New Jersey Department of Transportation
Office of Maritime Resources

Rebuilding Stronger than the Storm: Enhancing the Resiliency of the NJ Marine Transportation System

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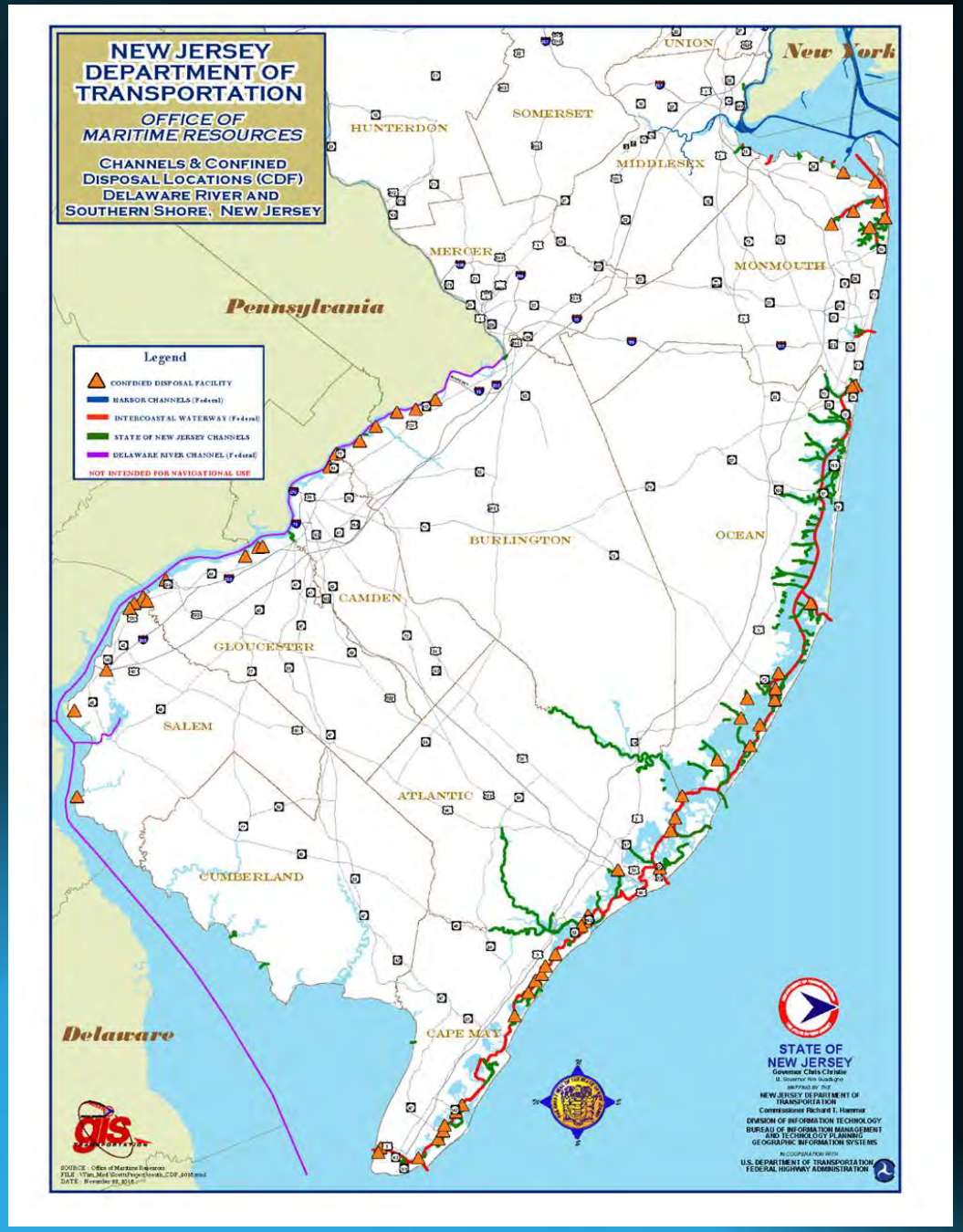
New Jersey's Marine Transportation System

- Federal Channels in NY/NJ Harbor, Delaware River, and NJ Intracoastal Waterway; over 750 km of engineered waterways
- State Channel Network - 215 Marked and Identified Channels; over 375 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



NY/NJ Harbor Region

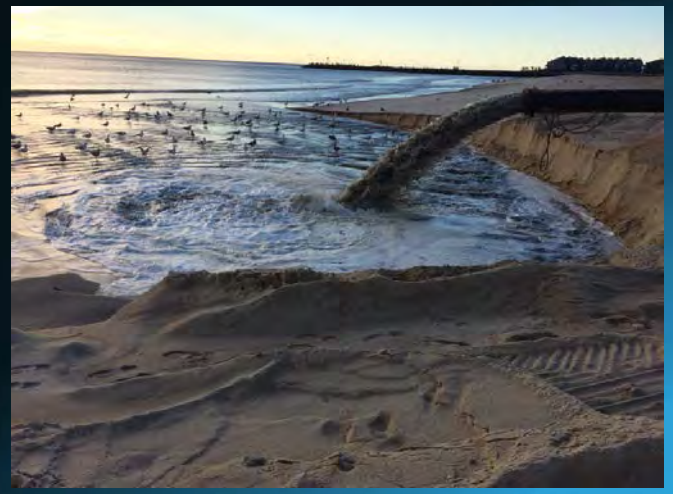
- Clamshell dredging
- Silty clay material
- 2-3 million m^3/yr
- High Debris
- Moderate to High Contamination
- High volume projects
- High economic value

Delaware River Region

- Mixed fine sand to gravel, some silt
- Hydraulic dredging to large, Federally owned and operated CDFs
- 3-4 million m^3/yr
- Moderate economic value
- Low to moderate contamination
- Variable volume jobs
- Low debris

Atlantic Shore Region

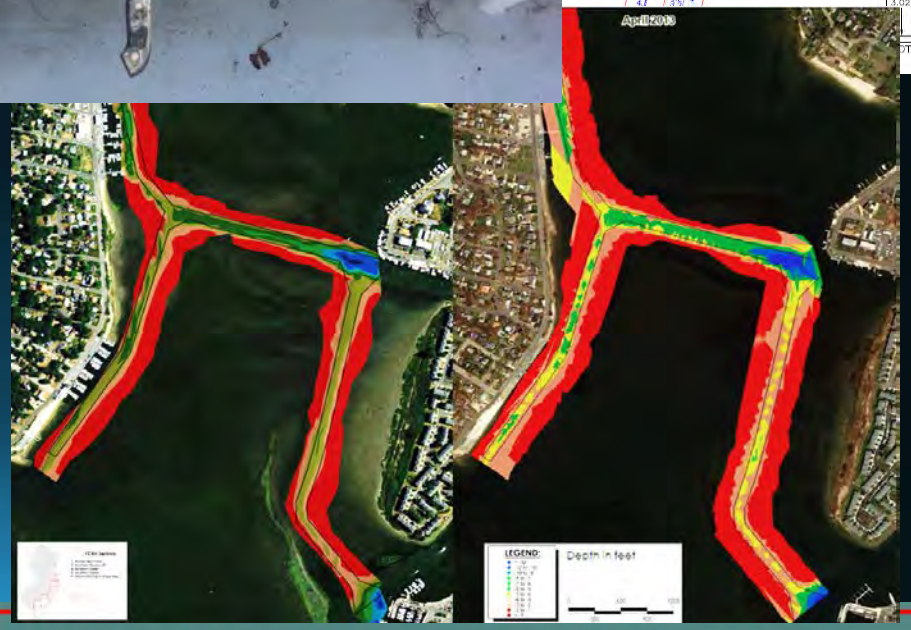
- Mixed from fine sand to silt
- Hydraulic dredging to CDFs
- Less than 400,000 m^3/yr
- Low volume jobs
- Low debris
- Low contamination
- Low economic value

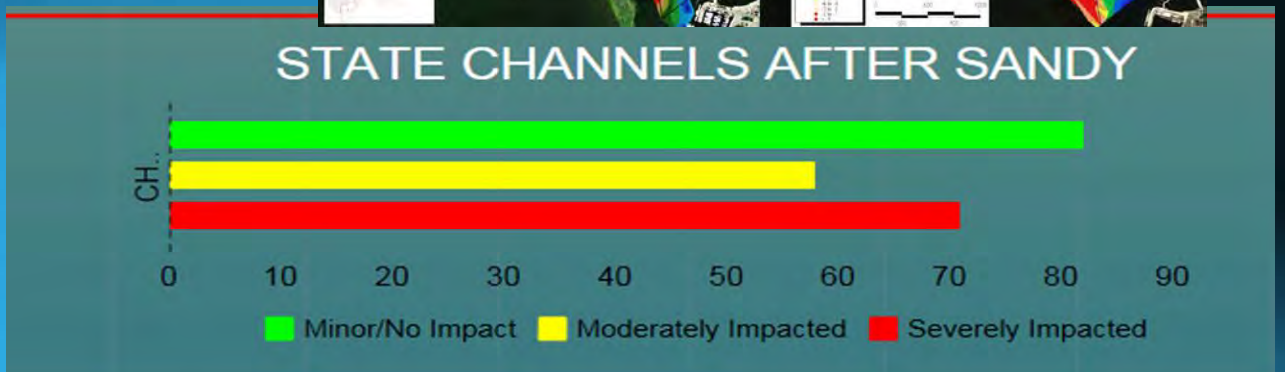


Superstorm Sandy Impacts

Channel Damage Assessment

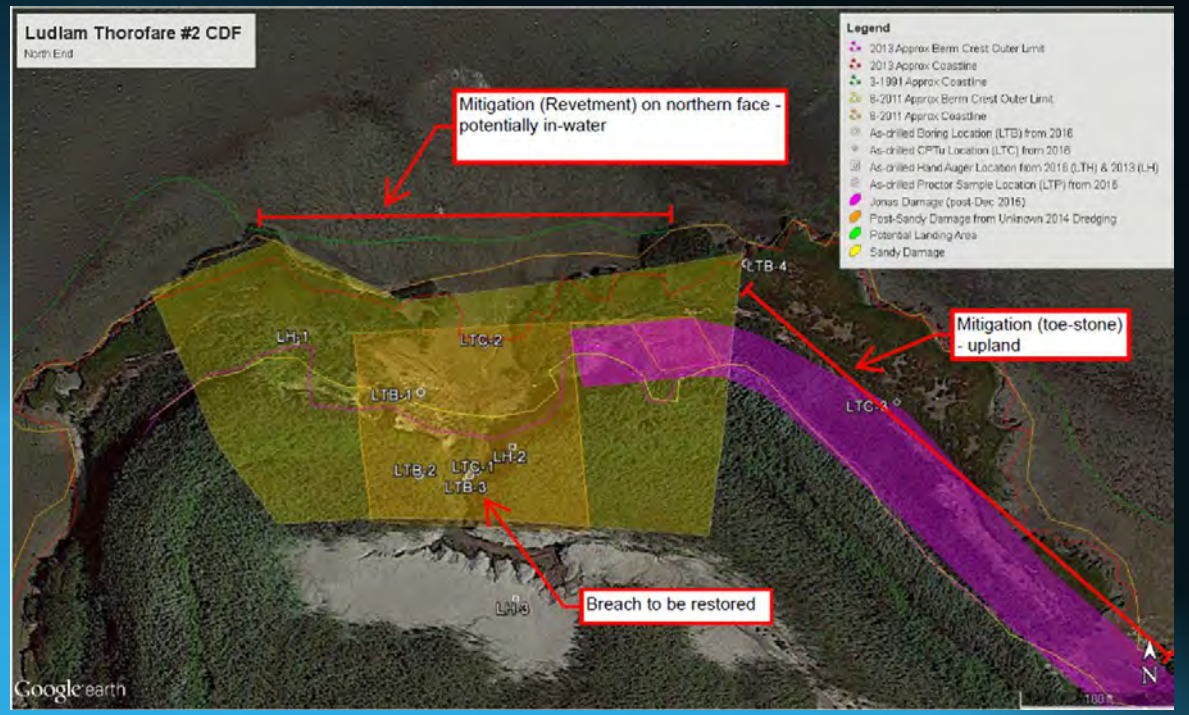
- Combination of bathymetry, pre and post storm comparisons, and confirmatory coring
- 361 shoals identified in 209 channels
  - 71 channels "severely impacted"
  - 124 shoals in 64 channels considered likely to be a result of Sandy
  - 43 Sandy channels considered severely or moderately impacted.
- 2.3 million cubic meters of sediment needs to be removed to return the system to a state of good repair
  - 610,000 cubic meters likely to be a direct result of Superstorm Sandy





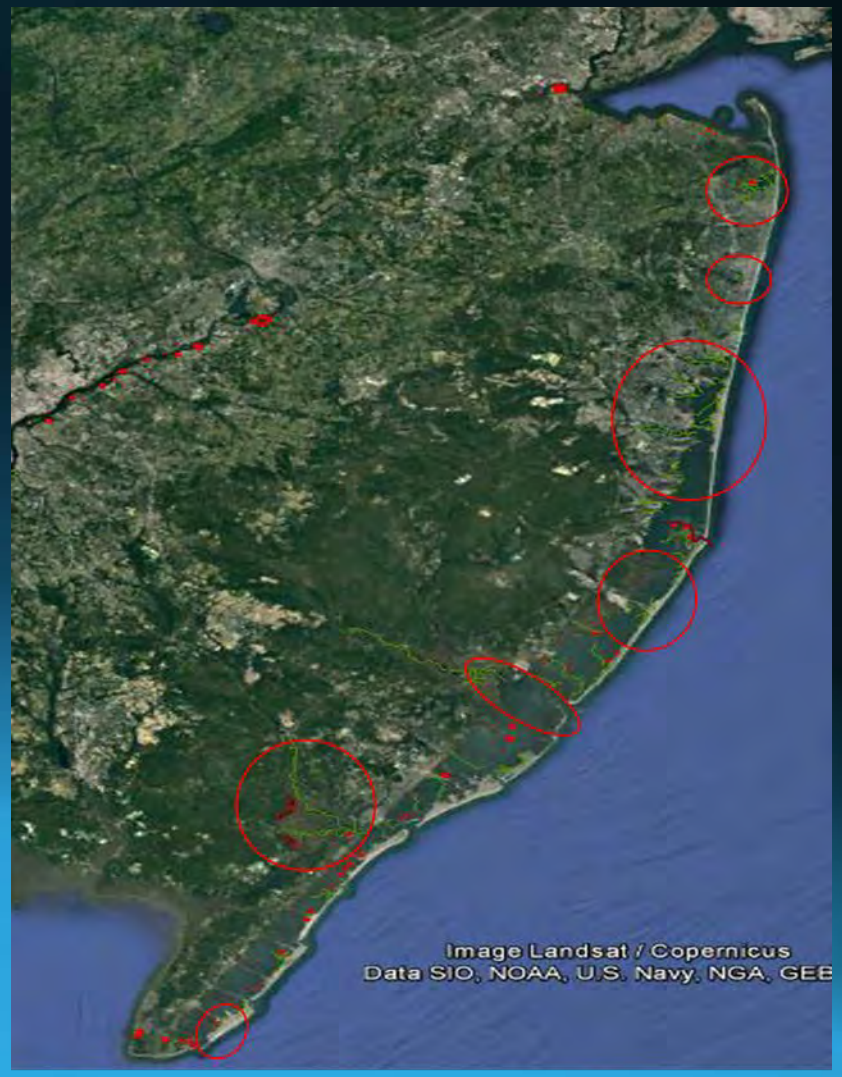
CDF Damage Assessment

- 25 CDFs evaluated for damage
- 5 found to be severely damaged by storm
- Partial to complete berm collapse
- Structural integrity compromised
- Need to rebuild and increase resiliency through hardening or other measures
- Estimated cost of $3 million



Gap Analysis

- Roughly 7 areas statewide without readily available management options
- Over 100 channels affected
- Non-traditional technology is very expensive
- Solution requires community input and support



Dredged Material Management

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

Beneficial Use of CDF Material

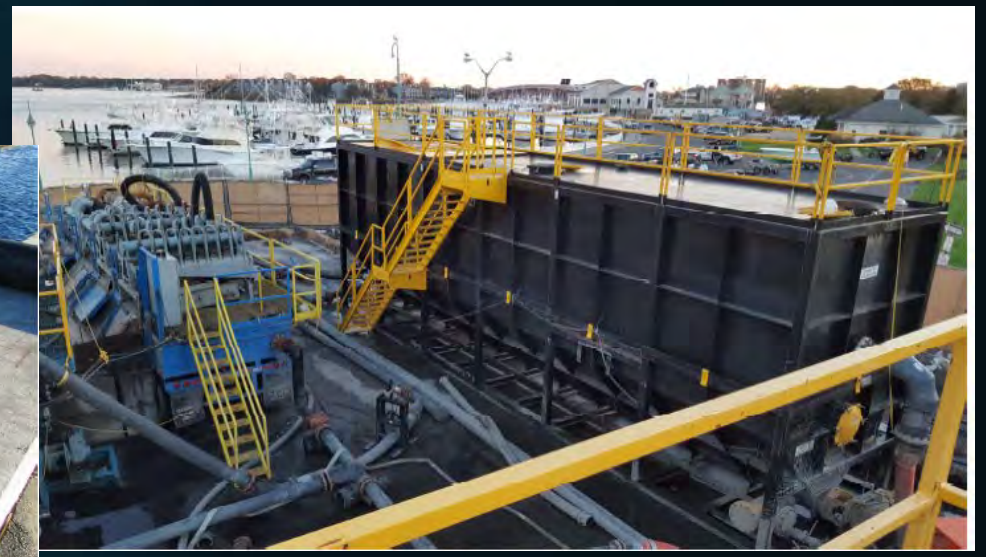
- New CDF locations are difficult if not impossible to find
- NJDOT has purchased two new CDF sites since Sandy, reconstructed one more and is working to construct a fourth.
- Material usually meets residential standards
- Material is suitable for a variety of structural and non structural purposes
- Access can be an issue
- Excavation is costly
- May need to be blended or processed for some uses

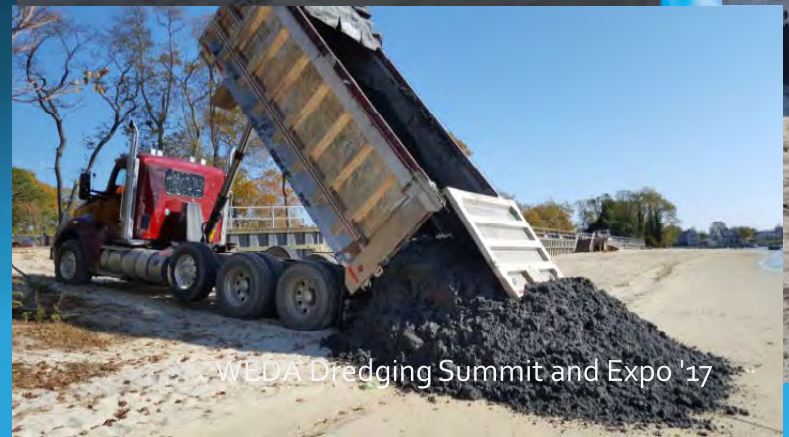
Dredged Material Management Facilities (DMMFs)

- Renewable Capacity
- Manage material inputs and outputs to increase options, decrease dewatering time and lower costs
- Permanent access roads or docking facilities; staging areas; pipelines
- Regional Sediment Management

Mechanical Dewatering

- What to do when there is no CDF available?
- Dewatering, de-sanding
- Modular, flexible, and capable of working efficiently on a small footprint
- Produce truckable, stackable solids
- 31,000 m^3
- $105-130 per m^3



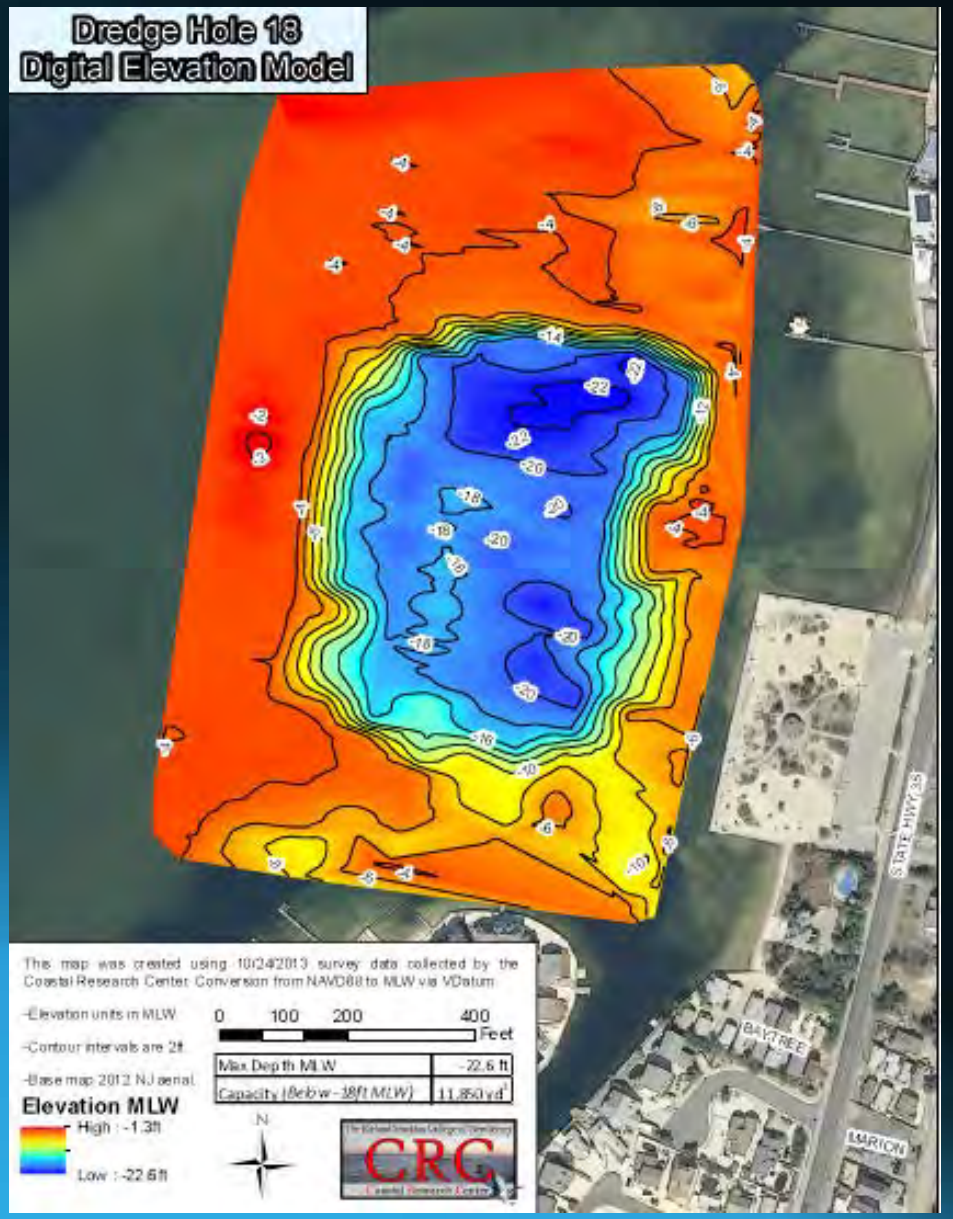


Passive Dewatering

- 30m by 12m geotubes
- 450 m^3 each, but can be custom made to fit
  Easy to deploy and control effluent to sump
- 16 weeks from silt to transport
- 3,000 m^3 total
- $65-118/$m^3$

Dredged Holes

- 122 depressions or borrow pits 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 335,000 m^3 including 0.6m sand cap
- 1.7 M m^3 of potential capacity, possibly more if all of the sites can be restored to a higher elevation

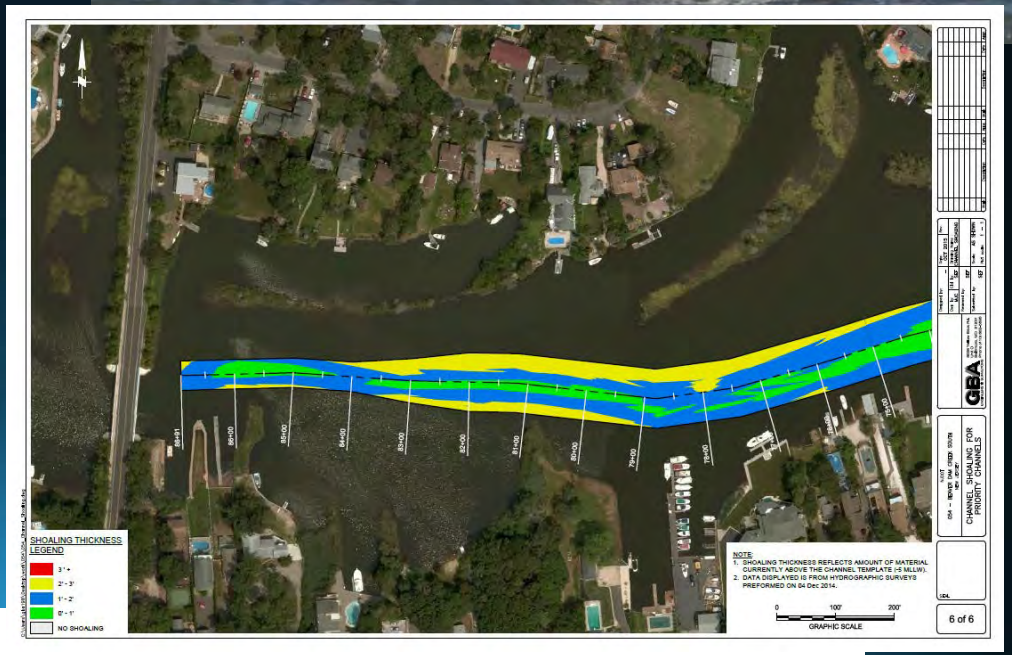


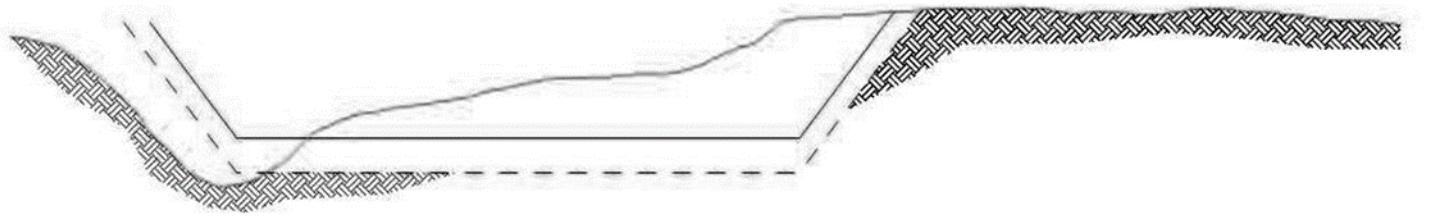
Marsh and Dune Restoration

- Coastal erosion and sea level rise has taken a toll on NJ coastal wetlands
- Dredging has further reduced natural accretion
- Dredged material can be used to restore lost sediment and improve habitat
- Dunes can provide resiliency to restored marsh
- 5000 m^3 to marsh, 14,000 m^3 to dune, 5500 m^3 to beach
- \$140/m^3

Waterway Linear Segmentation

- Similar to NJDOT Straight Line Diagrams
- User Groups
  - NJDOT OMR
  - State/Federal
  - Public (restricted)
- Data Management
  - Waterway referencing model
  - Navigation channel limits
  - Notable waterway features (marina, boat ramp, CDF, bridge, …)
  - Collected data
- Data Collection
  - Bathymetric survey data
  - In-situ sediment
- Data Analysis
  - Channel conditions
  - Dredging demand





Dredged Material Management System

Data Collection

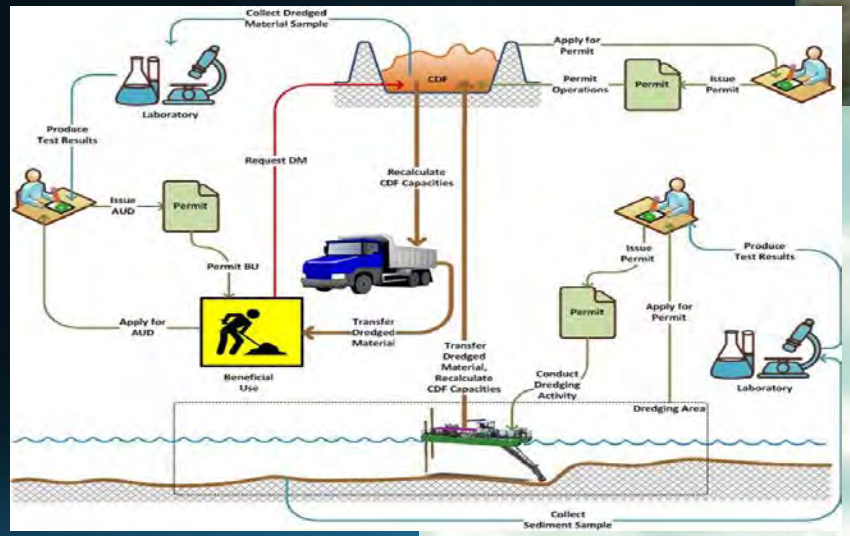
- CDFs map/survey
- Dredged material sampling/analysis
- Permit data
- Beneficial use options

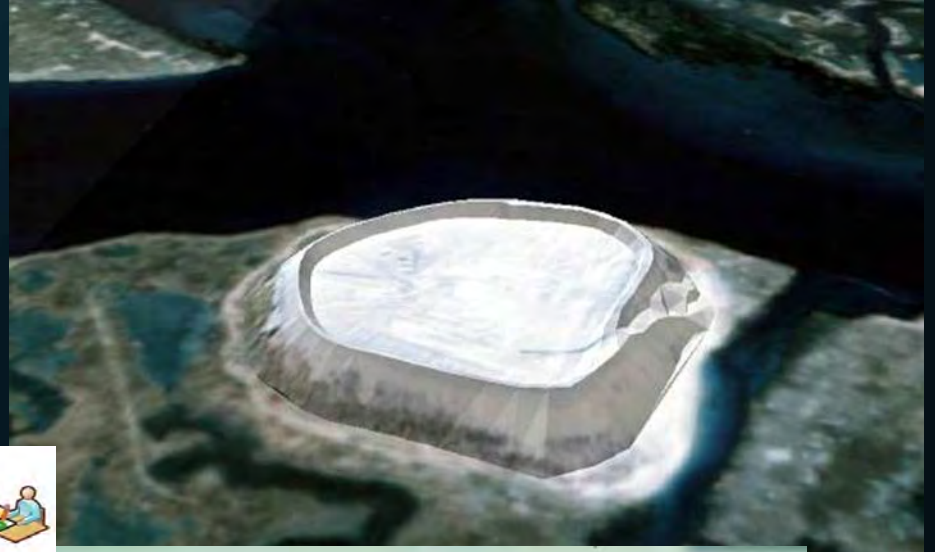
Data Analysis

- CDF capacity
- DM physical/chemical

Dredged Material Management

- "Dredged Material Marketplace"
  - Placement options
  - Match dredged material with beneficial use
- CDF planning





Success to Date

- 250,000 cubic meters dredged and placed
- 18 channels cleared
- 23 kilometers of waterway opened
- Cost of $17.2 million
- ~25 percent FEMA reimbursed to State
- 2 new CDFs
- 2 CDFs restored capacity

On-going Projects

- Manasquan River
  - 5 channels ~ 75,000 cubic meters
- Barnegat Bay
  - 4 channels ~ 105,000 cubic meters
- Forked River Complex
  - 5 channels ~ 33,000 cubic meters
- Cooks Creek
  - 1 channel ~ 7,600 cubic meters
- Shark River phase 2
  - 2 channels ~ 15,000 cubic meters
- Gateway CDF construction

2017/2018 Dredging Plans

2017 Dredging Projects:

- Shrewsbury Complex- 3 Channels
- Jonas Channels- 3 Channels
- Lavallette Beach Channel
- Metedeconk River Complex- 6 Channels
- Kettle Creek Complex- 4 Channels
- ~275,000 m^3

2018 Project Planning:

- Absecon/Lakes Bay- 5 Channels
- Wildwood Complex- 5 Channels
- West Creek Complex- 3 Channels
- Lower Barnegat Bay- 5 Channels
- Ship Bottom Complex- 5 Channels
- Harvey Cedars Complex- 6 Channels
- Patcong Creek
- ~ 510,000 m^3

Ongoing Challenges

- CDFs in private ownership
  - What have you done for me lately?
- Land use conflicts
  - NIMBY's and profiteers
- Ignorance
  - Dredge spoils are toxic waste!! (NOT)
- Regulatory rigor mortis
  - We've never done THAT before….
- Funding
- www.state.nj.us/transporation/airwater/maritime

Questions?