

AN INNOVATIVE APPROACH TO RESTORING NAVIGATION AND ENHANCING COASTAL RESILIENCE FOLLOWING HURRICANE SANDY

Monica Chasten

Project Manager

Operations Division

U.S. Army Corps of Engineers

Philadelphia District

Jackie Jahn

Project Ecologist

GreenVest LLC

Edison, NJ



US Army Corps
of Engineers



Regional Sediment Management (RSM)

A systems approach to deliberately manage sediments in a manner that maximizes natural and economic efficiencies to contribute to sustainable, resilient water resource projects, environments, and communities
= *Healthy Systems*

Navigation/ Dredging



Flood Risk Management



Environmental Restoration



RSM Operating Principles

- Recognize sediment as a regional resource; SEDIMENT AS AN ASSET
- Balanced, economically viable, environmentally sustainable solutions
- Improve economic performance by linking multiple projects
- Optimize operational efficiencies & natural exchange of sediments
- Consider local & regional impacts (physical, environmental, social)



US Army Corps
of Engineers



A Sediment Progression: From Confinement to In-Water Creation

Somewhere in Jersey....



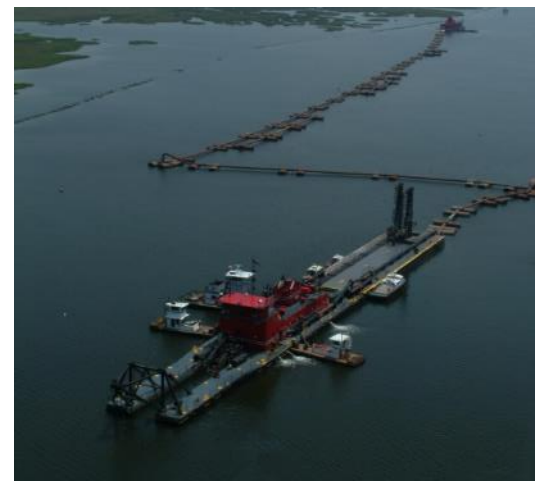
“Business as Usual”....Confined Disposal Facilities (CDF)



US Army Corps
of Engineers



A Sediment Progression: From Confinement to In-Water Creation



**US Army Corps
of Engineers**



A “PERSISTENT” APPROACH

Post-Sandy, federal channels in inlets and waterways require dredging

- **Navigation and Nature:** District took action to restore the navigation mission, but also looked for opportunities to assist with shoreline & ecosystem recovery
- **Technical Expertise:** Use of *Regional Sediment Management (RSM)* and *Engineering with Nature (EWN)* concepts to develop short-term (post-Sandy) and long-term dredging strategies
- **Team Approach:** Actions were aided by support from USACE North Atlantic Division and other districts, ERDC, NJDEP and other partners



US Army Corps
of Engineers



POST-SANDY COASTAL NAVIGATION MISSION

- **Oct 29, 2012:** Superstorm Sandy impacts NJ/DE Region
- **Nov 2012:** Stakeholder and Resource Agency coordination begins
- **Nov 2012:** Emergency dredging work begins (Government Plant)
- **Dec 2012:** Short & long-term strategic efforts with USACE ERDC & other districts begins; *Recovery work objective is to restore region and bolster system resilience*
- **Feb 2013 & Aug 2015:** Philly District awards Maintenance Dredging contracts; *key element for success since built in flexibility*
- **June 2013:** Environmental Assessment for Innovative Placement Pilots completed in June 2013
- **Aug 2014:** Construction of Pilot Projects begins



US Army Corps
of Engineers



POST-SANDY MISSION FRAMEWORK: RESTORE THE CHANNELS & REPAIR DAMAGES (& MAXIMIZE THE OPPORTUNITIES FOR SUSTAINABLE SOLUTIONS)

Assess Channels & Structures

Secure Funds for Repair and Restoration

Evaluate Potential Actions by Government Plant

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

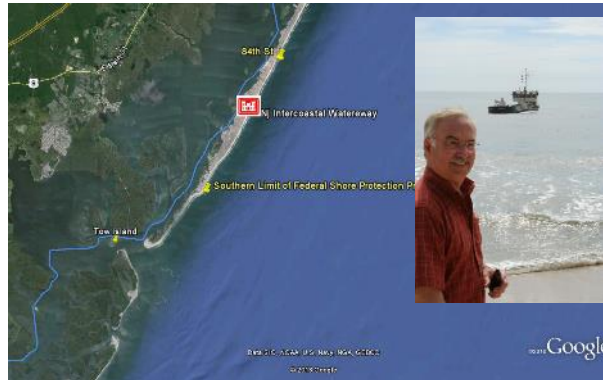


US Army Corps
of Engineers





NAVIGATION CHANNELS WITH NEARSHORE PLACEMENT OF SAND.....CLASSIC THIN?



New Jersey Intracoastal Waterway (NJIWW) Channel Dredging with Innovative Placement



Same Environmental Assessment done as modification for NJIWW dredging and placement



US Army Corps
of Engineers



MORDECAI ISLAND CONSTRUCTED! NOVEMBER 2015



Contractors: Barnegat Bay Dredging Company, Fish Tec Inc. and GreenVest LLC

MORDECAI ISLAND: 10 MONTHS AFTER CONSTRUCTION



NJIWW CHANNEL DREDGING AND PLACEMENT DEMONSTRATION PROJECTS: RING ISLAND AND AVALON NJ

LAND OWNED BY NJ DIVISION OF FISH & WILDLIFE

**CONSTRUCTED WITH EMERGENCY
SUPPLEMENTAL O&M FUNDS**

AND

**A NFWF GRANT TO NJDFW, THE NATURE
CONSERVANCY AND GREEN TRUST ALLIANCE**

CONTRACTOR: BARNEGAT BAY DREDGING CO.



**US Army Corps
of Engineers®**

New Jersey Intracoastal Waterway (NJIWW) Channel Dredging with Innovative Placement



Same Environmental Assessment done as modification for NJIWW dredging and placement



US Army Corps
of Engineers



RING ISLAND, NJ: BLACK SKIMMER HABITAT AND THIN-LAYER PLACEMENT



- Constructed August 2014 with O&M funds
- Land owned by NJDFW instead of Nummy Island CDF
- Habitat creation
 - Shorebird usage
 - Also used by horseshoe crabs & terrapins
- Small thin layer placement demo with >96% sand, 500 cy



US Army Corps
of Engineers®
Philadelphia District

ERDC

The Nature
Conservancy 
Protecting nature. Preserving life.



GreenVest
One Step Ahead.

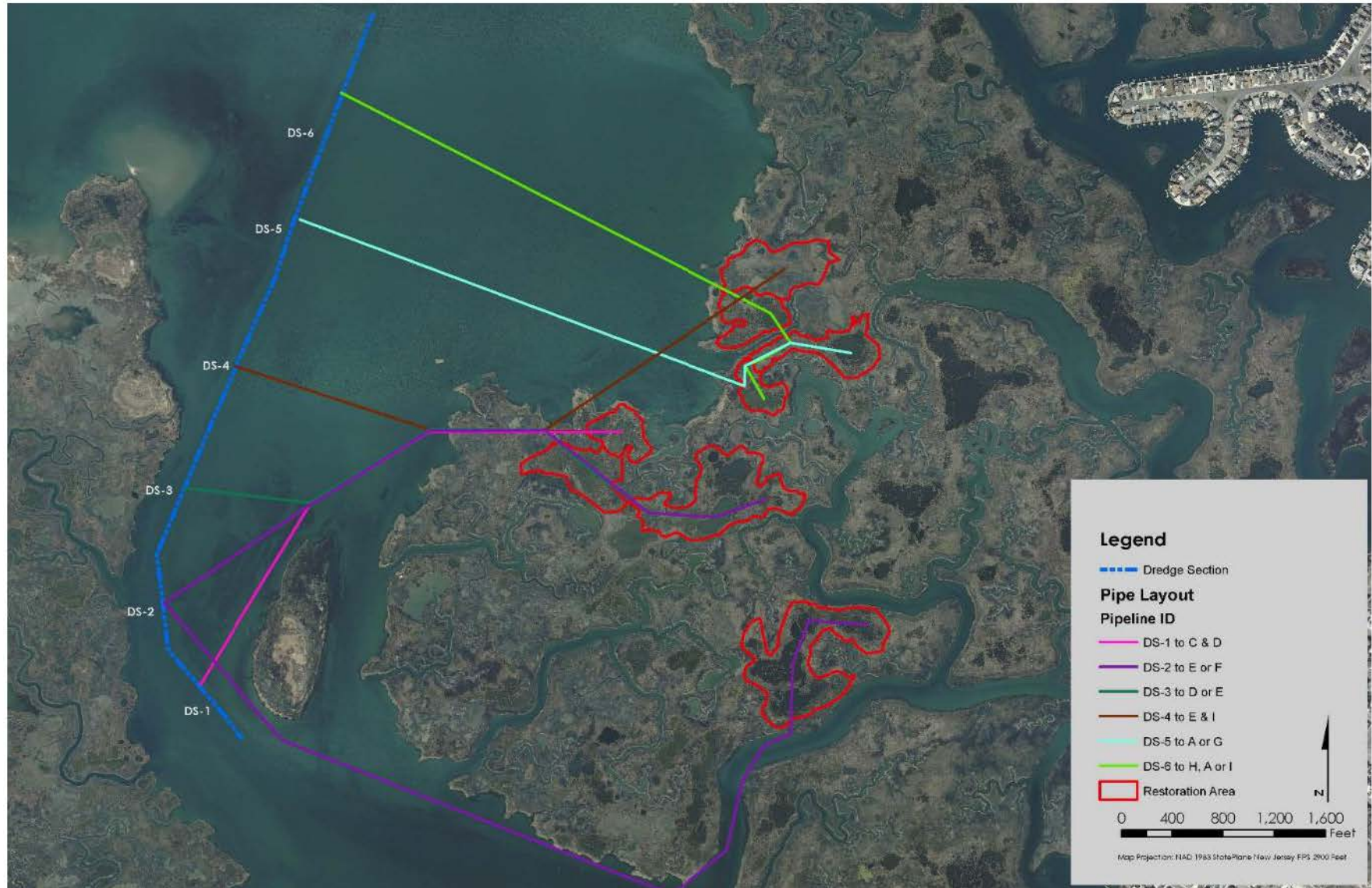
PH Princeton Hydro



US Army Corps
of Engineers®



NJIWW DREDGING & AVALON THIN LAYER PLACEMENT DEMONSTRATION PROJECTS



Constructed Dec 2014 to Feb 2016

NJIWW AVALON PILOT PROJECT:

DREDGING “THE FOOTBALL FIELD” AND THIN-LAYER PLACEMENT



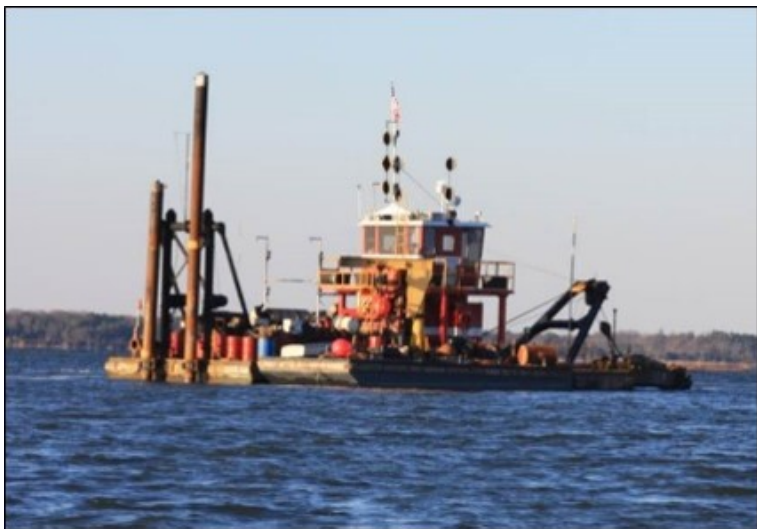
- Constructed Dec 2014
- Thin Layer Placement demo with fine-grained material
- Filled pools and pannes to restore marsh (5,000 cy & 6 acres)
- Minimal containment
- Documented lessons learned and informed NJ permits for construction of larger TLP project



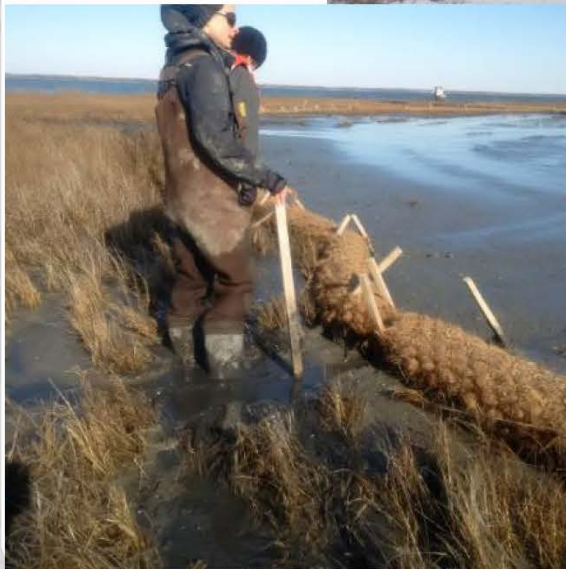
NJIWW AVALON PILOT PROJECT: DREDGING “THE FOOTBALL FIELD” AND THIN-LAYER PLACEMENT



- Larger project continued from Nov 15 to Feb 2016 (45,000 cy & 35 acres)
- USACE funded dredging, NFWF grant funded placement design, construction oversight
- Costs & lessons learned under development
- Monitoring to continue for several years



BOOTS ON THE GROUND

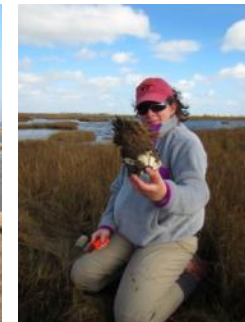
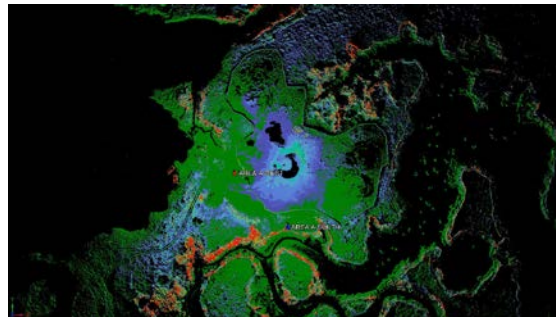
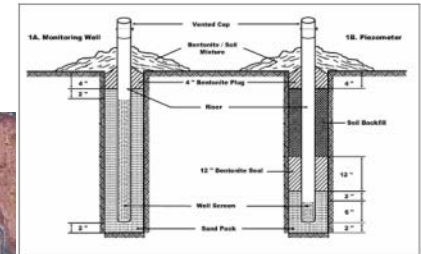


AVALON, NJ: 2015-2016 MONITORING RECOVERY

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



US Army Corps
of Engineers



KEY POINTS FROM THE CORPS SIDE

- USACE navigation mission is succeeding on limited funds by collaborating with shore protection and ecosystem restoration efforts, *MORE OPPORTUNITIES EXIST!!*
- Using sediment as a resource; *SMALL SUCCESSES LEAD TO LARGER ACTIONS*
- Momentum in NJ for more innovative placement such as TLP, but these techniques aren't always easy; they take *time, \$\$\$ and commitment/persistence*
- *Sediment Testing and Constructability Up front!* Talk to Regulators and Dredging Industry
- *Monitoring/Lessons Learned*; more R&D needed to make this more cost-effective solution



US Army Corps
of Engineers

