND SHORELINE PROTECTION AREA
Maurice River Township
Cumberland County, NJ.

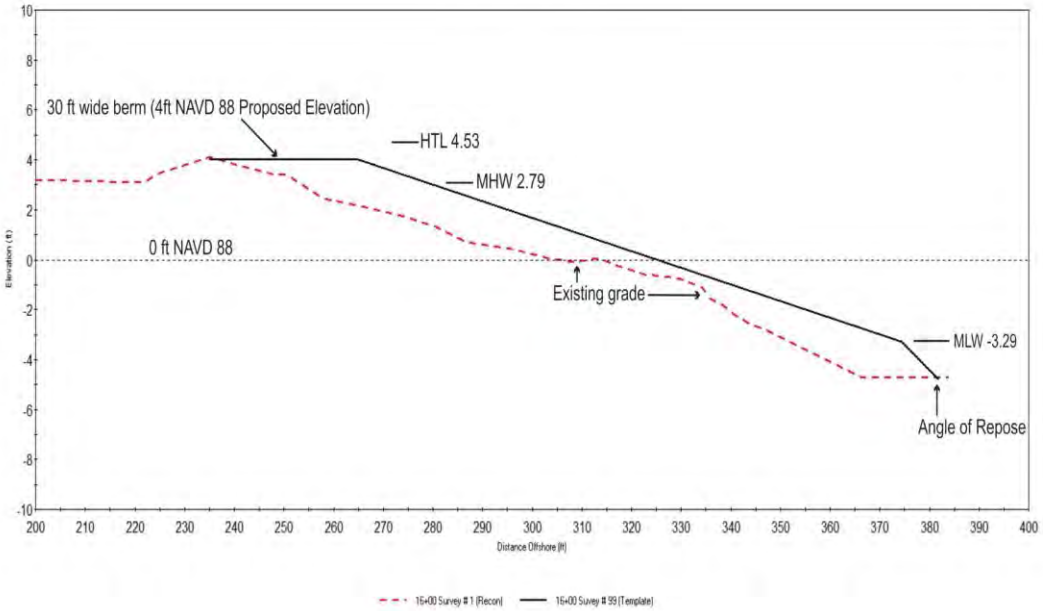
Moores Beach - 2013 Restoration Project
3 Month Post-Construction / Survey # 4
Line 03+50 = -7.25 cu.yds./ft.
Shoreline Retreat = -17.83 ft.



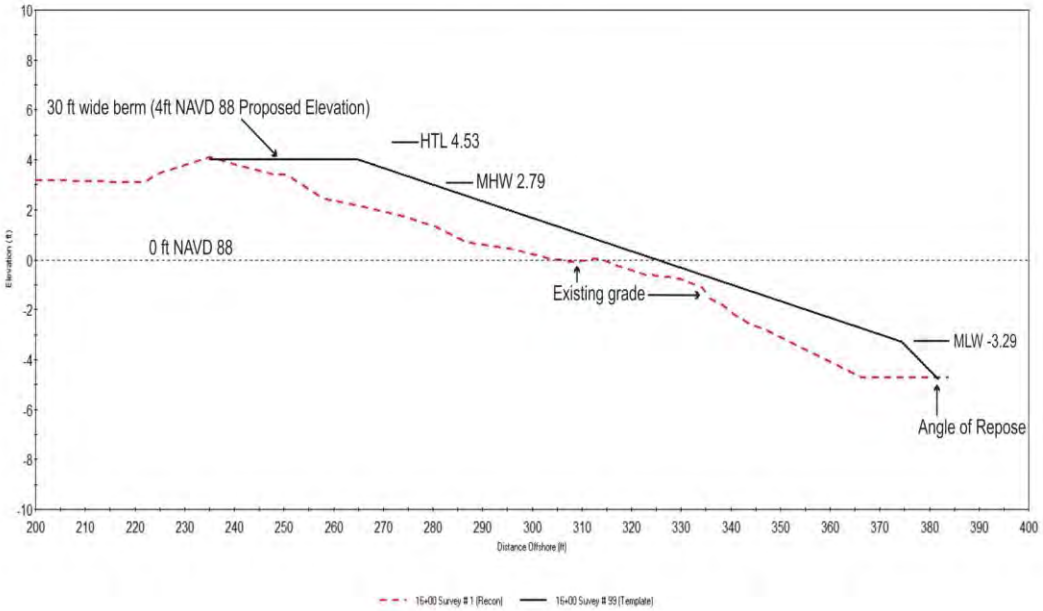
THOMPSON'S BEACH
HABITAT RESTORATION AND SHORELINE PROTECTION
MAURICE RIVER TOWNSHHIP
CUMBERLAND COUNTY, NJ



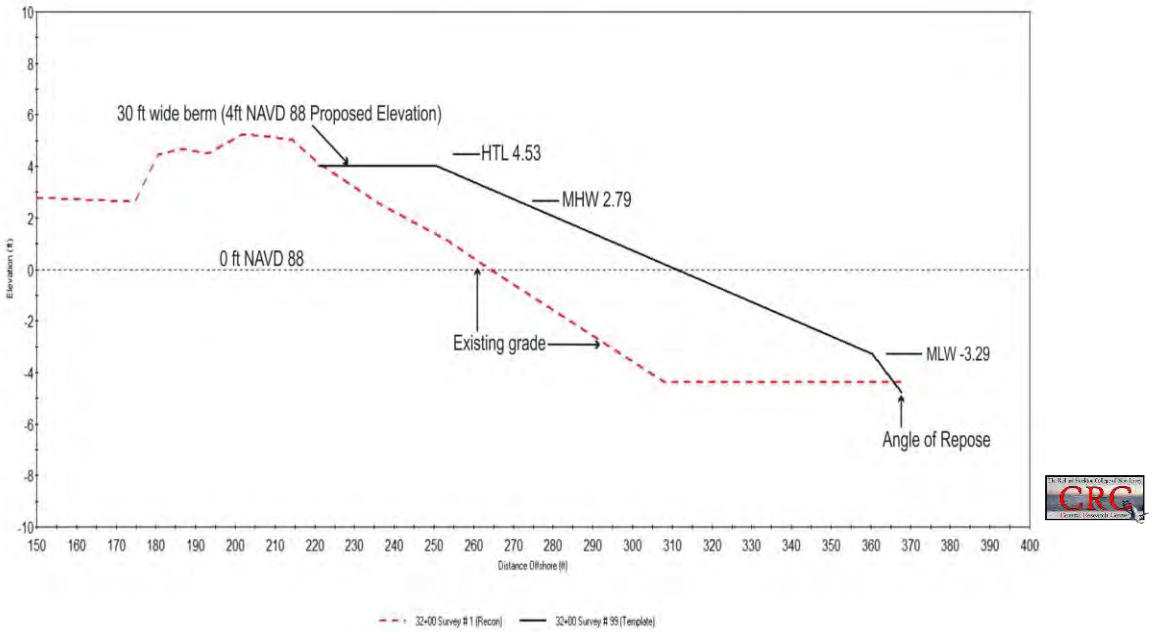
Thompsons Beach - Shoreline Restoration Project
Proposed Beach Template - Maximum Disturbance Limit
Line 16+00 = 6.570 cu.yds./ft.
Shoreline Advance = 11 ft.



Thompsons Beach - Shoreline Restoration Project
Proposed Beach Template - Maximum Disturbance Limit
Line 16+00 = 6.570 cu.yds./ft.
Shoreline Advance = 11 ft.



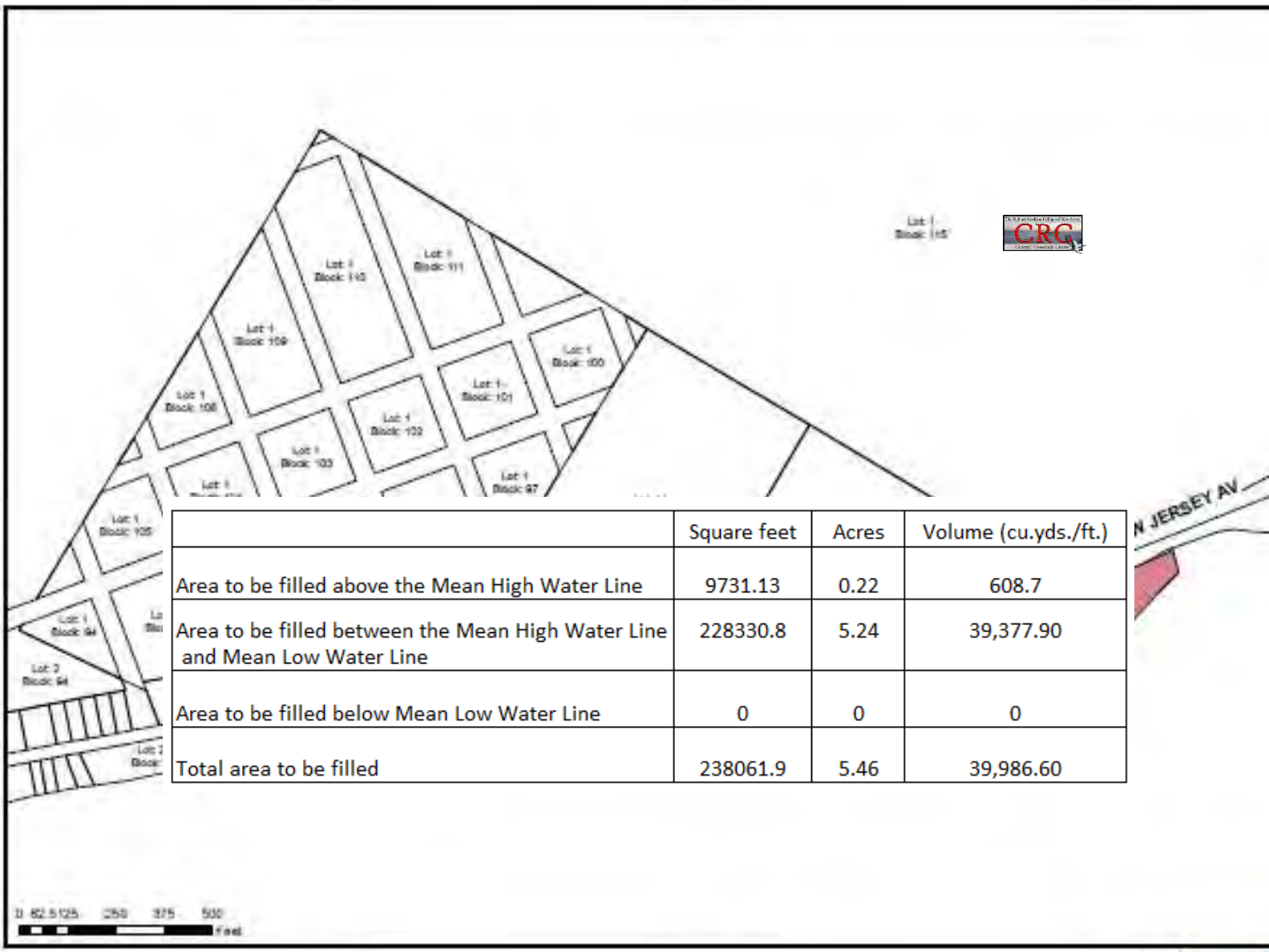
Thompsons Beach - Shoreline Restoration Project
Proposed Beach Template - Maximum Disturbance Limit
Line 32+00 = 14.792 cu.yds./ft.
Shoreline Advance = 47 ft.



FORTESCUE HABITAT RESTORATION AND SHORELINE PROTECTION

DOWNE TOWNSHIP

CUMBERLAND COUNTY, NJ.

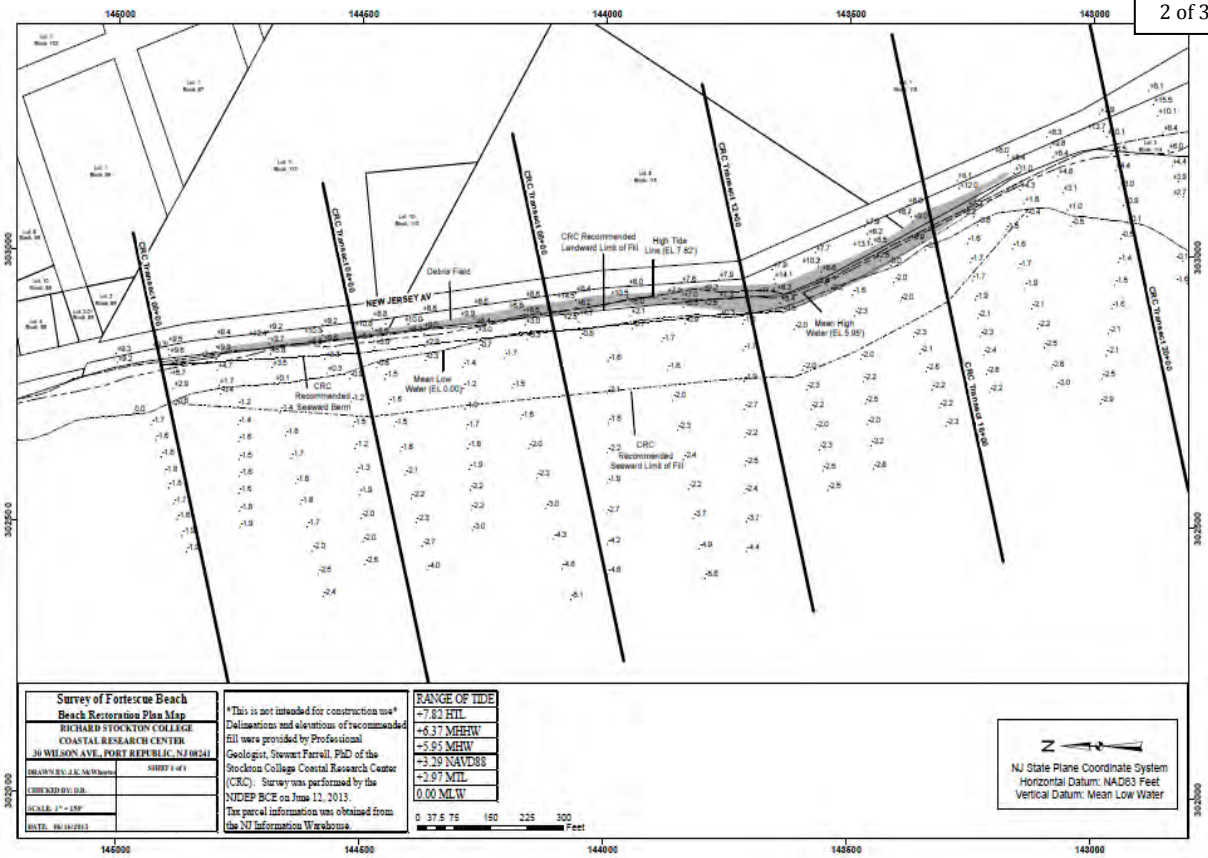


	Square feet	Acres	Volume (cu.yds./ft.)
Area to be filled above the Mean High Water Line	9731.13	0.22	608.7
Area to be filled between the Mean High Water Line and Mean Low Water Line	228330.8	5.24	39,377.90
Area to be filled below Mean Low Water Line	0	0	0
Total area to be filled	238061.9	5.46	39,986.60

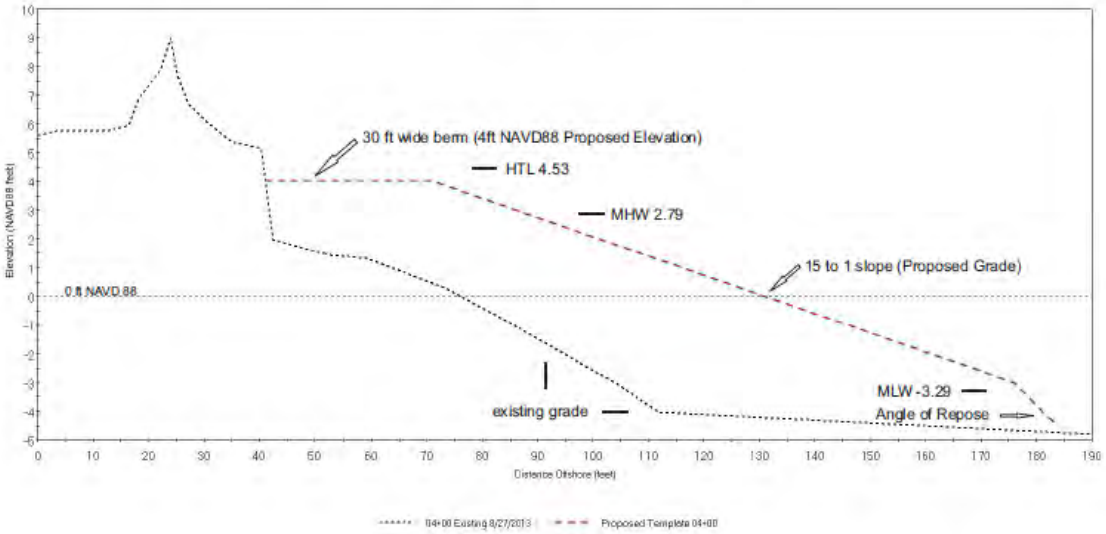
Location Map

Fortescue Beach Restoration Plan

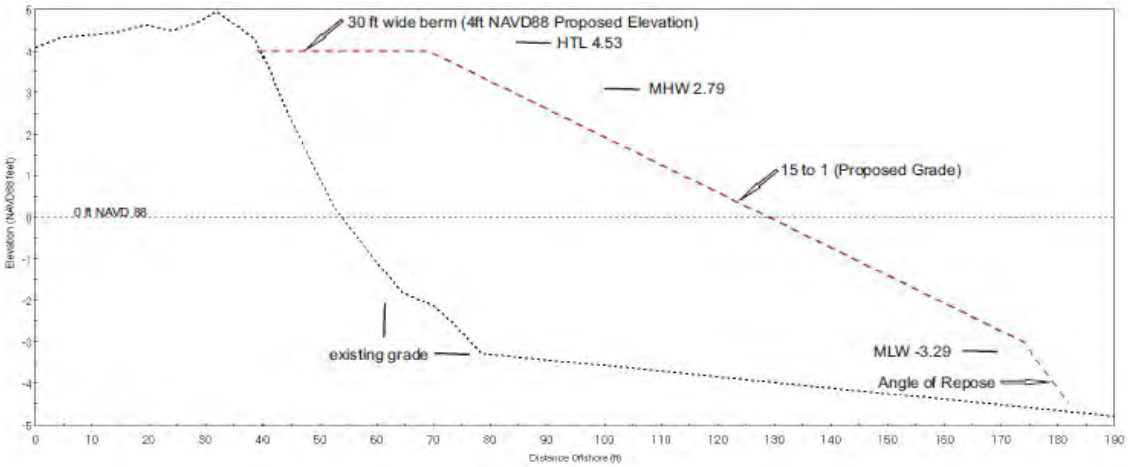
Proposed Project Area for Restoration Efforts



Fortescue Beach - Shoreline Restoration Project
Proposed Beach Template - Maximum Disturbance Limit
Section 04+00 - 18 cu.yds./ft.

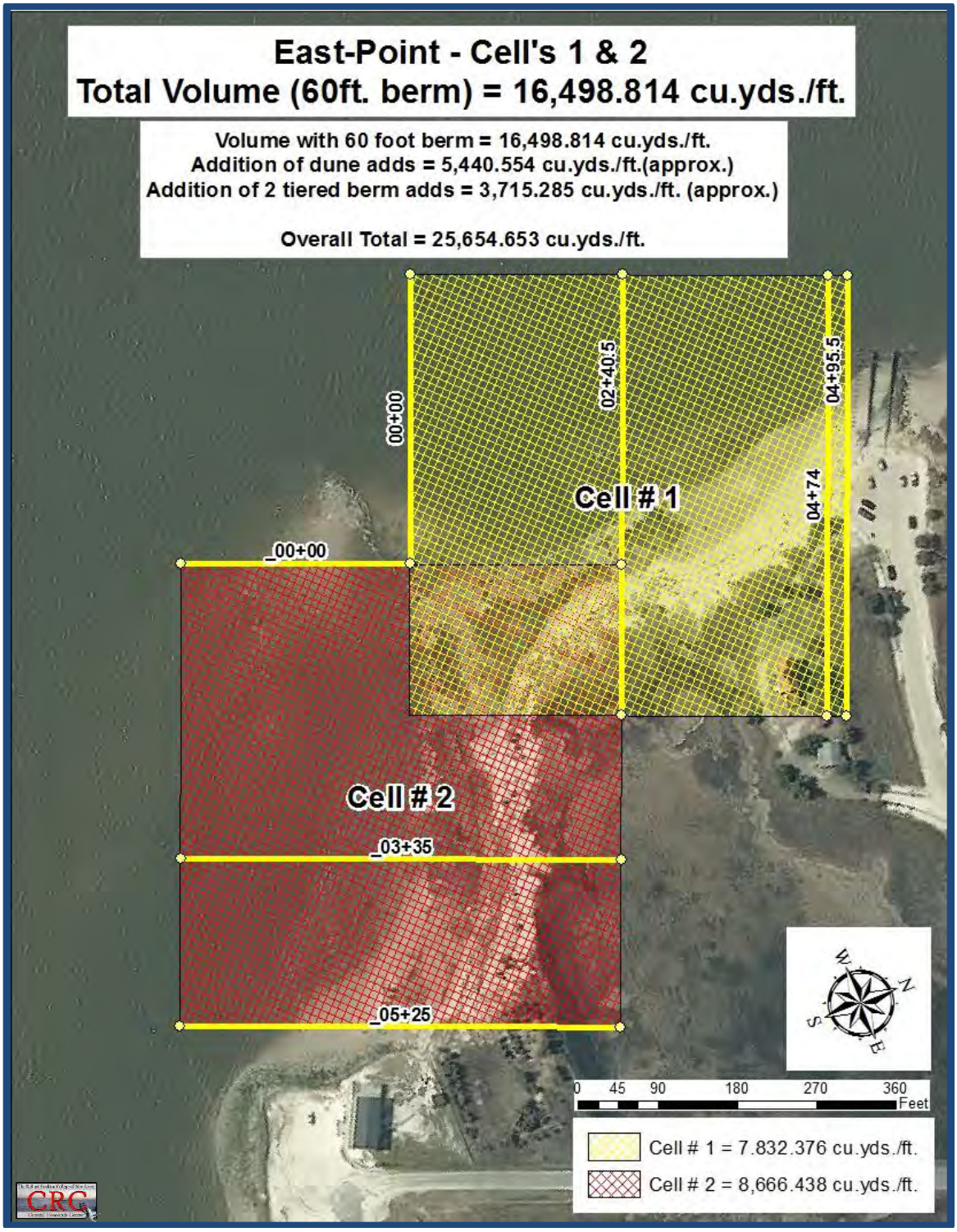


Fortescue Beach - Shoreline Restoration Project
Proposed Beach Template - Maximum Disturbance Limit
Section 12+00 - 21 cu.yds./ft.

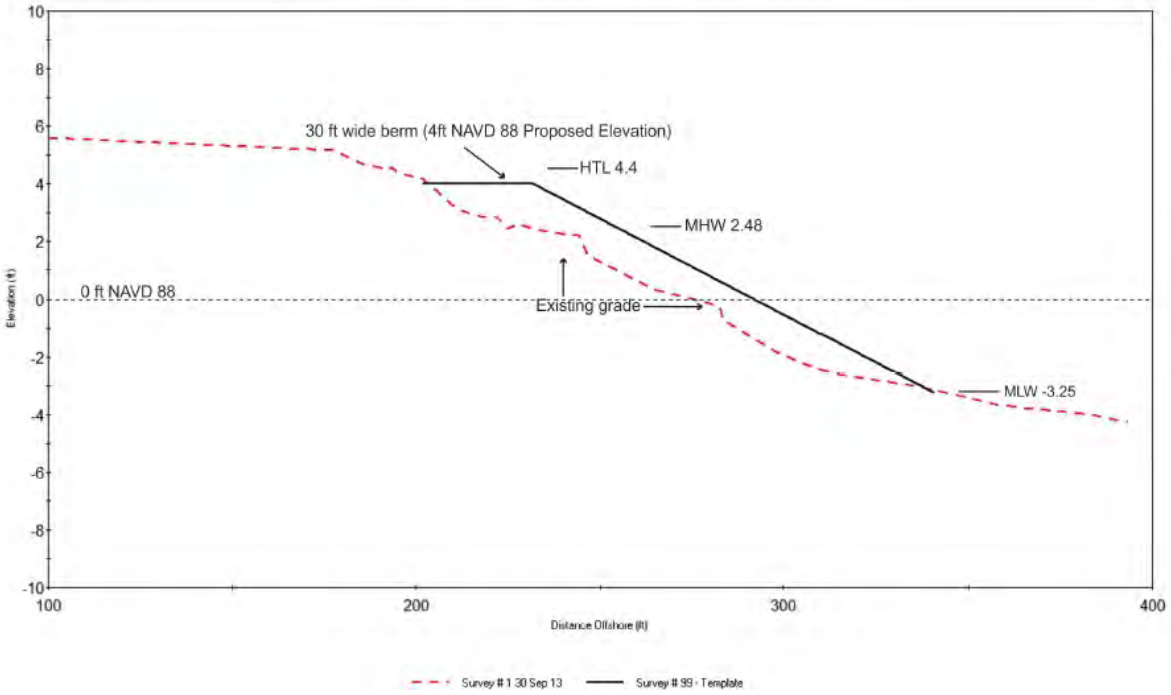


EAST POINT LIGHTHOUSE BEACH
HABITAT RESTORATION AND SHORELINE PROTECTION

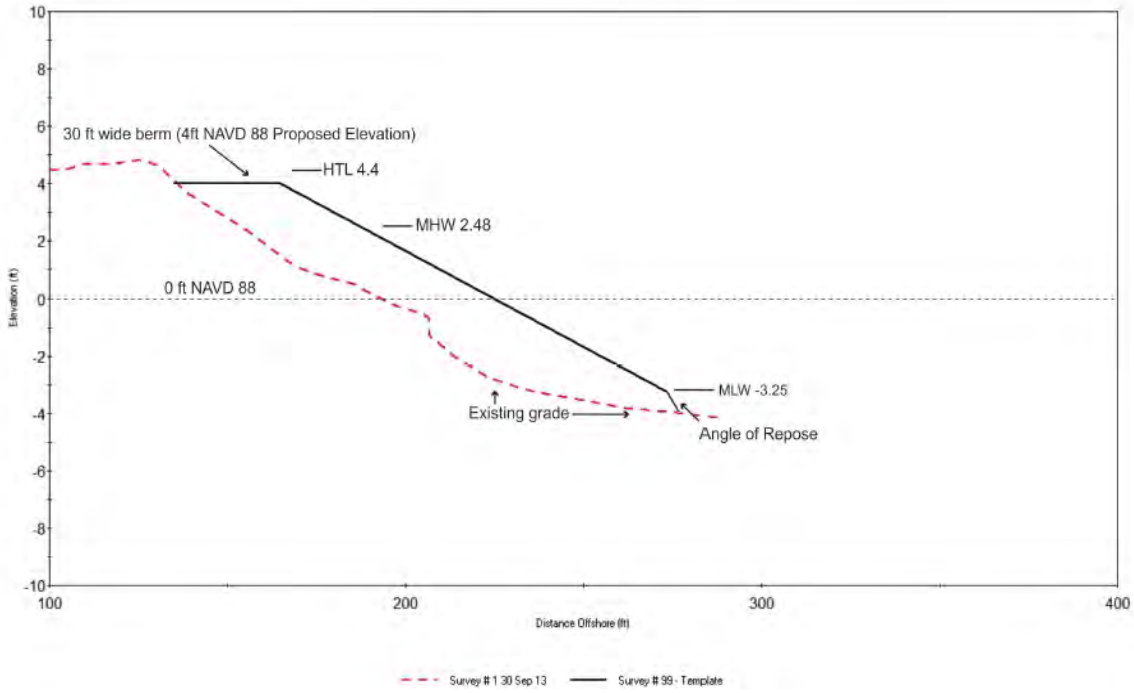
MAURICE RIVER TOWNSHIP
CUMBERLAND COUNTY, NJ



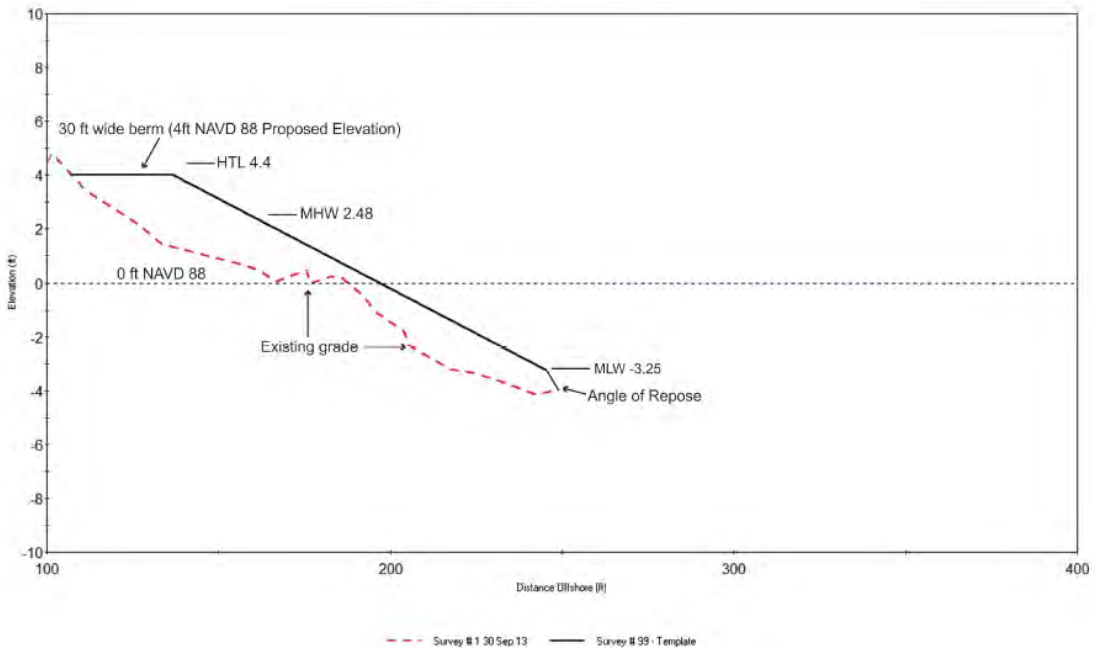
East-Point - Shoreline Restoration Project
Proposed Beach Template - Maximum Disturbance Limit
Line _05+25 = 5.567 cu.yds./ft.
Shoreline Adavnce = 16 ft.



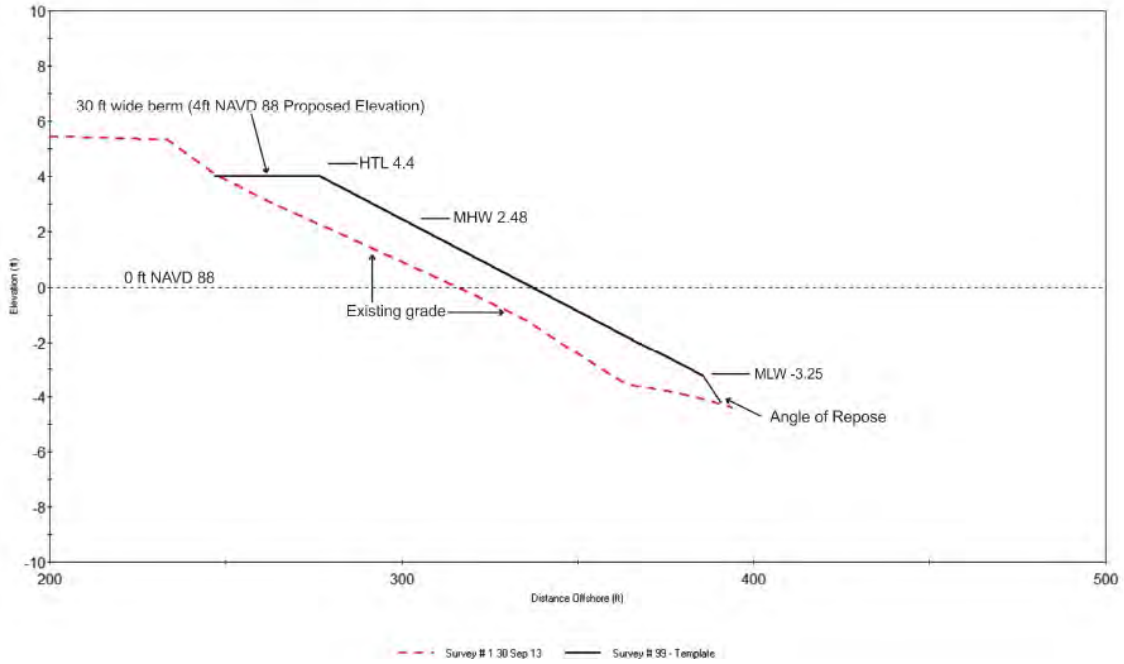
East-Point - Shoreline Restoration Project
Proposed Beach Template - Maximum Disturbance Limit
Line _03+35 = 10.024 cu.yds./ft.
Shoreline Advance = 32ft.



East-Point - Shoreline Restoration Project
Proposed Beach Template - Maximum Disturbance Limit
Line 02+40.5 = 7.811 cu.yds./ft.
Shoreline Advance = 9ft.



East-Point - Shoreline Restoration Project
Proposed Beach Template - Maximum Disturbance Limit
Line 04+74 = 6.98 cu.yds./ft.
Shoreline Advance = 21ft.



Establishing Shorebird Restoration Priorities on Delaware Bay

Conserve Wildlife Foundation of NJ
Lawrence Niles, Cristina Frank

Abstract

The process of effectively planning and implementing a restoration project is complex and must withstand many uncertainties inherent in ecosystems while minimizing costs and meeting a variety of goals. The process of adaptive management allows project leaders to develop more successful and predictable plans by integrating lessons from previous restoration projects. This project developed an evaluation framework and a system of scoring for wetland restoration projects in the Delaware Bay Region. The evaluation investigated the sources of complications and successes for 31 beach and/or intertidal restoration projects. In summary, 65% were completed or progressing towards completion and 35% failed or are currently stalled. Funding was the most influential (positive or negative) factor overall. In NJ, the primary cause for failure/stall was related to permitting and stakeholder support. In DE, the causes for failure/stall were more variable ranging from lack of stakeholder support to restoration methodology and funding. Projects in NJ typically experienced a greater frequency of complications than DE. A comparison of partner involvement demonstrated the need for partner coordination and the need to identify a diverse set of partners with the expertise and resources that best fit a particular restoration project. Recommendations for streamlining the process of plan development and implementation are also offered.

Introduction

Restoration projects require effective planning to maximize restoration success while minimizing overall costs (Wyant et. Al 1995). These plans must meet a wide array of both ecological and societal goals (Hackney 2000, Thom 2000). They must balance these goals with the need to withstand or adjust to any number of uncertainties inherent in ecological restoration (Thom 1997). For this reason, it is valuable to monitor and evaluate restoration projects during and following implementation and construction in order to revise success criteria and to inform future restoration planning (Hackney 2000, Thom 1997). This process of adaptive management has the potential to increase the probability of restoration success.

In an effort to inform existing and future shorebird restoration projects and planning in the Delaware Bay Region, this project evaluated successful and failed beach and intertidal marsh restoration projects (Figure 1 and 2). Conservation and restoration partners were interviewed using an evaluation framework (Table 1) designed to identify the sources of failure and success experienced during the various stages of planning and implementation. The goal was to identify key pitfalls and to determine the best strategies to implement effective beach and intertidal marsh restoration projects in the Delaware Bay Region. An inventory of beach and intertidal marsh restoration opportunities was also developed for future discussion.

Methods

Beach and intertidal marsh restoration projects were reviewed by interview of conservation and restoration professional using an evaluation framework designed to identify potential sources of failure and success (Table 1). Each project was categorized by its current status as completed (including projects in the post-project assessment stage), ongoing (with a likelihood of completion), stalled (potential for failure) or failed. For some analyses, projects were merged into two groups: completed/ongoing and failed/stalled. This framework evaluated nine stages of each project. For each stage, the leading entity, a status score (4 - completed without complications, 3 - completed despite complications, 2 - ongoing/in progress, 1 - stalled or 0 - failed) and, if applicable, the primary reason for the complication for each status was recorded (Table 2). The subject was also asked to rank up to seven factors that influenced the project's progress and overall outcome (Table 2). These factors could have positively or negatively influenced the project or may not have had any notable influence on the project at all.

Following the interview process, an evaluation score was determined for each project by summing the status scores across all stages (4 - completed without complications, 3 - completed despite complications, 2 - ongoing/in progress, 1 - stalled or 0 - failed). A perfect score of 36 indicates that a project was completed successfully without any complications. A lower score indicates that some complications were experienced.

Subjects were also asked to provide information about restoration opportunities for shorebirds in the Delaware Bay Region. Evaluation of restoration opportunities employed the same evaluation framework as that used for established projects (Table 2). Subjects indicated the current status of each of the nine stages of potential projects and the probability of success.

Results and Discussion

Overview

Fifteen interviews were conducted across 14 different entities including non-profit organizations, corporations and county, state and federal agencies. Thirty-one established beach and/or intertidal marsh restoration projects were discussed, evaluated and ranked (Figures 1 and 2; Tables 3 and 4). Of these, 9 are currently completed, 11 are ongoing (with a likelihood of success), 7 are stalled (with a potential for failure) and 4 have failed. In summary, 65% are considered completed or progressing towards completion and 35% have failed or are currently stalled with a potential for failure. The highest evaluation score assigned was 36 (Moore's Beach and Mispillian Harbor/Back Beach) and the lowest was 7 (Thousand Acre Marsh) (Table 3). The average evaluation score overall was 25.

Fifteen potential restoration opportunities were also discussed and evaluated (Figure 3; Table 6). Nine of these are existing or failed projects that require additional resources and/or management/restoration work.

Factors Affecting Restoration Projects

A summary of all factors, having both negative and positive influences, identified funding as the most influential factor affecting beach and/or intertidal restoration projects in the Delaware Bay Region (Table 4). Lack of funding was a source of failure or stall for almost as many projects as it was a source of success for those with secure funding. Funding was also the most influential issue affecting potential restoration opportunities. It is critical to identify the appropriate funding source for wetland projects as they are often very expensive and can take a long time to implement. For larger projects, it is often appropriate to identify a larger number of partners to facilitate funding.

Stakeholder support and permitting had considerable negative influences on project progress and outcome. Complications due to restoration methodology/implementation were also common but were frequently overcome due to the flexibility of the plan and the expertise of the partners. Some of these complications were attributed to corrupt or inexperienced contractors. As was noted by many of the subjects, project design must allow for flexibility and revisions throughout the restoration process to accommodate for unforeseen circumstances. This is also important to allow for the implementation of adaptive management principles (Thom 1997). Factors such as funding and permitting are not as versatile and therefore require considerable planning and coordination among stakeholders and partners. This is especially the case when developing and implementing coastal ecosystem restoration projects as restoration costs are steep and uncertainties are common.

Only a few project leaders mentioned the positive or negative influences of leadership and partner coordination, however, this does not indicate that these factors were in fact less influential. Several project leaders attributed restoration success to the effective and efficient coordination among project partners – a level of cooperation that was achieved by balancing the needs of all those on board. In other cases, leadership and partner coordination were discussed in tandem and can not be teased apart.

A Comparison of New Jersey and Delaware

A comparison of restoration projects across New Jersey and Delaware was conducted to identify potential strengths and/or weaknesses throughout the restoration process within each state (Table 5). Average score for each state was comparable with 25 for NJ and 26 for DE. In NJ, 59% of NJ's projects were completed or are ongoing with 41% of the state's 22 projects considered failed or are stalled. In DE, 78% of the state's 9 projects are completed or ongoing and only 22% have failed or are stalled.

NJ and Delaware were also compared by analyzing the numbers and types of complications or factors lending to a project's success or failure (Table 4). These seven factors were originally ranked by project leaders as an overall assessment of a particular project (Table 2). In NJ, a total of 61 complications, or approximately 2.8 per project, were noted by project leaders (Table 3). Issues associated with the permitting process were most prevalent, affecting 19 projects or 86% of NJ's projects. Of those, six

eventually resulted in failure or are currently stalled. In DE, a total of 12 issues, or 0.8 per project, were recorded. Complications associated with restoration methodology/implementation were most prevalent in DE, negatively affecting six projects or 66%. It should be noted, however, that these issues were generally resolved due to the flexibility that was built into the plans. As a result, only one of six projects affected by restoration methodology complications actually led to failure in DE.

In NJ, permitting and lack of stakeholder support appear to be the primary causes of projects that failed or are stalled. In DE, the causes of failure/stall were more evenly distributed across several factors including lack of funding, lack of stakeholder support and restoration methodology.

The types of factors having a positive influence and the most influence on project progress and outcome were also compared. In NJ, funding and stakeholder support had the greatest positive influence. Permitting and stakeholder support were the most influential, positive or negative, across of all of NJ's projects. In contrast, partner coordination and restoration methodology had the greatest influence across all projects in DE. Partner coordination and flexibility of the plan had the greatest positive influence.

A Comparison of Partners

In an effort to identify the most effective partner or combination of partners for a restoration project, additional comparisons were conducted among the five types of partners interviewed (federal, state, county, corporate and non-profit) and the overall progress and outcome of restoration projects under their supervision. Thirteen projects included at least one federal partner, 18 projects at least one state partner, 5 projects at least one county partner, 8 projects at least one corporate partner, and one project with one non-profit partner. Demonstrating minimal variation, the average score of projects with a federal, state, county and/or non-profit partner on board was 24, 26, 27 and 28 respectively. Projects with a corporate partner scored an average of 33 and were all completed or are ongoing. This could be attributed to the essential role that corporations can fulfill as a secure funder and in some cases the source of technical expertise. Projects with corporate funding, however, typically require adherence to a shorter timeline. This should be considered when the appropriate funding resources are being identified for a restoration project.

A comparison of the number of partners involved and project progress and outcome indicated that projects with more than one partner generally scored higher. Ideally, it is beneficial to coordinate a diversity of partners around a restoration project. USFWS, for example, maintains extensive expertise in preparing restoration plans, submitting permit applications and implementing on-the-ground restoration activities. This review demonstrated USFWS' familiarity with intertidal wetland projects involving the restoration of tidal flow and control of *Phragmites* (Table 3). USACE specializes in the technical aspects of investigating and developing coastal engineering projects. Most beach restoration projects require USACE as a partner. State agencies/departments offer a broad spectrum of expertise and can be critical in expediting the process of planning and

permitting if a good relationship exists among the departments involved. Partners at the county level can be instrumental in generating local stakeholder support. Non-profit organizations play an important role in restoration partnerships as they are generally not as confined as government agencies and can also provide a diversity of resources from planning, to community outreach, on-the-ground restoration and monitoring. Assembling the best mix of partners depends on a variety of factors including the scope and type of restoration proposed, the cost of the restoration and ownership.

Lessons Learned

Based on the experiences of the project leaders that were interviewed for this research, the following section provides suggestions for streamlining the restoration planning and implementation process.

1. *Restoration Methodology*: A restoration plan begins with understanding of a project's scope or vision. With a scope or vision clearly defined, goals and objectives can then be developed. Quite often, the best resources for developing a restoration plan are previously implemented projects. It is useful to review projects that have already been implemented to assess which methodologies have been more effective, more widely-accepted by the community or less costly, for example, in similar restorations. Successful, tested strategies can be adapted to new projects. Employing previously implemented methodologies also has the potential to expedite the permitting process and stakeholder buy in. This is also important to ensure that restoration projects will continue to provide suitable habitat over time and to inform future restoration projects.

   Projects leaders also stressed the value of building flexibility into a restoration plan. As suggested by Pastorok et al., planning for potential failure is one of the best strategies for maximizing success. Uncertainties and variability are an inherent part of ecosystems and therefore must be considered early. Flexibility of a plan, including its methodology and the consideration of alternative outcomes, could keep a project from failing altogether. This adaptive management strategy allows for revision of project stages based on the outcome of previous stages (Clewell 2005).

   For larger projects, project leaders recommended creating an independent advisory committee composed of knowledgeable scientists that can review project plans and provide recommendations. The EECMP, for example, was integral to the momentum and completion of several intertidal marsh restoration projects implemented under PSEG's Estuary Enhancement Program.

   Throughout the process of initial plan development, it is critical that all partners are in agreement of the plan's vision, goals and objectives. Stakeholders must also be identified and involved early in the planning process to address any potential issues (Hubbard 2000).

2. *Stakeholder Support*: Stakeholders include those that are impacted by the proposed restoration project such as include landowners, community members, local businesses, independent organizations and investors. Public meetings or forums are typically offered by project partners to increase public awareness of the importance of restoration, communicate a project's vision and to identify the entities that have a stake in the outcome of a project. Failure to address stakeholder concerns early could undermine a project at a later stage when modifications tend to be very costly (Hubbard 2000). Several projects in the Delaware Bay Region were challenged with opposition from environmental organizations and local communities regarding the application of herbicide for *Phragmites* control. Outreach though public meetings and discussion coupled with modification of the application procedure facilitated resolution and progress early in the process.

3. *Funding*: Restoration partners stressed the importance of identifying the most appropriate funding source for wetland projects. This is particularly important because wetland restoration is often expensive and can take a long time to implement. For larger projects, it has been suggested that identification of a greater number of diverse partners can facilitate funding.
4. *Partner Coordination/Leadership*: The importance of partner coordination can not be understated (Clewell 2005, Jones et al. 2009, Hackney 2000, Hubbard 2000, Thom 1997). Restoration efforts require a team approach, with each partner lending expertise towards goals shared by the group. Coastal habitat restorations, in particular, are complex and require a wide range of disciplines from ecology, hydrology and engineering to planning, communicating and social science. Including a diversity of experienced partners will help ensure the development and implementation of a well-balanced and feasible restoration plan. (Corcoran 2002). As was observed in this evaluation of wetland restoration projects, partner coordination facilitated the success of several projects (Table 3).

5. *Permitting*: Attaining the necessary permits for restoration projects can often be daunting, time consuming and costly, especially for any projects affecting wetland habitats. Suggestions for streamlining the permitting process include clearly demonstrating the habitat or species benefit of a project and establishing a relationship with other projects. Whether building upon existing projects or demonstrating a benefit to ongoing restoration work, familiarity of a restoration project can accelerate the permitting process as well as stakeholder buy in and overall implementation. Hubbard (2000) and Hackney (2000) both suggest a systems approach in which projects are developed in relation to other projects as well as integrated into regional restoration plans.

   Revisions to the permitting process have also been suggested. Application review, for example, could incorporate a checklist of priority species and habitats. Assuming a sound restoration plan, approval of projects addressing priority species/habitats should be expedited.

Currently, there is no standard evaluation framework or procedure to evaluate coastal restoration projects. This assessment offers an evaluation framework for wetland restoration projects and should be considered a valuable part of adaptive management. Post-construction assessment, including monitoring, results in the transfer of knowledge and experience from past projects into proposed ones. Merging the lessons of past experiences, including restoration failures, with new scientific technology and information will result in better, more predictable restoration projects (Clewell 2005, Jones et al. 2009, Hackney 2000, Thom 1997).

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Appendices

Appendix A: Figures

Figure 1. Map of established beach and/or intertidal restoration projects sites in the northern portion of the Delaware Bay Region that were evaluated.

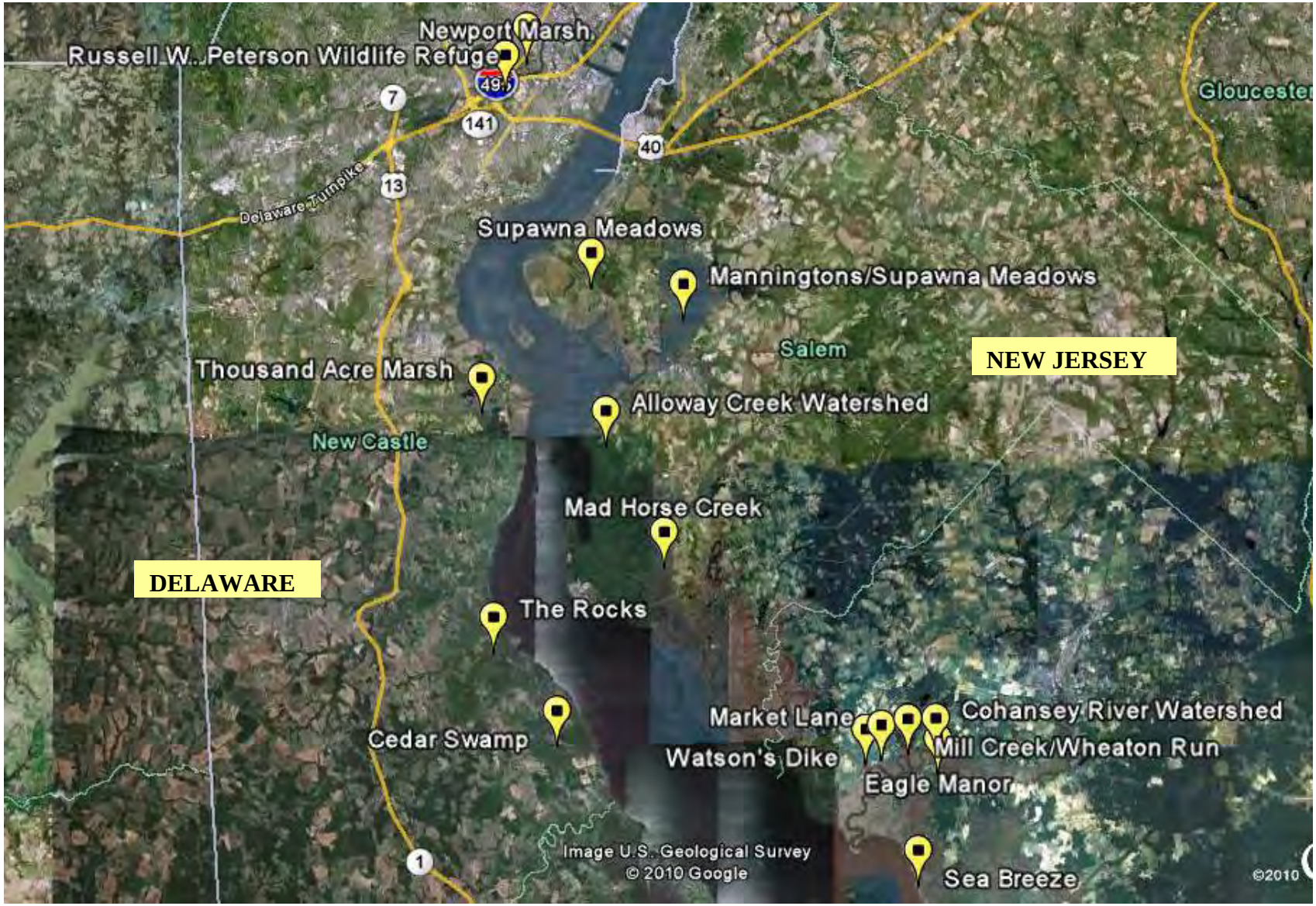


Figure 2. Map of established beach and/or intertidal restoration projects sites in the southern portion of the Delaware Bay Region that were evaluated.

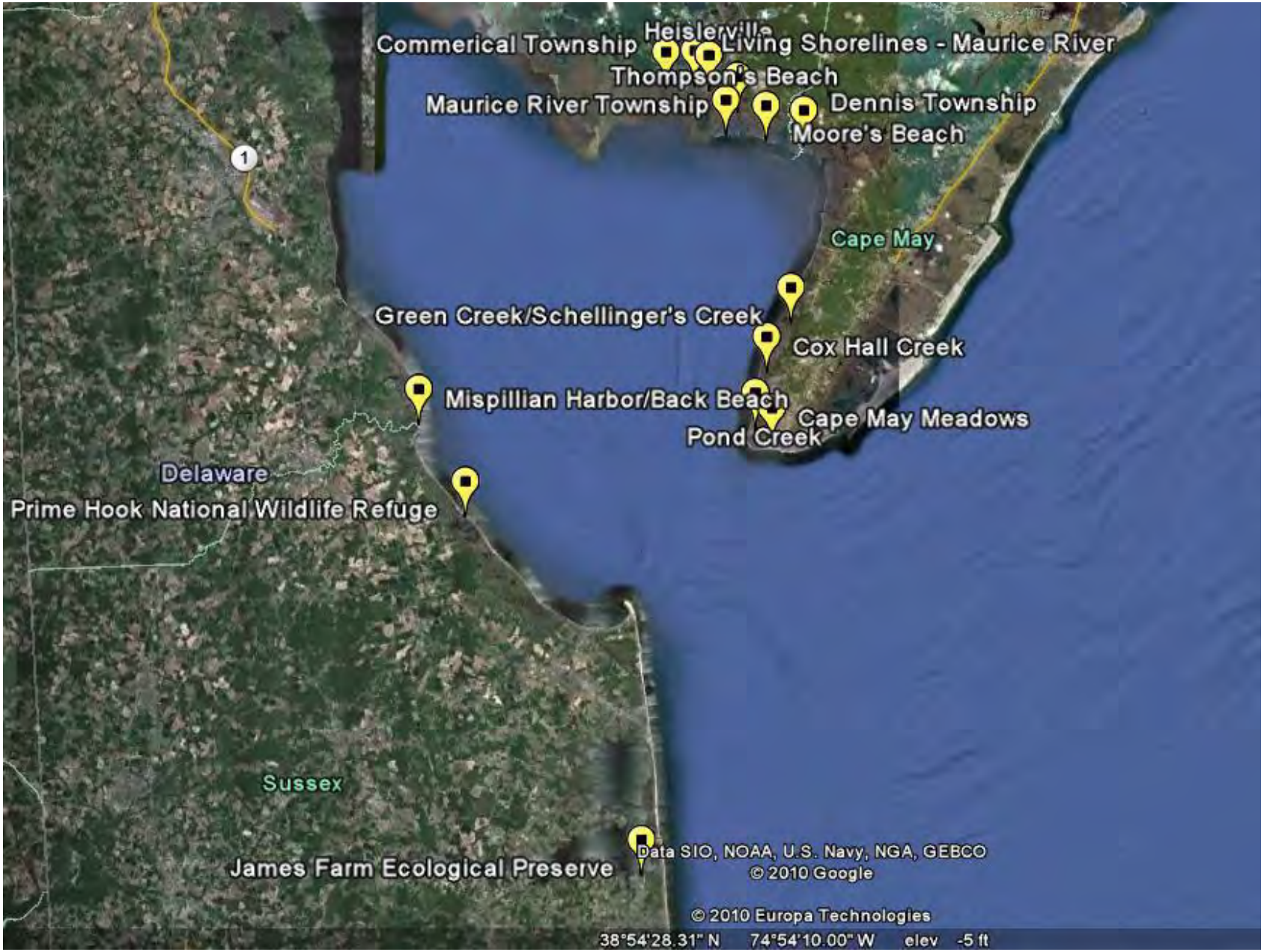
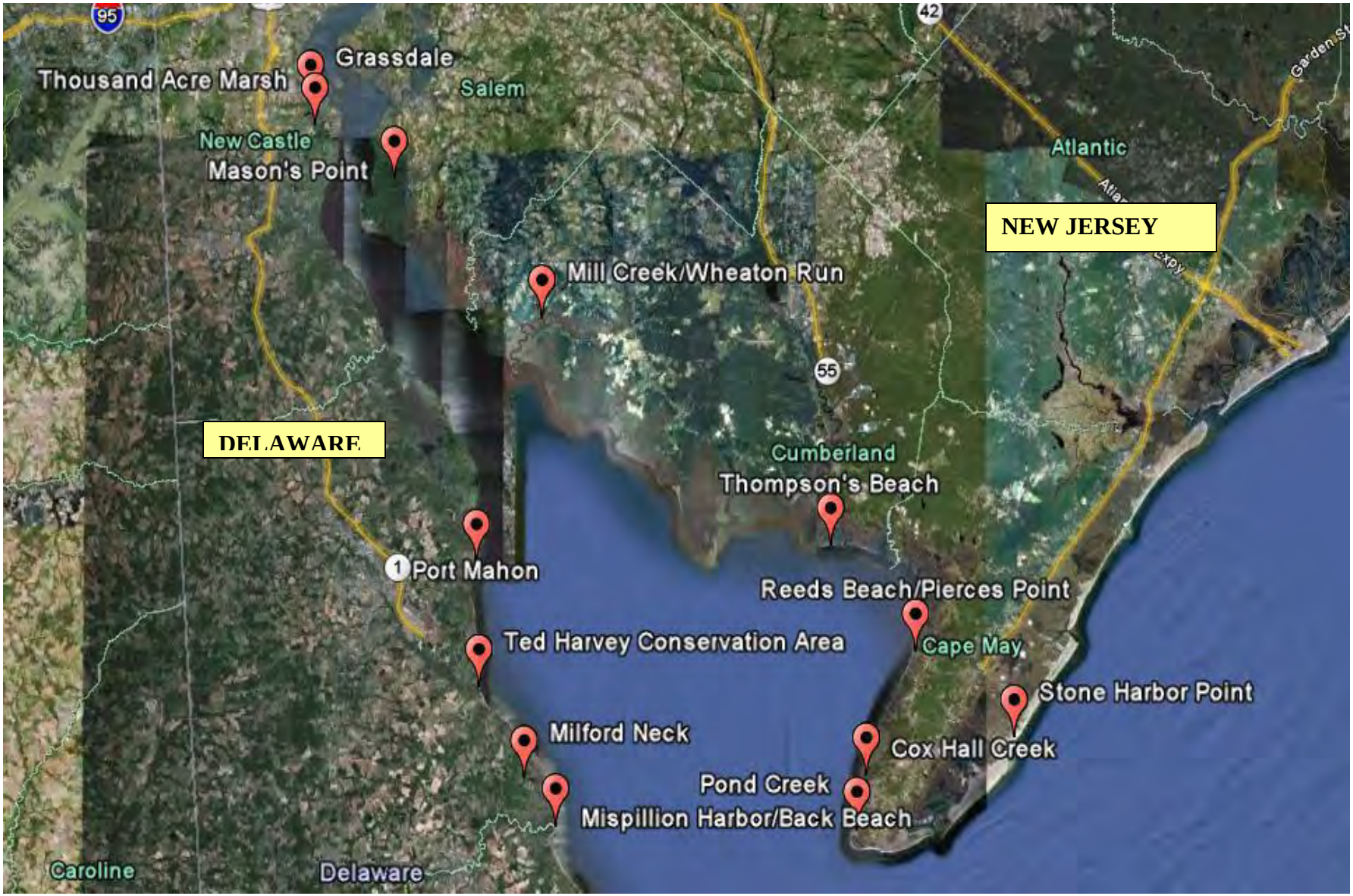


Figure 3. Map of beach and/or intertidal wetland restoration project opportunities in the Delaware Bay Region.



Appendix B: Tables

Table 1. Framework for collecting data on established and potential beach and/or intertidal restoration projects. Each of the nine stages addresses the development, identification and execution of that particular stage. For example, stakeholder support is the stage at which project partners identify, involve and build stakeholder support for the project.

	Project Title			
PROJECT STAGE	**Status**	**Evaluation**	**Leading Entity**	**Notes**
Funding				
Project Design				
Project Management				
Permitting				
Stakeholder Support				
Implementation				
Bidding Contractor				
Project Construction				
Post-project Assessment				
TOTAL SCORE	**0**			
RANK FACTORS AFFECTING OVERALL PROJECT *(Beginning with 1 = most influence; n/a = non-issue)*				
Leadership				
Funding				
Restoration Methodology/ Implementation				
Flexibility of Plan				
Permitting/Regulatory Issues				
Partner Coordination				
Stakeholder Support				

Established Restoration Projects	
Status	**Evaluation (Source of complication for status ratings)**
4 Completed w/o complications	Regulatory/ permitting problems
3 Completed despite complications	Lack of stakeholder support
2 Ongoing/In progress	Landowner conflict
1 Stalled/Unfinished due to complications	Conflicted priorities
0 Failed	Unforeseen circumstances
	Lack of funding
	Poor planning
	Unrealistic schedule

Potential Restoration Projects	
Status	**Probability of Success**
3 Completed	4 75%-100%
2 Ongoing/In progress	3 50%-74%
1 Stalled	2 25%-49%
0 Failed	1 0%-24%

Table 2. Definition of terms used in the framework for collecting data.

Factors Affecting Overall Project	Definition
Leadership	Addresses the ability of project leaders to carry the project to its completion
Funding	Availability or lack of financial resources to implement a project
Restoration Methodology/Implementation	Development and implementation (including contract work) of restoration strategies.
Flexibility of Plan	Ability of a plan to be revised/adjusted in the event of changes to the project site, funding,, ineffective methods, etc.
Permitting/Regulatory Issues	Includes any positive or negative issues associated with permitting and/or regulatory requirements
Partner Coordination	Identifying and involving project partners. Includes all organizations/agencies working together to design, fund and implement a restoration project
Stakeholder Support	Identifying, involving and building stakeholder support. May involve conducting outreach through a public forum or meeting. Stakeholders include landowners, local residents, businesses and any agencies/organizations that have a stake in the outcome of the restoration but are not partnering on project design, funding or implementation
Status	**Definition**
Completed w/o Complications	Indicates that the project stage in question was completed without any delays or complications. Score of 4
Completed Despite Complications	Indicates that the project stage in question was completed regardless of delays or complications. Score of 3
Ongoing/In Progress	Indicates that the project stage in question has been executed and is moving forward. Score of 2
Stalled/Unfinished	Indicates that the project stage in question has been executed and is stalled due to a complication or that the project stage was never executed due to a complication. Score of 1
Failed	Indicates that the project stage was executed but was not completed and has been abandoned. Score of 0

Table 3. Summary of all established beach and/or intertidal restoration projects in the Delaware Bay Region. The evaluation score was determined for each project by summing the status scores across all stages (4 - completed without complications, 3 - completed despite complications, 2 - ongoing/in progress, 1 - stalled or 0 - failed). A perfect score of 36 indicates that a project was completed successfully without any complications.

Project Name	Score	Status	Location	State	Acres	Habitat Type	Impairment	Restoration Strategy	Leading Entity	Target Species	Last Completed Stage	Failure/Stall Factors	Success Factors
Thousand Acre Marsh	7	Failed	Delaware City	DE	400	Intertidal Marsh	Tidal Restriction	Restore Flood Regime	DEMC	Shorebirds/ Marsh Birds/ Waterfowl	Project Design Ongoing	Funding/ Stakeholder Support/ Restoration Methodology/ Implementation	n/a
Eagle Manor Farm	11	Failed	Bridgeton	NJ	12	Freshwater Marsh	Habitat Loss	Freshwater Marsh Creation	USFWS	Migratory Birds/ Waterfowl	Project Design	Permitting	n/a
Watson's Dike	11	Stalled	Greenwich TWP	NJ	3	Intertidal Marsh	Flood Control/ Invasive Vegetation	Maintain Flood Regime/ *Phragmites* Control	USFWS, Cumberland Co	Migratory Birds/ Marsh Birds	Stakeholder Support	Funding	Stakeholder Support
Cohansey Dike	14	Failed	Bridgeton	NJ		Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	NJDFW	Waterfowl	Project Design	Permitting Delays/ Funding	n/a
Mill Creek/ Wheaton Run	14	Failed	Bridgeton	NJ	143	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USFWS	Marsh Birds/ Waterfowl	Project Design	Funding	Stakeholder Support
Pond Creek	15	Stalled	West Cape May	NJ	170	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USFWS, NJDFW, USACE	Migratory Birds/ Marsh Birds/ Waterfowl	Project Design/ Permitting/ Stakeholder Support	Funding/ Stakeholder Support/ Permitting Delays	n/a
Cox Hall Creek	16	Stalled	Town Bank	NJ	2150	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	Cape May Co, USFWS	Migratory Birds/ Marsh Birds/ Waterfowl	Project Design & Permitting Ongoing	Funding/ Permitting Delays	Stakeholder Support
Grassdale	16	Stalled	Delaware City	DE	86	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USACE	Marsh Birds/ Waterfowl	Project Design Ongoing	Funding/ Restoration Methodology/ Implementation	n/a
Thompson's Beach	16	Stalled	Maurice River TWP	NJ	25	Beach	Habitat Degradation	Debris Removal	NJBCE	Shorebirds/ HSC	Project Design Ongoing/ Permits Submitted	Funding/ Stakeholder Support/ Permitting	n/a
Sea Breeze Beach	17	Stalled	Sea Breeze	NJ	25	Beach	Habitat Degradation	Debris Removal	NJDFW, NJBCE	Shorebirds/ HSC	Permitting Ongoing	Permitting/ Stakeholder Support	Funding
Mad Horse Creek	20	Stalled	Lower Alloways TWP	NJ	50	Intertidal Marsh	Tidal Restriction	Intertidal Marsh Creation/ Restore Flood Regime	NJDFW, NJNRD	Marsh Birds/ Waterfowl	Project Design Ongoing	Leadership/ Funding/ Partner Coordination	Permitting Not Required
Commercial TWP Salt Hay Farm	26	Ongoing	Commercial TWP	NJ	2894	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	NJDFW, PSEG	Shorebirds/ Marsh Birds/ Waterfowl	Project Construction Ongoing	Stakeholder Support, Restoration Methodology/ Implementation	Funding

Table 3. Summary of all established beach and/or intertidal restoration projects in the Delaware Bay Region. The evaluation score was determined for each project by summing the status scores across all stages (4 - completed without complications, 3 - completed despite complications, 2 - ongoing/in progress, 1 - stalled or 0 - failed). A perfect score of 36 indicates that a project was completed successfully without any complications.

Project Name	Score	Status	Location	State	Acres	Habitat Type	Impairment	Restoration Strategy	Leading Entity	Target Species	Last Completed Stage	Failure/Stall Factors	Success Factors
Prime Hook NWR	26	Ongoing	Milton	DE	10	Freshwater Marsh/ Dune	Salt Water Intrusion	Dune Enhancement	DNREC, NWR	Shorebirds/ Marsh Birds/ Waterfowl	Permitting/ Stakeholder Support	Restoration Methodology/ Implementation / Partner Coordination	Stakeholder Support
Russell W. Peterson Wildlife Refuge	26	Ongoing	Willimington	DE	212	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	DEMC	Shorebirds/ Marsh Birds/ Waterfowl	Project Construction	Restoration Methodology/ Implementation / Permitting Delays	Partner Coordination/ Leadership/ Flexibility of Plan
Alloway Creek Watershed	27	Ongoing	Elsenboro, Lower Alloways Creek TWPs	NJ	1601	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	NJDFW, PSEG	Shorebirds/ Marsh Birds/ Waterfowl	Stakeholder Support/ Permitting	Stakeholder Support/ Restoration Methodology/ Implementation	Funding
Cape May Meadows	28	Ongoing	West Cape May	NJ	180	Freshwater Marsh/ Beach/ Dune	Salt Water Intrusion/ Habitat Loss/ Invasive Vegetation	Beach Nourishment/ Dune & Freshwater Marsh Enhancement/ *Phragmites* Control	USACE	Shorebirds/ Beach Nesting Birds/ Migratory Birds	Project Construction	Stakeholder Support/ Permitting Delays	Partner Coordination/ Leadership/ Flexibility of Plan
Living Shorelines/ Maurice River	28	Ongoing	Maurice River TWP	NJ	20	Intertidal Marsh/ Beach	Habitat Loss	Shoreline Stabilization	PDE	Marsh Species (Birds, Shellfish, Fish)	Implementation Ongoing	Funding/ Permitting Delays/ Restoration Methodology/ Implementation	Partner Coordination/ Stakeholder Support
The Rocks	28	Ongoing	Odessa	DE	550	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	PSEG	Shorebirds/ Marsh Birds/ Waterfowl	Permitting/ Stakeholder Support	Restoration Methodology/ Implementation	Funding
James Farm Ecological Preserve	31	Completed	Bethany Beach	DE	150	Intertidal Marsh	Tidal Restriction	Restore Flood Regime	DNREC, DEMC	Shorebirds/ Marsh Birds/ Waterfowl	Post-project Assessment	n/a	Stakeholder Support/ Flexibility of Plan/ Partner Coordination
Supawna Meadows NWR	31	Completed	Salem	NJ	7	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USACE	Marsh Birds/ Migratory Birds/ Waterfowl	Post-project Assessment	Restoration Methodology/ Implementation / Permitting Delays	n/a
Cedar Swamp	32	Ongoing	Odessa	DE	1863	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	PSEG	Shorebirds/ Marsh Birds/ Waterfowl	Project Constrction	Restoration Methodology/ Implementation	Funding

Table 3. Summary of all established beach and/or intertidal restoration projects in the Delaware Bay Region. The evaluation score was determined for each project by summing the status scores across all stages (4 - completed without complications, 3 - completed despite complications, 2 - ongoing/in progress, 1 - stalled or 0 - failed). A perfect score of 36 indicates that a project was completed successfully without any complications.

Project Name	Score	Status	Location	State	Acres	Habitat Type	Impairment	Restoration Strategy	Leading Entity	Target Species	Completed Stage	Failure/Stall Factors	Success Factors
Maurice River TWP Salt Hay Farm	32	Ongoing	Maurice River TWP	NJ	1135	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	NJDFW, PSEG	Shorebirds/ Marsh Birds/ Waterfowl	Project Construction	Permitting Delays/ Stakeholder Support/ Restoration Methodology/ Implementation	Funding
Mannington/ Supawna Meadows	33	Ongoing	Manningt on TWP	NJ	475	Intertidal Marsh	Invasive Vegetation	*Phragmites* Control	USFWS, NWR	Marsh Birds/ Migratory Birds/ Waterfowl	Project Construction	Permitting/ Restoration Methodology/ Implementation	Stakeholder Support
Dennis TWP Salt Hay Farm	34	Completed	Dennis TWP	NJ	384	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	NJDFW, PSEG	Shorebirds/ Marsh Birds/ Waterfowl	Post-project Assessment	Stakeholder Support/ Permitting Delays	Funding
Newport Marsh	34	Ongoing	Newport Marsh	DE	50	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	DEMC, DEDOT, DEDFW, Delmarva Power	Marsh Birds	Project Construction	n/a	Partner Coordination/ Leadership/ Flexibility of Plan
Cohansey River Watershed	35	Completed	Fairfield, Hopewell TWPs	NJ	400	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	NJDFW, PSEG	Shorebirds/ Marsh Birds/ Waterfowl	Post-project Assessment	Stakeholder Support, Restoration Methodology/ Implementation	Funding
Green Creek/ Schellinger's Creek	35	Completed	Green Creek	NJ	292	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USFWS, CMCDM C	Marsh Birds/ Migratory Birds/ Waterfowl	Post-project Assessment	Stakeholder Support	Flexibility of Plan/ Restoration Methodology/ Implementation
Heislerville	35	Completed	Heislervill e	NJ	50	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	NJDFW	Shorebirds/ Marsh Birds/ Waterfowl	Post-project Assessment	Funding	n/a
Market Lane	35	Completed	Greenwic h	NJ	25	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USFWS	Marsh Birds/ Migratory Birds/ Waterfowl	Post-project Assessment	Permitting Delays/ Restoration Methodology/ Implementation	Flexibility of Plan
Mispillian Harbor/ Back Beach	36	Completed	Milford	DE	50	Beach	Habitat Loss	Beach Nourishment	DNREC, USACE	Shorebirds/ HSC	Post-project Assessment	n/a	Flexibility of Plan/ Partner Coordination
Moore's Beach	36	Completed	Delmont	NJ	25	Beach	Habitat Degradation	Debris Removal	NJDFW, Maurice River TWP	Shorebirds/ HSC	Post-project Assessment	Stakeholder Support	Partner Coordination

Table 4. Summary of factors affecting beach and/or intertidal restoration projects in the Delaware Bay Region. Negative factors (-) caused delays or failure. Positive (+) factors facilitated the progress and/or success of a project. Note that some projects were influenced by more than one factor. The total # of projects that are influenced either negatively (-) or positively (-) is summed by factor in the last row.

Project Status	Leadership		Funding		Restoration Methodology/ Implementation		Flexibility of Plan		Permitting/ Regulatory		Partner Coordination		Stakeholder Support	
	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Completed	0	0	1	2	3	1	0	4	3	0	0	3	4	1
Ongoing	0	2	1	5	9	0	0	2	5	0	1	3	4	2
Stalled	1	0	5	1	1	0	0	0	4	1	1	0	2	2
Failed	0	0	4	0	1	0	0	0	2	0	0	0	1	1
TOTAL # of Projects	**1**	**2**	**11**	**8**	**14**	**1**	**0**	**6**	**14**	**1**	**2**	**6**	**11**	**6**

Table 5. A comparison of average scores and project status for New Jersey and Delaware.

	Average Score	Total # Projects	Failed		Stalled		Ongoing		Complete		Failed/ Stalled		Complete/ Ongoing	
All Projects	25	31	4	13%	7	23%	11	35%	9	29%	11	35%	20	65%
NJ	25	22	3	14%	6	27%	6	27%	7	32%	9	41%	13	59%
DE	26	9	1	11%	1	11%	5	56%	2	22%	2	22%	7	78%

Table 6. Summary of all potential beach and/or intertidal restoration opportunities in the Delaware Bay Region.

Project Name	Need	Location	State	Acres	Habitat Type	Impairment	Restoration	Leading Entity	Target Species	Current Stage	Probability of Success
Cox Hall Creek	Funding	Town Bank	NJ	2150	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USFWS, Cape May Co	Migratory Birds/ Marsh Birds	Project Design	75-100%
Grassdale	Funding	Delaware City	DE	86	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USACE	Marsh Birds/ Waterfowl	Project Design	75-100%
Mason's Point	Funding	Elsinboro TWP	NJ	930	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	PSEG, NJDFW	Shorebirds/ Marsh Birds/ Waterfowl	n/a	50-75%
Milford Neck	Funding	Milford	DE	2800	Intertidal Marsh	Tidal Restriction	Restore Flood Regime	DNREC	Shorebirds/ Marsh Birds/ Waterfowl	n/a	50-75%
Mill Creek/ Wheaton Run	Funding	Bridgeton	NJ	143	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USFWS	Marsh Birds/ Waterfowl	Project Design	25-50%
Mispillian Harbor/ Back Beach	Funding	Milford	DE	50	Beach	Habitat Loss	Beach Re-nourishment	DNREC, USACE	Shorebirds/ HSC	Project Design	50-75%
Pond Creek	Funding	West Cape May	NJ	170	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USFWS, NJDFW, USACE	Migratory Birds/ Marsh Birds	Project Design/ Permitting	50-75%
Port Mahon	Funding	Port Mahon	DE	25	Intertidal Marsh/ Beach	Tidal Restriction/ Habitat Loss/ Degradation	Restore Flood Regime/ Beach Nourishment	DNREC	Shorebirds/ HSC/ Waterfowl	Project Design	50-75%
Reeds Beach/ Pierces Point	Funding	Reed's Beach	NJ	25	Beach	Habitat Loss	Beach Nourishment	USACE	Shorebirds/ HSC	Project Design/ Permitting	50-75%
Stone Harbor Point	Funding	Stone Harbor	NJ	116	Beach/ Dune	Habitat Loss	Beach/ Dune Re-nourishment	USACE	Shorebirds/ Beach Nesting Birds	Project Design	50-75%
Ted Harvey	Funding	Bowers	DE	2700	Beach	Habitat Loss	Beach Nourishment	DNREC	Shorebirds/ HSC	n/a	50-75%
Thompson's Beach	Funding/ Local Support/ Permitting	Maurice River TWP	NJ	25	Beach	Habitat Degradation	Debris Removal	TNC, NJDFW	Shorebirds/ HSC	Project Design/ Permits Submitted	75-100%
Thousand Acre Marsh	Funding/ Local Support	Delaware City	DE	400	Intertidal Marsh	Tidal Restriction	Restore Flood Regime	DEMC	Shorebirds/ Marsh Birds/ Waterfowl	Project Design	25-50%
Upper Portions of Delaware Estuary	Funding	Cumberland/ Salem Counties	NJ	1000+	Intertidal Marsh	Invasive Vegetation	*Phragmites* Control	NJDFW	Shorebirds/ Migratory Birds/ Marsh Birds	Project Design	75-100%
Watson's Dike	Funding	Greenwich TWP	NJ	3	Intertidal Marsh	Tidal Restriction/ Invasive Vegetation	Restore Flood Regime/ *Phragmites* Control	USFWS, Cumberland Co	Migratory Birds/ Marsh Birds	Project Construction	25-50%

Appendix C: List of Acronyms

CFIB – Delaware Center For the Inland Bays
CMCDMC - Cape May County Department of Mosquito Control
DEDFW – Delaware Division of Fish and Wildlife
DEDOT – Delaware Department of Transportation
DEMC – Delaware Mosquito Control
DNREC – Delaware Department of Natural Resources and Environmental Control
DU – Ducks Unlimited
EEPAC- Estuary Enhancement Project Committee
NJBCE – NJ Bureau of Coastal Engineering
NJDEP – NJ Department of Environmental Protection
NJDFW – NJ Division of Fish and Wildlife
NJDPF – NJ Division of Parks and Forestry
NJNRD - NJ Natural Resource Damages
NOAA – National Oceanic and Atmospheric Administration
NWR – National Wildlife Refuge
PDE – Partnership for Delaware Estuary
PSEG – Power Service Electric & Gas
TNC – The Nature Conservancy
USACE – US Army Corps of Engineers
USFWS – US Fish and Wildlife Service