

*New Jersey Department of Transportation
Office of Maritime Resources*

Thin layer placement and other animals:
The Search for
Sustainable Dredged Material Management Solutions
in Coastal New Jersey

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Atlantic Shore Region

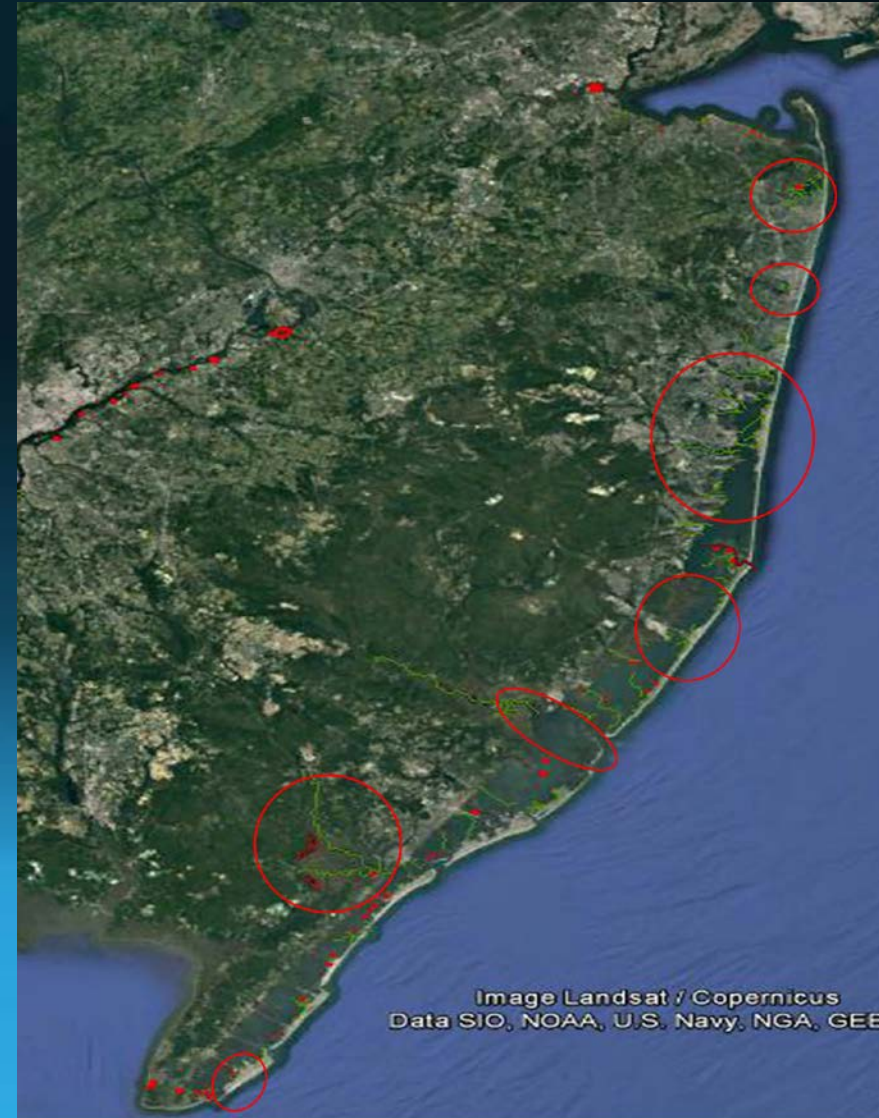


- 200 nm of State channels
- 100 nm of Federal Intracoastal Waterway
- 500,000 cy per year of material ranging from sand to silt
- Hydraulic cutterhead pipeline dredging to CDFs for silt or beachfill for sand
- Historically handled by Bureau of Coastal Engineering at NJDEP



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**
- State Policy for Beneficial Use
- Regional Sediment Management
- Keep Sediment in the System if Possible

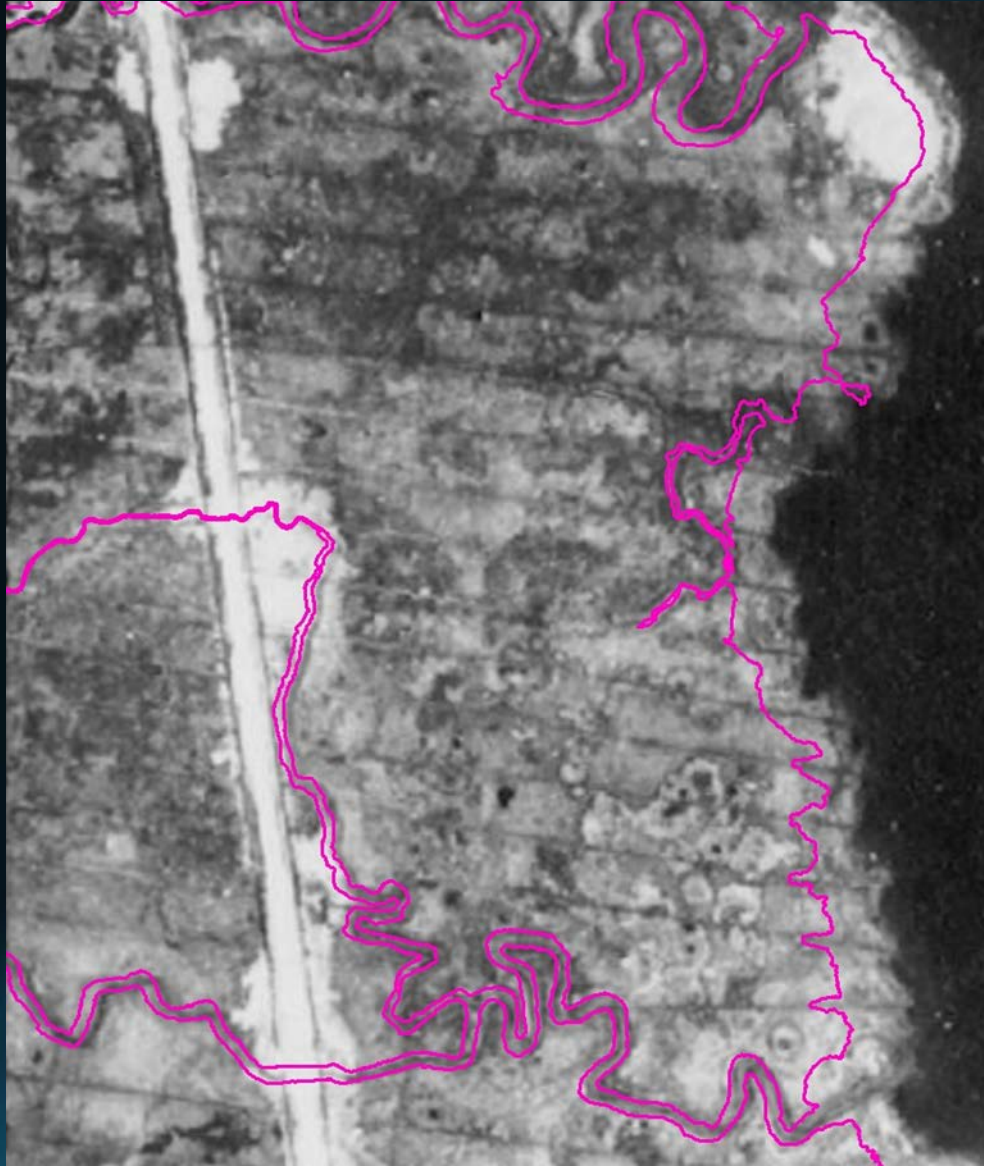


Marsh Restoration



Example of NJ Coastal Marsh Loss

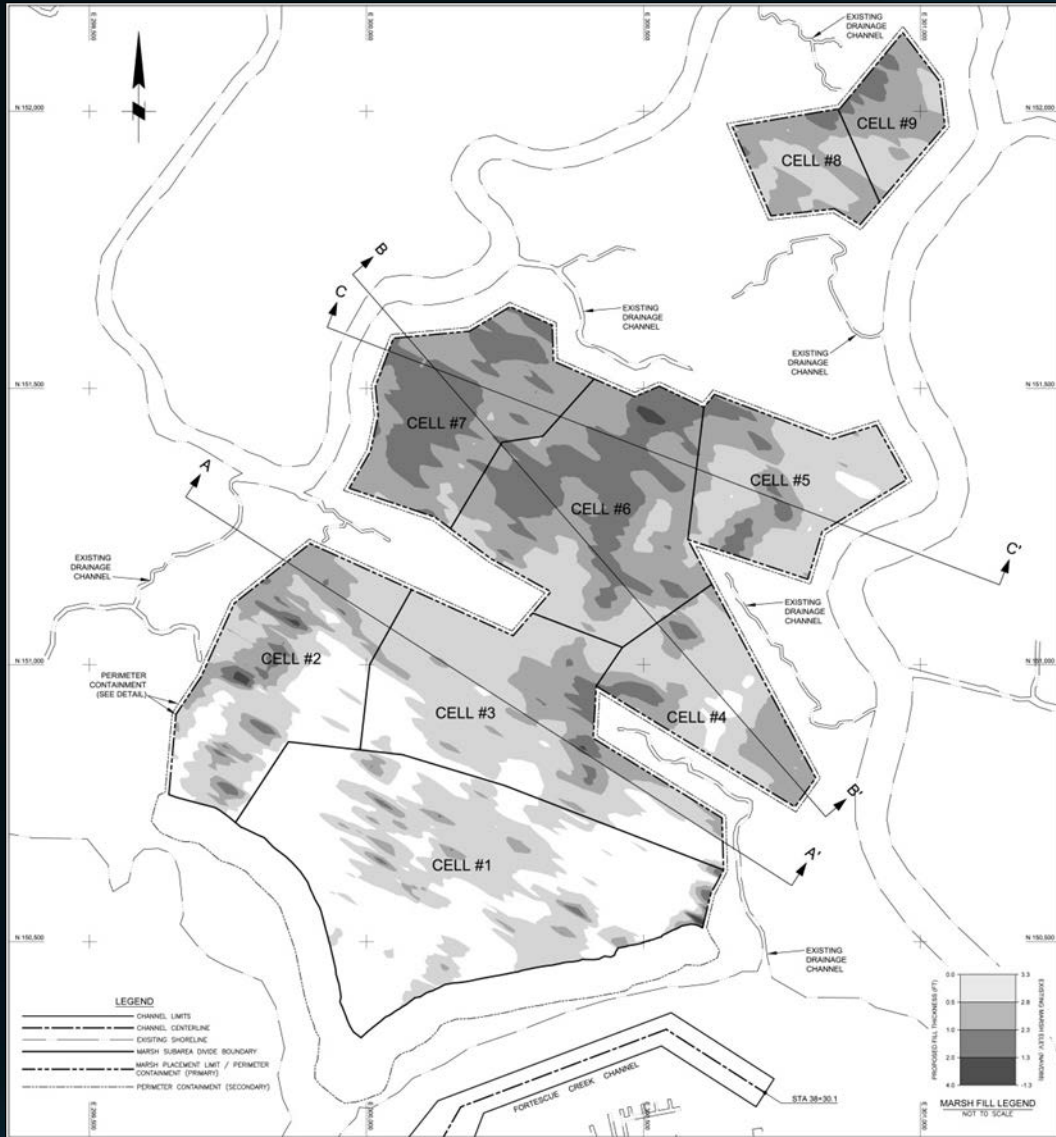
1930



2015

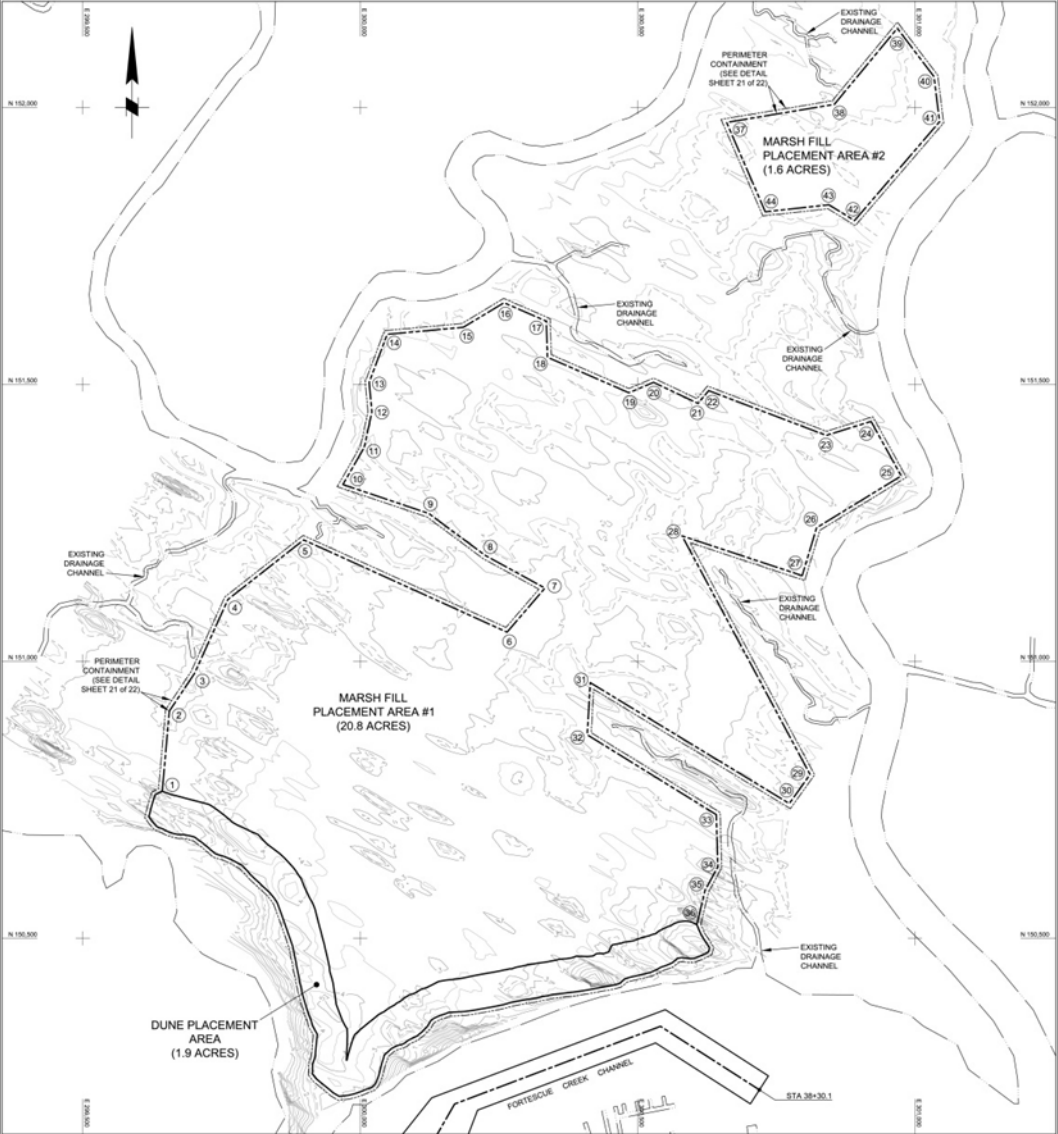


Fill Thickness



- Focus on biological endpoints of plant communities
- Final elevation drives plant communities
- Fill may be thin or thick depending on initial conditions and project goals
- Important to monitor consolidation and plant succession
- Material type matters for construction and for goals

Material Containment



Material Distribution



Fill Placement in Sequence:

1. Install inflow piping for initial two sequences.
2. Three inflow points available any dredging day.
3. Three groupings of sequential fill. Change as directed by RE.
4. Direct inflow point within each grouping with quick change valves.
5. Each inflow point has both pipe spreader and nozzle discharge tools available.

Marsh Placement



Marsh Damage?



WEDA Dredging Summit and Expo 2018

Great Expectations

- Overall project: \$106/cyd, 32070 cyd
- Marsh alone: \$236/cyd, 6490 cyd (construction only, engineering/oversight/monitoring not included)
- Minimize Containment
- Provide Options
- Contractor Experience
- Manage Expectations

Dune Restoration

- 18,500 cyd, \$85/cyd



Unconfined Upland Placement

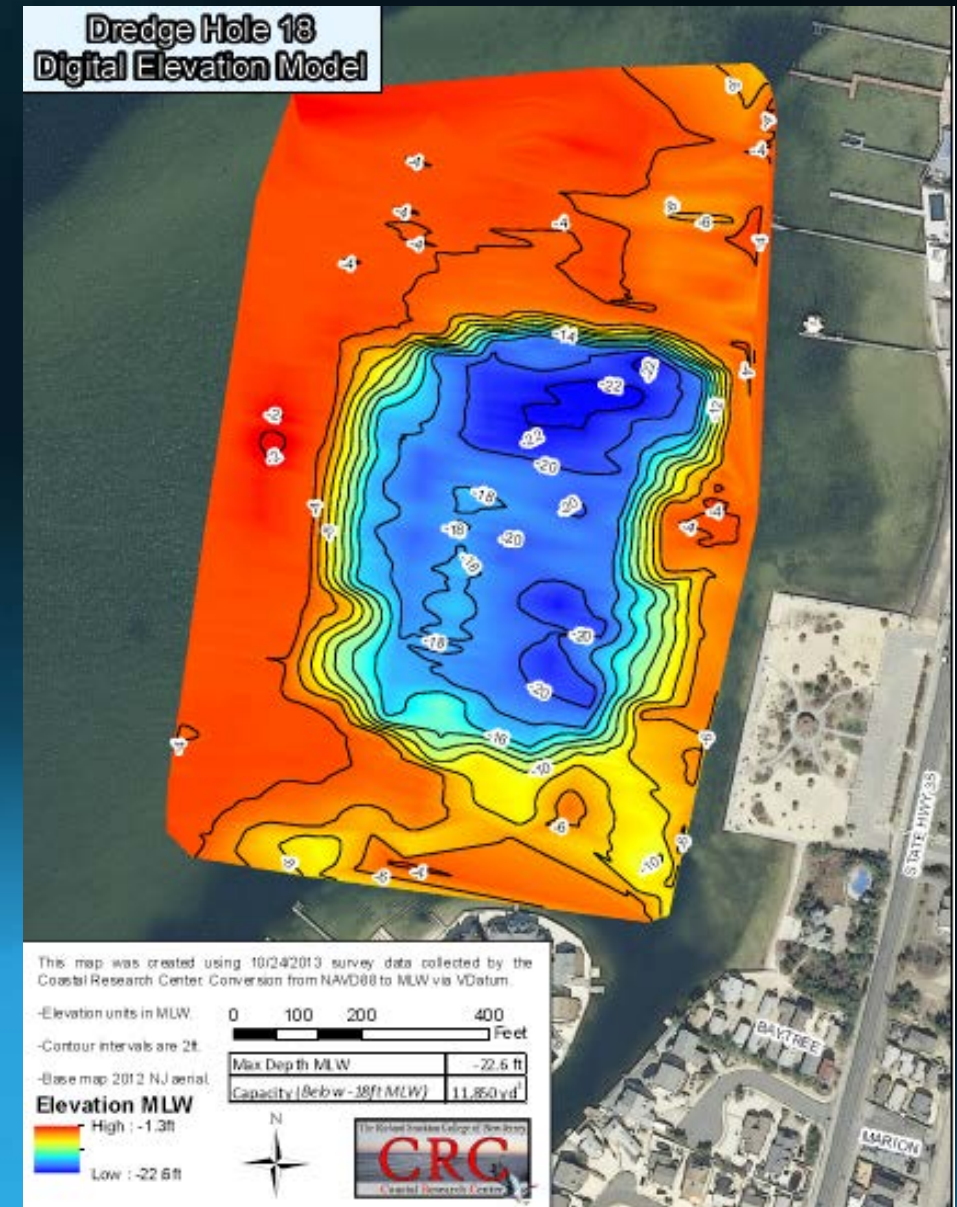


- 1 acre
- 6000 cyd clean sand
- 6 Nesting pairs of American Oystercatchers – NJ Species of Special Concern
- 30 nesting pairs of Least Terns – NJ Endangered
- 15 nesting pairs of Black Skimmer – NJ Endangered
- 60 nesting pairs of Common Terns



Confined Open Water Placement

- 122 borrow pits or “dredged holes” in back bay areas of coastal NJ
- Evaluated for size/depth, water quality and benthic community
- Screened for viability: capacity, proximity to channels, habitat improvement potential
- 5 priority sites identified; 2 currently permitted for 450,000 cyd including 1ft sand cap
- 2 more sites in conceptual design
- 2.25 M cyd of potential capacity, possibly more if all of the sites can be restored to a higher elevation
- 180,000 cyd at \$65/cyd



Unconfined Open Water Placement



High energy environments

Clean material only

Use of ebb tide to move material to desired location

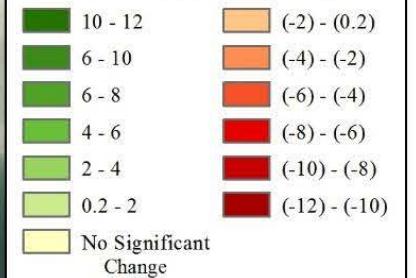
Unable to observe turbidity visually or with turbidity monitoring

8500 cyd, \$20/cyd

Beach Creek: Pre to Post-Dredging Elevation Change



Elevation Change (in feet)



▲ Water Quality Samples

▣ Inlet Groin

▤ Volume Area

The Beach Creek Elevation Change Map was created by comparing bathymetric data collected on October 31, 2017 and January 24, 2018 by the Stockton University Coastal Research Center.

Estimated volume change across surveyed area:
-49,680 cubic yards

Estimated volume change in masked area:
+2,960 cubic yards

Elevation Changes are in feet.

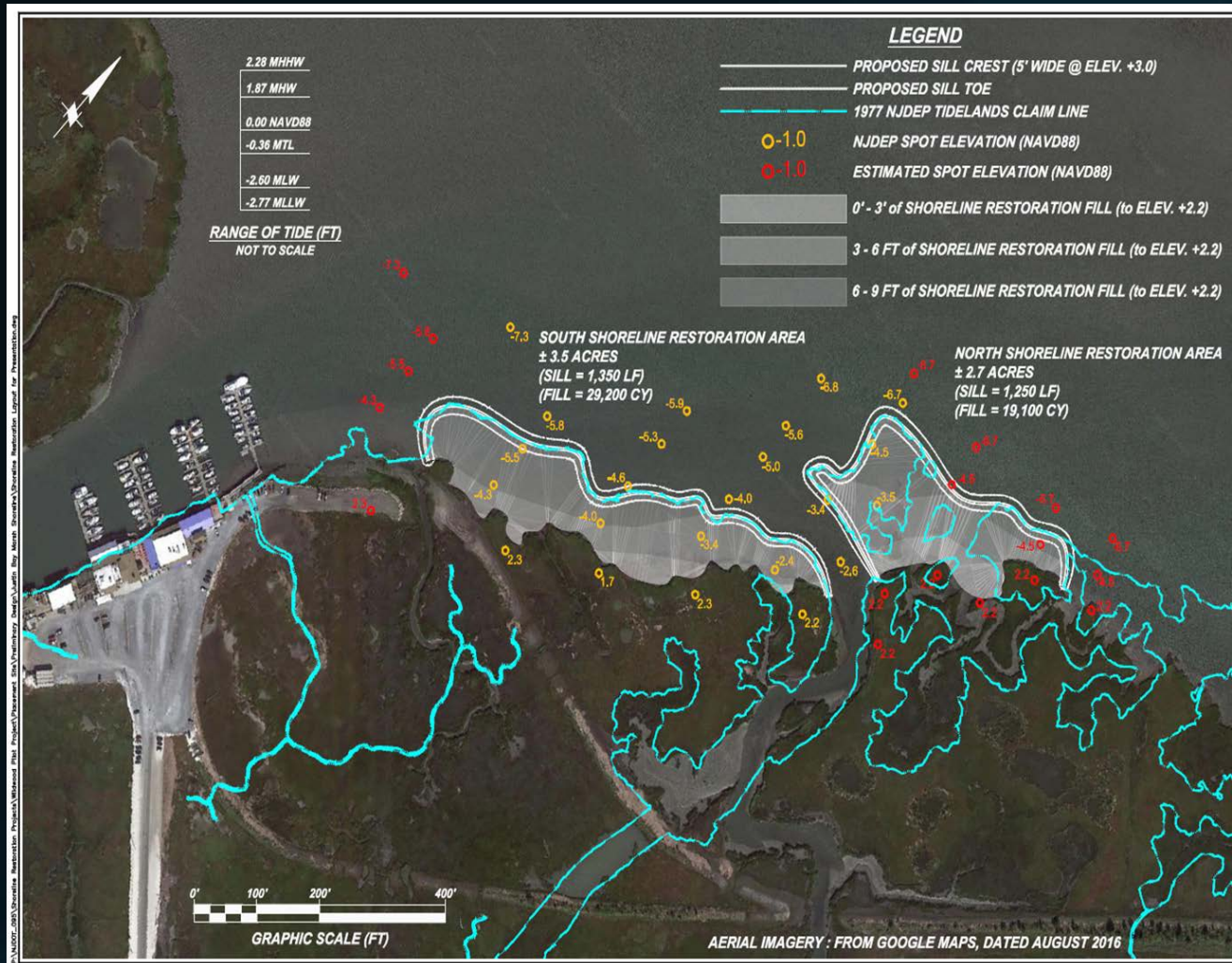
Base Aerial Imagery: 2015



Shoreline Stabilization



Concept Design

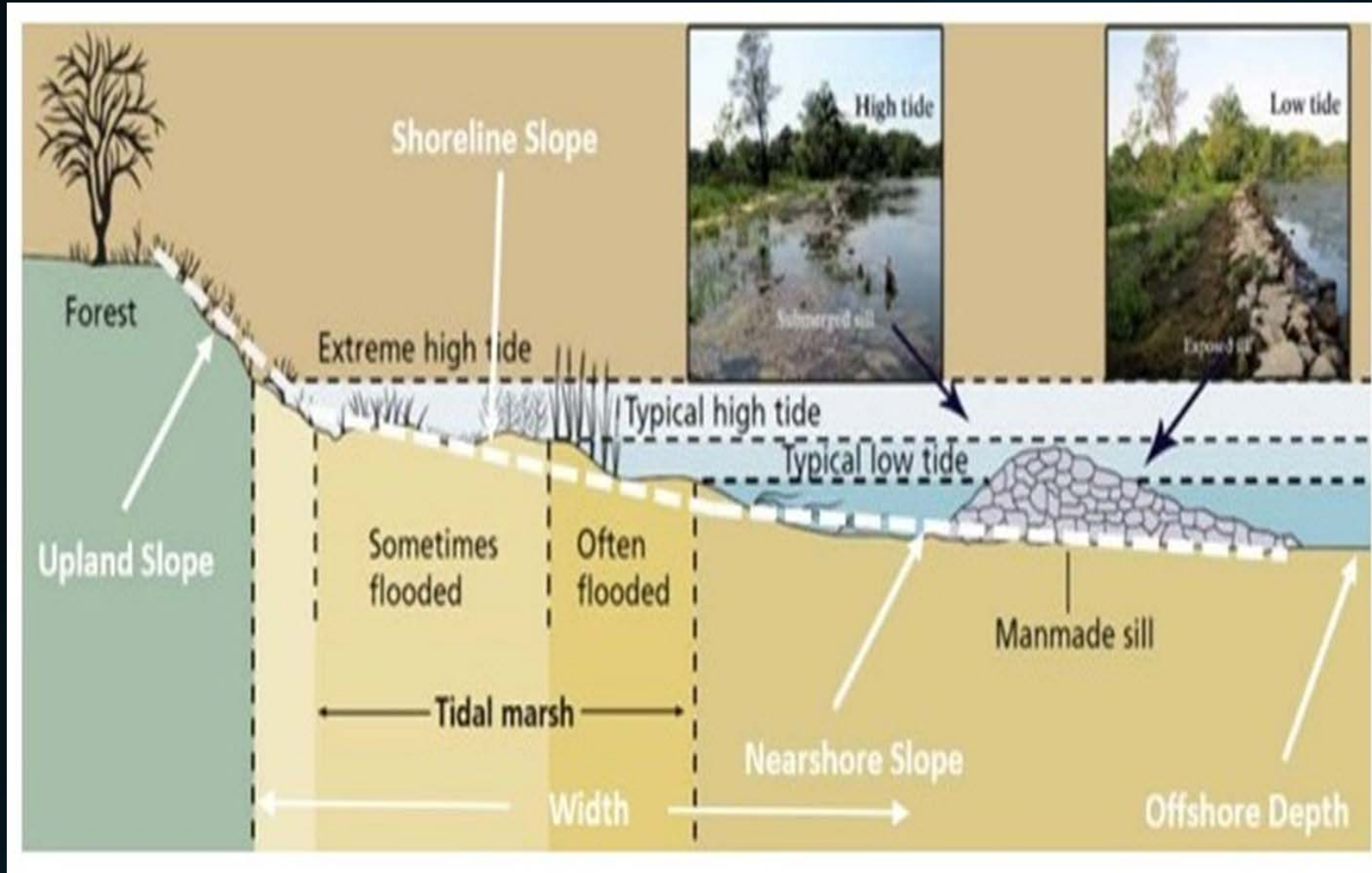


- Return shoreline to pre-existing 1977 limits
- Common sense with regard to geometry avoid “little fences and mudpies”
- Need to identify areas with enough material need to justify set up
- Will need understanding of coastal conditions (wind, tide, waves)
- 48,300 cyd at \$138/cyd

Material Retention Strategies

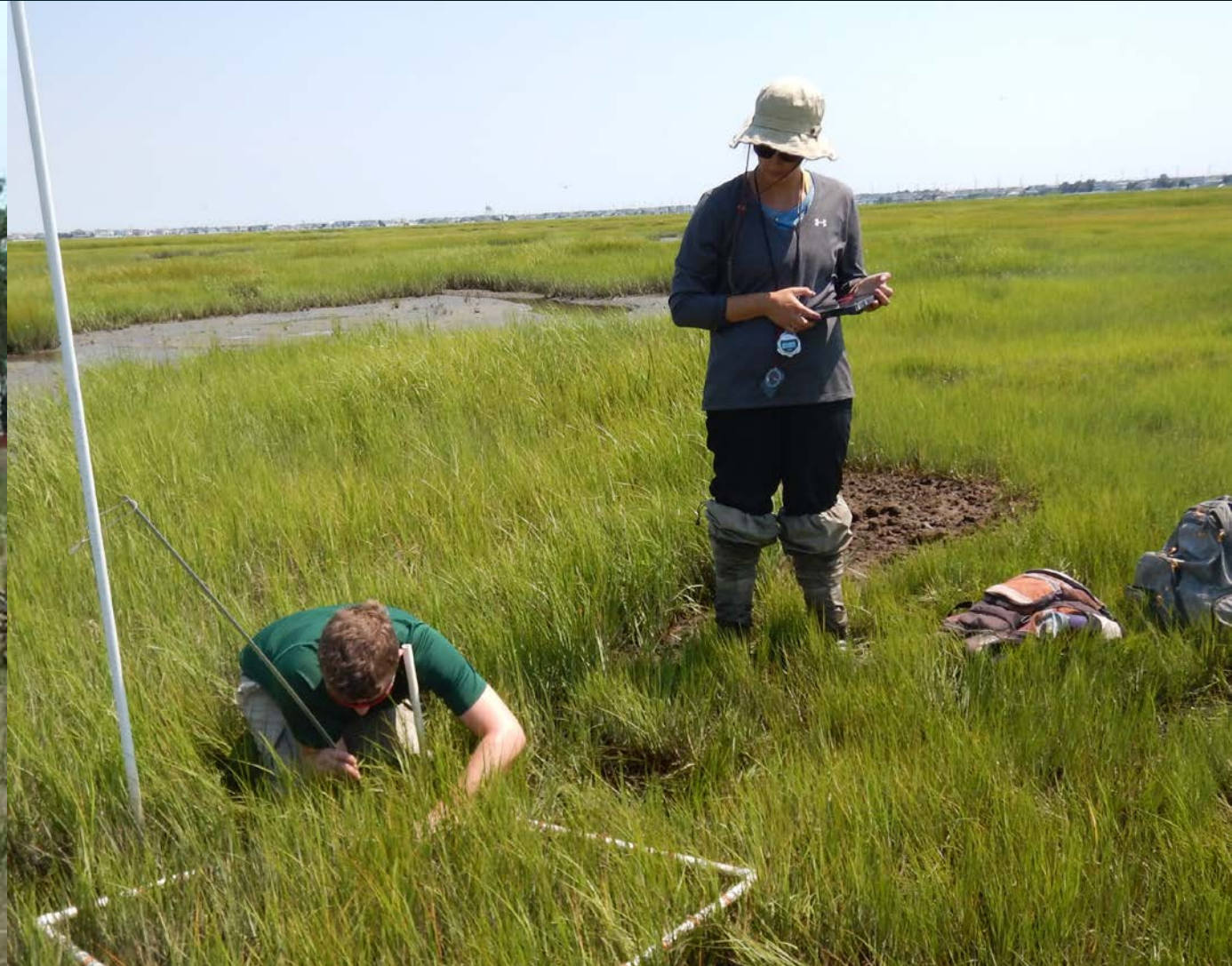


Design Profile



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

Plantings and Monitoring





Material Staging: Temporary CDFs



110 acres
180,000 cyd

Barnegat Bay Area
Current Need Exceeds
145,000 cyd

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Image © 2018 TerraMetrics

Lessons Learned

- Be prepared, be flexible, be patient
- We need to reach consensus on what constitutes an “impaired” or “stressed” ecosystem
- Full recovery may take longer than expected due to natural geochemical processes
- Adaptive management happens before, during and after construction – define who is responsible for what and how it will be paid for
- Make sure contractor has experience with the placement technique
- Minimize work on the marsh (equipment/containment)
- Multiple options/pathways will help ensure dredging costs do not escalate (what is your Plan B?)
- Separate dredging activities from restoration activities (monitoring/biological targets)

Questions?

