RECENT EXPERIENCE WITH CHANNEL DREDGING AND PLACEMENT TO RESTORE WETLANDS IN NEW JERSEY

Monica Chasten, Jerry Pasquale, and Ken Goldberg
USACE Philadelphia District (NAP)

Candice Piercy and Tim Welp
Engineer Research and Development Center

Dave Golden
NJ Division of Fish and Wildlife, Bureau of Land Management

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Brief History of Dredged Material Management in Coastal NJ

- ***Before 2002:*** remove shoals from channels as quickly as possible, place in CDFs
- ***2002:*** NAP engages with Regional Sediment Management program
- ***2002-2012:*** slow progress towards more sustainable approaches to managing sediments
- ***October 2012:*** Superstorm Sandy
- ***2012-present:*** rapid advancement of beneficial use practices resulting in multiple wetland restoration projects (EWN)

Hurricane Sandy

Impacted NAP:

- Shoals impeded navigation
- Adjacent beaches and environmental resources damaged.
- NAP Nav managers took proactive approach
- Regional Sediment Management (RSM) & Engineering With Nature (EWN)
- Teamed with stakeholders & ERDC
- Approach used: to evaluate post-storm dredging requirements and develop sustainable strategies (short-term recovery and build long-term resilience into the coastal system).

Post-Sandy Mission:
Restore the Channels & Repair Damages
(& Maximize the Opportunities for Sustainable Solutions)

- Assess Channels & Structures
- Secure Funds for Repair and Restoration
- Sample and Analyze Sediment
- Determine Placement Areas (State Provides for Corps)
- Evaluate Constructability (initial & throughout)
- Engineering Design & Reviews (National/Regional)
- Contracting
- Construct (specialty work)
- Monitor & Develop Lessons Learned

New Jersey Intracoastal Waterway (NJIWW) Channel Dredging

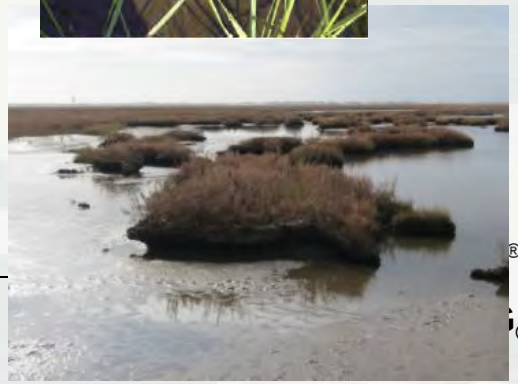
Mordecai Island, Ring Island and Avalon New Jersey

Salt Marshes in NJ: What is the Cause of Distress?

Active edge erosion

Patches of subsidence in marsh interior

Extensive pools and pannes – actively growing



Mordecai Island: Marsh Island Restoration

- Shoals historically dredged and placed in Parker Island CDF
- Hurricanes Irene and Sandy led to critical shoaling in NJIWW
- November 2015, 23,000 m^3 (30,000 yd^3) dredged from federal NJIWW as part of post-Sandy recovery efforts placed in Mordecai Island breach area
- May 2016: marsh vegetation planted to accelerate revegetation and stabilize bare sediments

Persistent wave action and boat wakes led to ongoing edge erosion despite stabilization actions

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NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Mordecai Island
Before Construction

Cover International Dredging Review
Jan/Feb 2016 Vol 35 No1

MORDECAI ISLAND

and Beneficial Use along the NJIWW

Mordecai Island
After Construction

Mordecai Island During Construction


Google earth
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Mordecai Island
Marsh Vegetation Planting


One picture,
a thousand
words...

Ring Island, NJ: Black Skimmer Habitat and Thin-layer Placement

- Dredged 4,600 m^3 (6,000 yd^3) shoal from NJIWW federal channel on NJFWS land

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Ring Island, NJ: Black Skimmer Habitat and Thin-layer Placement

- Constructed August 2014
- Bird habitat creation
  - Shorebird usage (least terns, oystercatchers)
  - Also used by horseshoe crabs & terrapins
- Small (380 m^3) (500 yd^3) thin layer placement demo with >96% sand 7.5 cm and 15 cm layers

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Ring Island, NJ: Black Skimmer Habitat and Thin-layer Placement

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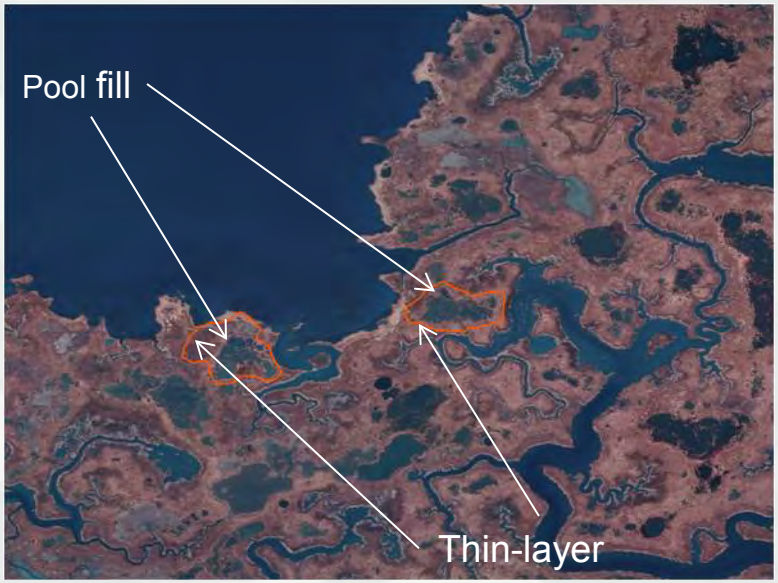
Avalon, NJ: 2014 Restoration Demo



- Pilot Project constructed Dec 2014
- Small thin layer placement demo with ~3,800 m^3 (5,000 yd^3) fine-grained DM ~2.5 hectares (6 acres)
- Filled pools and pannes to nourish deteriorating marsh

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Avalon, NJ: 2014 Restoration Demo

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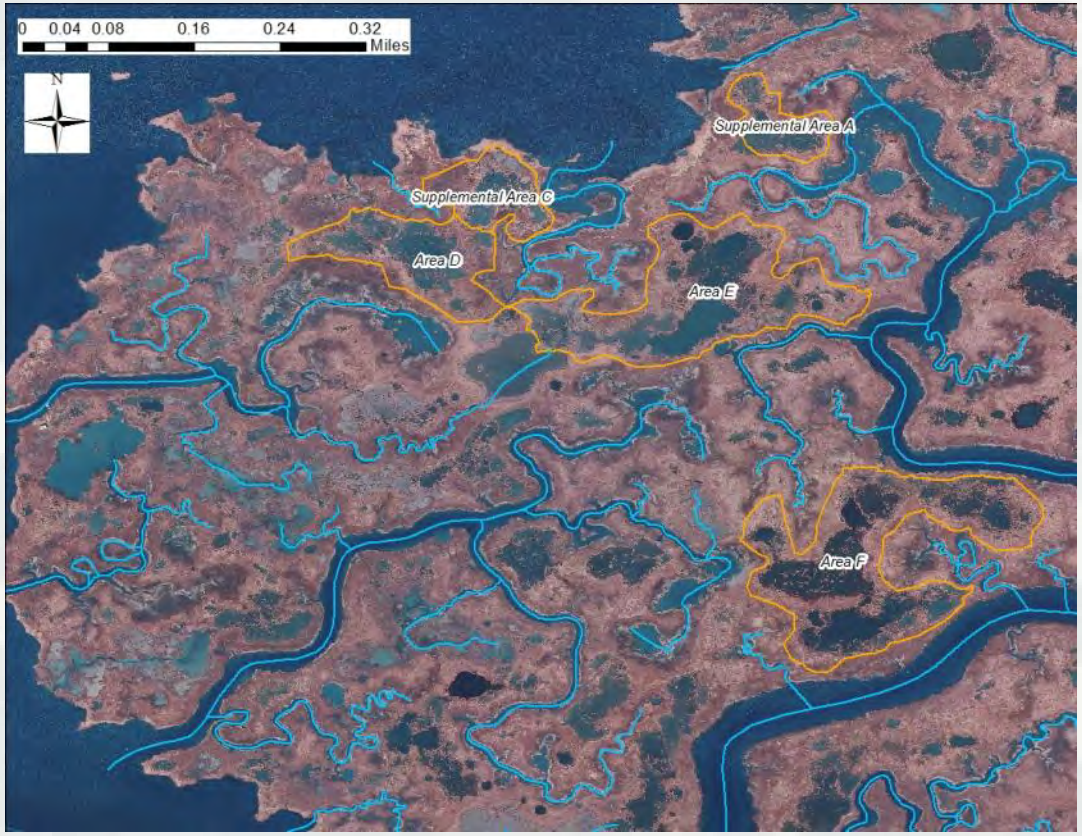
Avalon, NJ: 2015-2016 Design and Construction

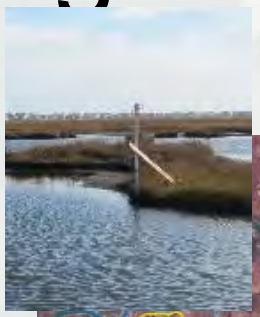


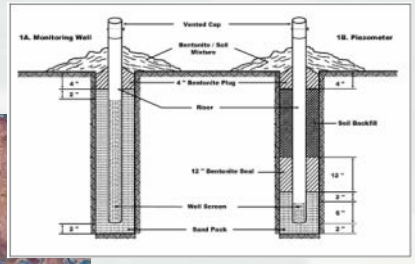
- ~ 14 hectares (35 acres) of marsh received 35,000 m^3 (45,000 yd^3) DM between Nov 2015 and Feb 2016
- Thicknesses ranged from just a few cm up to ~0.5 m in pools
- Defined target elevation based on vegetation community surveys
- Placed within hydrologically isolated areas on the marsh

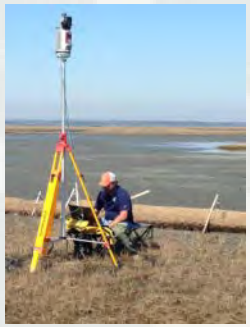
Avalon, NJ: 2015-2016 Design and Construction

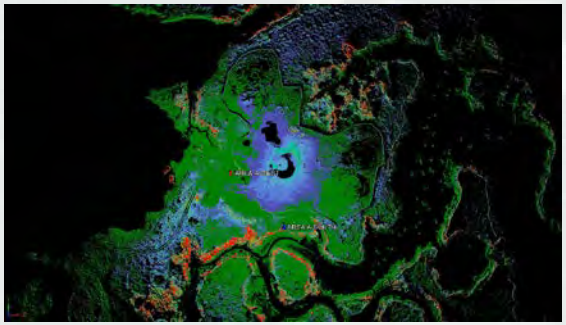
Avalon, NJ: 2015-2016 monitoring recovery

- Before-after control-impact monitoring design
  - Water levels (NFWF partners/ERDC)
  - Soil physical and biogeochemical properties (ERDC)
  - Vegetation and infaunal communities (NFWF partners)
- Post-placement elevation









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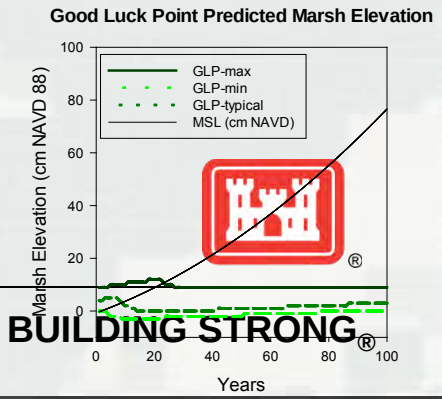
Avalon as an R&D Test Bed to Advance Marsh Restoration Practices

Bulking and consolidation of DM in marsh environments

- If material is hydraulically placed, elevation changes over time.
- Elevation change can be modeled.
  - Maximum volume: at end of placement
  - Elevation subsides during primary settling and drainage of ponded water (SETTLE)
  - Long term: consolidation of dredged material and underlying foundation (PSDDF).

Long-term marsh elevation response to DM placement & SLR

- Marsh Equilibrium Model projects future conditions based on known interactions between biomass and accretion
- Developed at University of South Carolina by Dr. James Morris
- Goal: use MEM to predict the response of marshes to thin-layer and other episodic sediment deposition events



QUESTIONS?