

*New Jersey Department of Transportation  
Office of Maritime Resources*

Ensuring Sustainable Marine Transportation by  
Beneficially Using Dredged Material  
to Support Marsh Ecosystems in Coastal New Jersey

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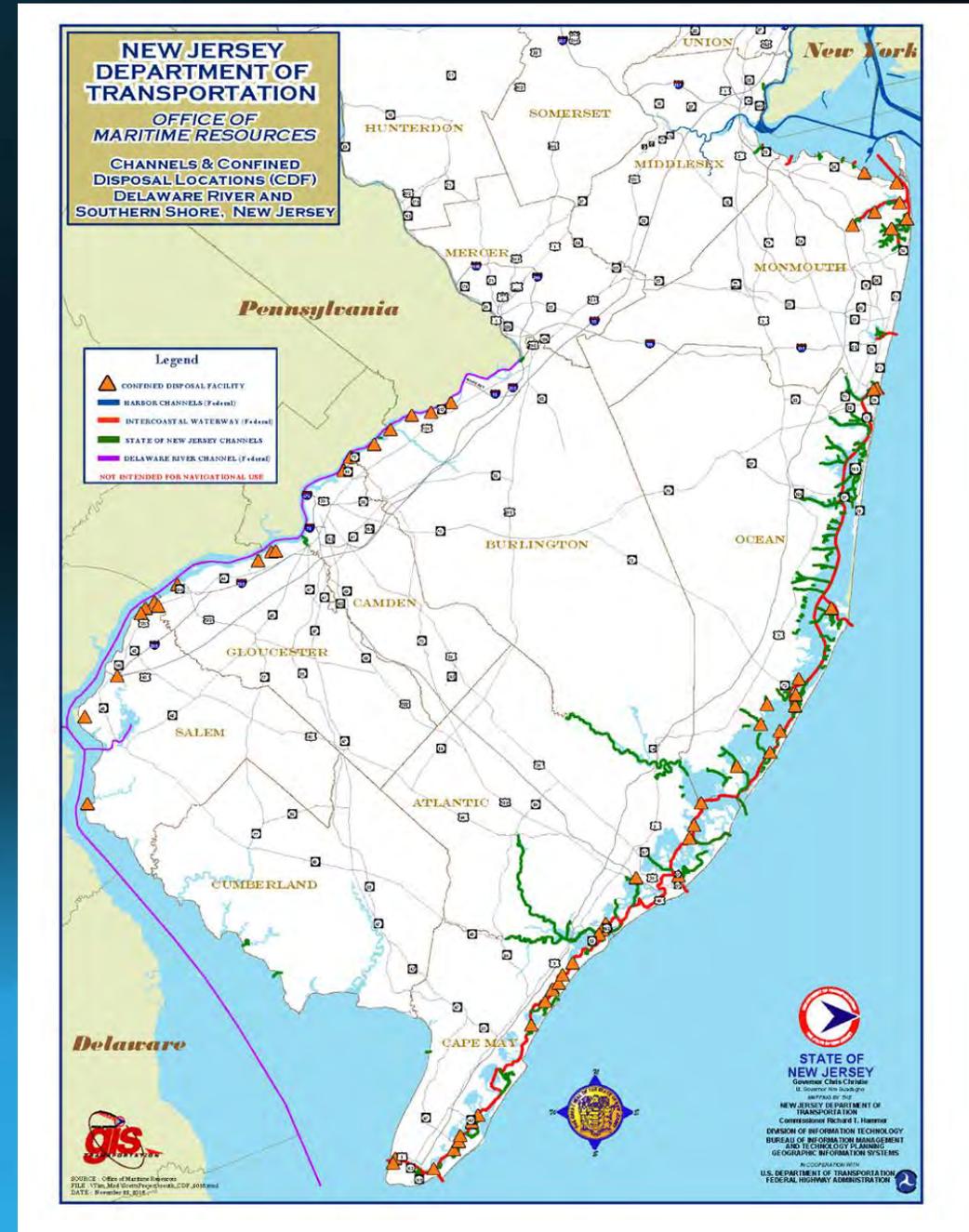
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# *Introduction*

- Background on the NJ Marine Transportation System
- Condition of coastal marsh system in NJ
- Marsh/dune/island restoration projects recently completed
- Lessons Learned
- Upcoming projects

# New Jersey's Marine Transportation System

- Federal Channels in NY/NJ Harbor, Delaware River, and NJ Intracoastal Waterway; over 465 nm (860 km) of engineered waterways
- State Channel Network - 215 Marked and Identified Channels; over 200 nm (370 km) of engineered waterways
- Two International Ports (PONYNJ and South Jersey Port Corporation)
- Internationally recognized tourism destination
- World Class Fishery (most lucrative shellfishery in the U.S.)
- Worth over \$50 billion annually to the New Jersey economy



# Atlantic Shore Region

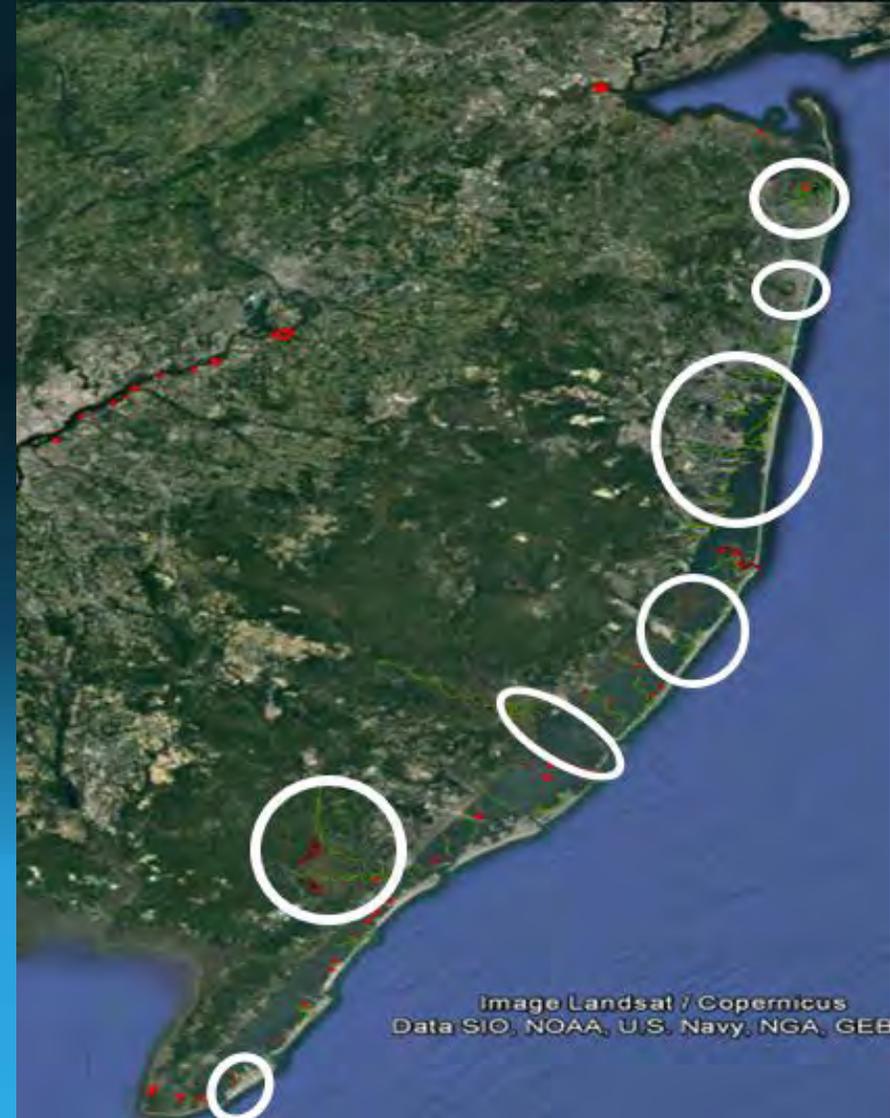


- 200 nm (370 km) of State channels
- 100 nm (185 km) of Federal Intracoastal Waterway
- 500,000 cy per year of material ranging from sand to silt
- Immediately following Superstorm Sandy we identified 3 million cubic yards of dredging need system wide
- Hydraulic cutterhead pipeline dredging to CDFs for silt or beachfill for sand



# Gap Analysis

- Roughly 7 areas statewide without readily available management options
- Over 100 channels affected
- Non-traditional technology is very expensive and time consuming
- Permit requirements often limit practical solutions – more hard data on dredging and dmm impacts are needed
- Sustainable solutions require community input and support



# *Dredged Material Management*

- **Confined Disposal**
- **Beach Replenishment**
- **Beneficial Use / Renewable capacity**
- **Mechanical/Passive Dewatering**
- **Marsh/Dune/Island Restoration**
- **Asset Management Strategies**
- **Regional Sediment Management**



WEDA Dredging Summit and Expo 2019



# *Example of NJ Coastal Marsh Loss*

1930



2015



# *Marsh Enhancement*

- 55 acres (22.5 ha); 62,000 cyd (47,400 CM); \$65/cyd



# *Dune Restoration*

2.6 acres (1 ha); 900 ft (275 M); 18,500 cyd (14,100 CM);  
\$85/cyd



WEDA Dredging Summit and Expo 2019

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# *Habitat Creation*

- 1 acre (0.4 ha)
- 7000 cyd (5300 CM) clean sand
- \$61/cyd
- 6 Nesting pairs of American Oystercatchers – NJ Species of Special Concern
- 30 nesting pairs of Least Terns – NJ Endangered
- 15 nesting pairs of Black Skimmer – NJ Endangered
- 60 nesting pairs of Common Terns



# *Island Restoration*

- 4 acres (1.6 ha)
- 25,000 cyd (19,100 CM)
- \$32/cyd
- Hydraulic placement
- Hay bales used for material retention
- Silt curtain used to protect nearby SAV
- Intertidal vegetation planted to stabilize dredged material
- Unintentional creation of beach nesting bird habitat



# *Lessons Learned*

- Collaboratively define success criteria up front with all stakeholders involved
- Make sure contractor has experience with the placement technique
- Minimize work on the marsh (equipment/containment)
- Adaptive management happens before, during and after construction – avoid over-engineering, but define your strategies up front
- Be prepared, be flexible, be patient
- Full recovery may take longer than expected due to natural geochemical processes

# *Marsh Restoration Projects Utilizing DM*

Project	Location	Strategy	Capacity (CM)	Cost
Fortescue	Delaware Bay	Marsh/Dune Enhancement	37,000 cy (28,300)	3.4M
Avalon	Cape May	Marsh Enhancement	55,000 cy (42,000)	1.8M
Ring Island	Cape May	Dune Creation	7,000 cy (5300)	0.43M
Mordecai Island	Barnegat Bay	Island Restoration	25,000 cy (19,100)	0.8M
Good Luck Pt.	Barnegat Bay	Marsh Enhancement	16,000 cy (12,200)	1.5M
2-Mile Landing	Cape May	Shoreline Stabilization	145,000 cy (111,000)	13.0M
Popular Pt.	Barnegat Bay	Shoreline Stabilization	80,000 cy (61,100)	7.2M
Tuckerton	Barnegat Bay	Marsh Enhancement	265,000 cy (202,600)	23.8M
Shaw Island	Cape May	Island/Marsh Restoration	120,000 cy (91,700)	10.8M

# *Marsh Enhancement and Dune Restoration at Good Luck Point*



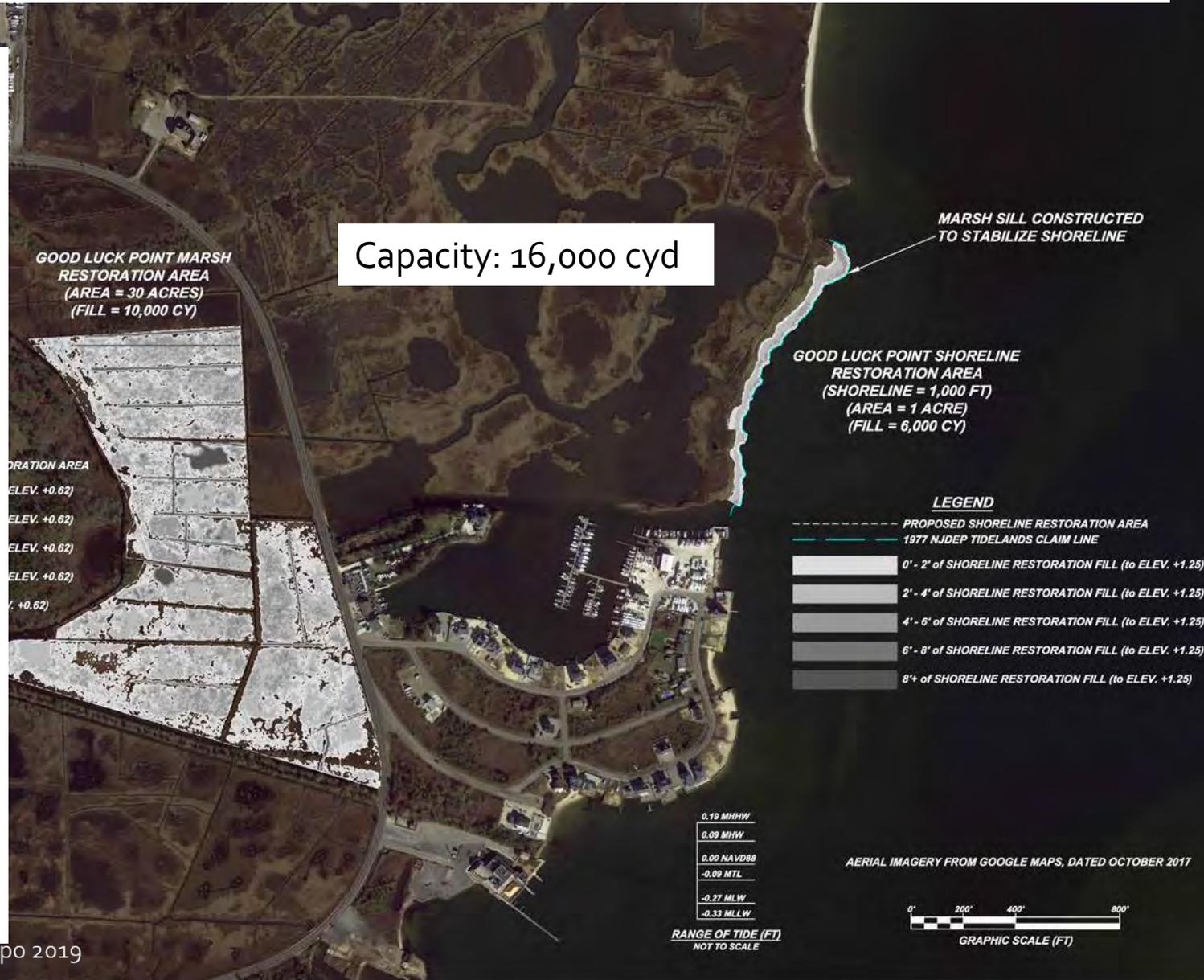
# Good Luck Point Restoration Area



## Project Specifics

- 30 acres (12 ha) of marsh and 1000 ft (300 M) of shoreline
- 10,000 cyd (7,600 CM) of fine grained, 6000 cyd (4,500 CM) of coarse
- <1' (0.3 M) average fill thickness
- Free pump using diffusers
- Create dune or beach with coarse material to protect shoreline

Capacity: 16,000 cyd



# *Marsh Enhancement and Shoreline Stabilization at Tuckerton Marsh*



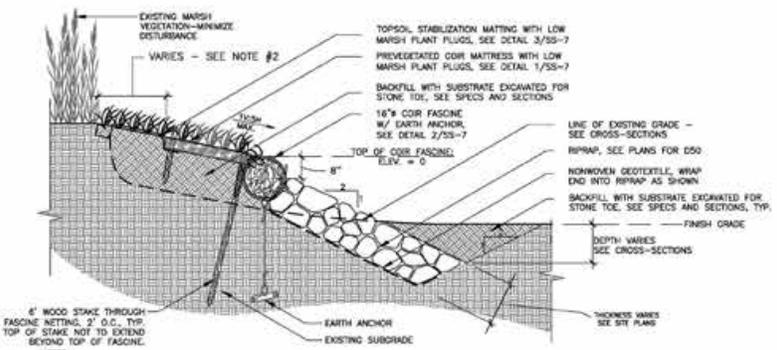
# Tuckerton Marsh Rd Restoration Area

## Project Specifics

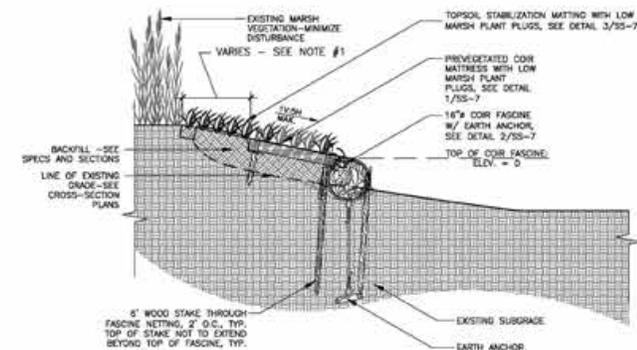
- 164 acres (66 ha) of marsh and 7400 ft (2256 M) of shoreline
- Marsh Platform Enhancement w/shoreline protection
- Free pump using diffusers
- 1' (0.3 M) average fill thickness
- Fill in excavated holes and mosquito ditches
- Level out old CDF berms to allow free tidal flow
- Stabilize shoreline using oyster bags or stone
- Relocate CDF closer to road for longterm maintenance



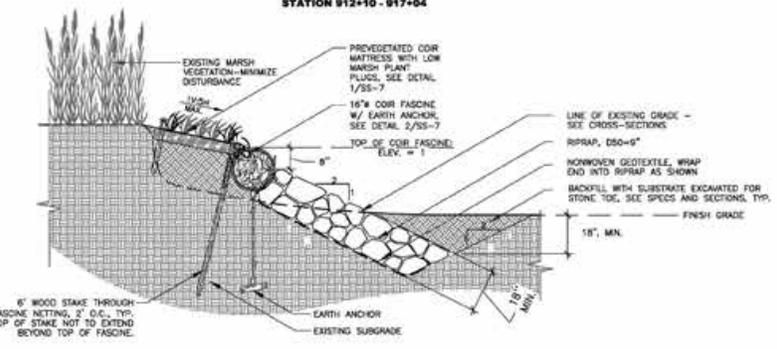
# Erosion Control Measures



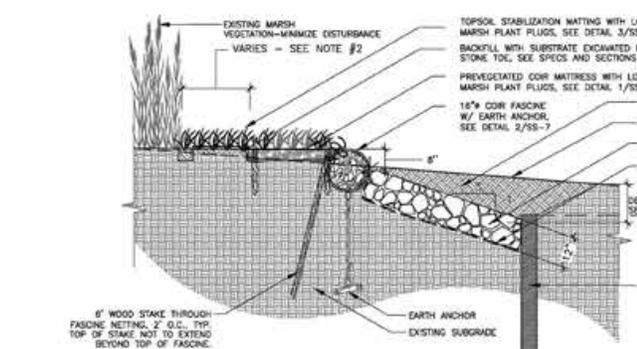
**1 MARSH PLANTING, COIR FASCINE, AND STONE TOE**  
 NOT TO SCALE  
 STATION 600+21 - 605+87  
 STATION 701+81 - 703+86  
 STATION 706+12 - 713+27  
 STATION 800+76 - 808+40  
 STATION 811+66 - 817+02  
 STATION 898+89 - 900+69  
 STATION 912+10 - 917+04



**2 MARSH PLANTING AND COIR FASCINE**  
 NOT TO SCALE  
 STATION 700+82 - 701+81  
 STATION 813+47 - 816+85  
 STATION 902+80 - 903+40  
 STATION 909+92 - 912+10



**3 MARSH PLANTING, COIR FASCINE, AND STONE TOE**  
 NOT TO SCALE  
 STATION 901+65 - 907+12



**4 MARSH PLANTING, COIR FASCINE, STONE TOE, AND SHEET**  
 NOT TO SCALE  
 STATION 900+60 - 902+50



# *Marsh Restoration and Shoreline Stabilization at 2 Mile Landing*



**LEGEND**

- PROPOSED SHORELINE RESTORATION AREA
- 1977 NJDEP TIDELANDS CLAIM LINE
- 0' - 2' of SHORELINE RESTORATION FILL (to ELEV. +2.50)
- 2' - 4' of SHORELINE RESTORATION FILL (to ELEV. +2.50)
- 4' - 6' of SHORELINE RESTORATION FILL (to ELEV. +2.50)
- 6' - 8' of SHORELINE RESTORATION FILL (to ELEV. +2.50)
- 8'+ of SHORELINE RESTORATION FILL (to ELEV. +2.50)

AERIAL IMAGERY FROM GOOGLE MAPS, DATED AUGUST 2016

2.28 MHHW  
 1.87 MHW  
 0.00 NAVD88  
 -0.36 MTL  
 -2.60 MLW  
 -2.77 MLLW

RANGE OF TIDE (FT)  
 NOT TO SCALE

0' 200' 400' 800'

GRAPHIC SCALE (FT)

Capacity: 145,000 cyd

MARSH SILL CONSTRUCTED TO STABILIZE SHORELINE

TWO-MILE LANDING SHORELINE RESTORATION AREA  
 (SHORELINE = 5,000 LF)  
 (AREA = 14 ACRES)  
 (FILL = 158,000 CY)

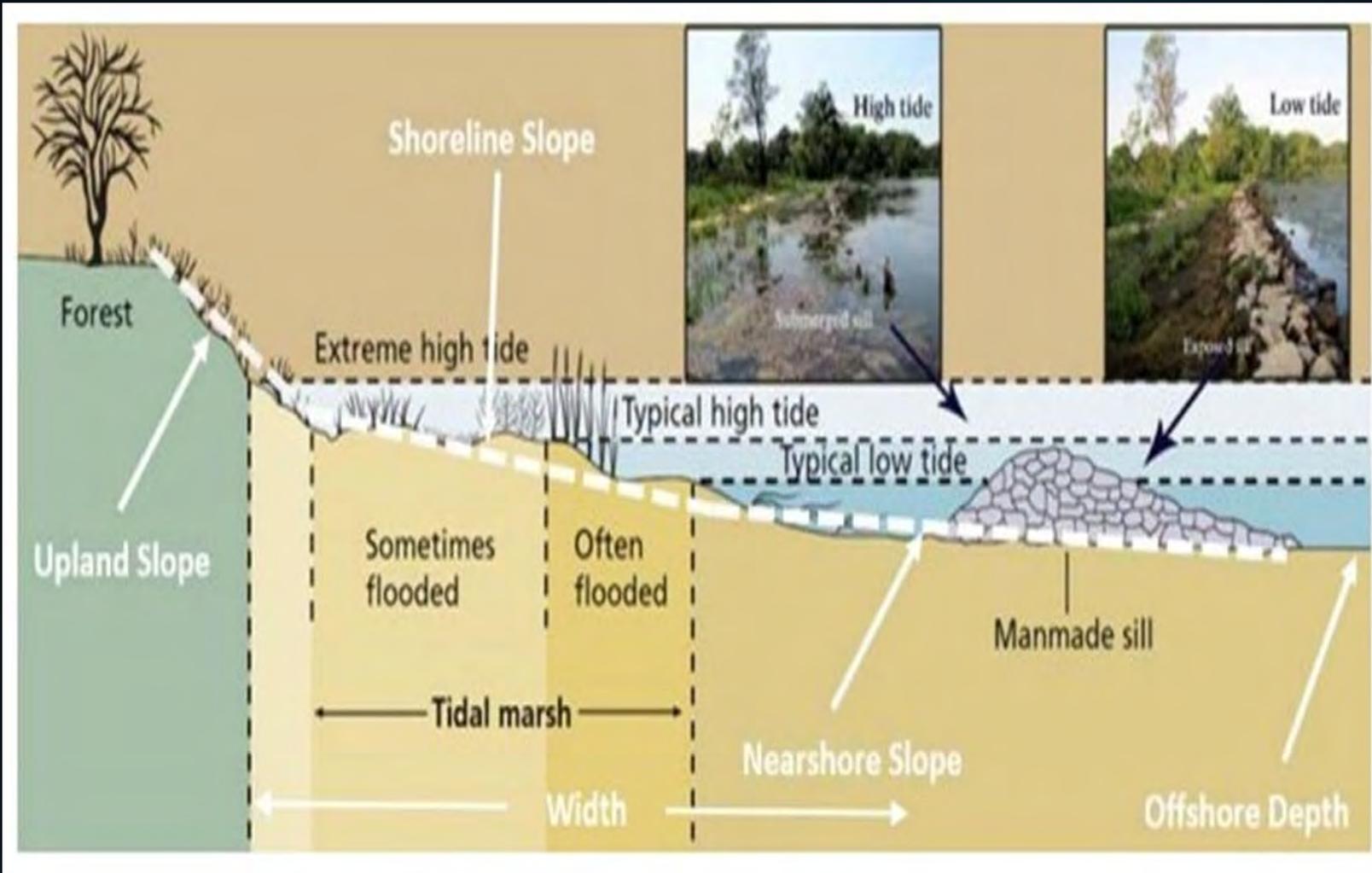
MARSH SILL CONSTRUCTED TO STABILIZE SHORELINE

**Project Specifics**

- Shoreline Stabilization and Marsh Restoration
- 19 acres (7.7 ha) of wetland, 5000 ft (1500 M) of shoreline
- Create rock or shell sill to hold material and stabilize shoreline
- Sill will allow tidal exchange
- Plant area once dewatered

# Two Mile Landing Restoration Area

# Design Profile



- Retention structure required to hold material while it consolidates
- Retention sills need to allow tidal exchange if marsh species are to thrive
- Elevation matters!
- Consolidation of material over time will require monitoring

# *Material Retention Strategies*



# *Marsh Restoration and Shoreline Stabilization at Popular Point*



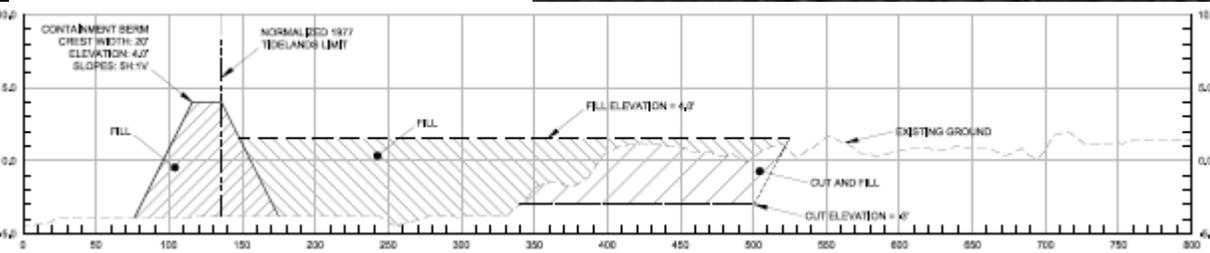
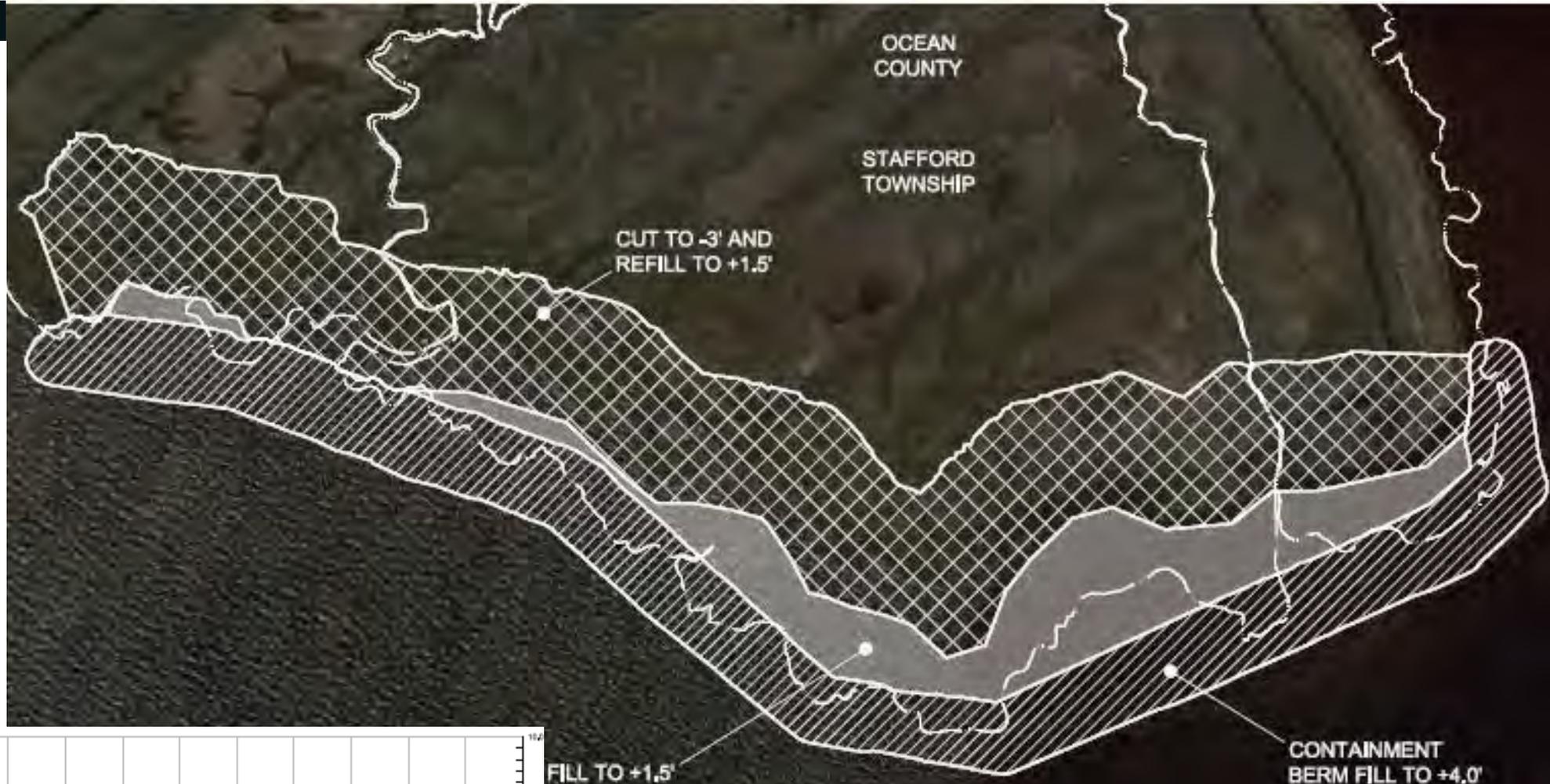
# *Historical Berm*



# Popular Point Restoration Area

## Project Specifics

- Shoreline stabilization, marsh and dune restoration
- 13 acres (5 ha) of wetland, 2,500 ft (762 M) of shoreline
- Evaluating alternatives to rock sill for material retention.
- May need erosion control measures



Capacity: 63,000 cyd

# *Island Restoration / Marsh Creation at Shaw Island*

- 25 acres (10 ha) of wetland to be created
- 120,000 cyd (91,700 CM) of material needed
- \$40-60 per cyd
- Retain CDF as renewable capacity



# *Ongoing Challenges*

- Procurement process
- Limited work windows
- Public perception
- Regulatory framework needed
- Stakeholder partnering
  - Habitat conversion
  - Site selection
  - Wetland laws
- Cost/benefit apportionment



*Questions?*

**WERE ON A MISSION  
FROM GOD**

