

GAINING MOMENTUM: HOW SMIL ADVANCES BENEFICIAL USE PRACTICES ALONG THE NEW JERSEY INTRACOASTAL WATERWAY

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Philosophical Approach



- USACE is perhaps the largest national “sediment broker” due to navigation mission and dredging
- “Sediment is the currency of marsh ecosystems” ~ Dr. Lenore Tedesco
- How can we improve our stewardship of that sediment “currency” and maintain the mission(s)?
- Looking for operational efficiencies in a climate of limited funds: *How can we dredge less and use sediment best?*



State endangered Black Skimmer at newly created habitat from dredged sediment, Ring Island, NJ



Organizational Perspective

U.S. Army Corps Of Engineers Philadelphia District



■ **Navigation Mission: USACE**

Philadelphia District maintains federal channels, including the Delaware River & Bay, coastal inlets, and the 117-mile New Jersey Intracoastal Waterway

■ **Setting the bar high for coastal NJ!**
When dredged sediment is CLEAN, District strives to find opportunities to use 100% of it beneficially. Progression from 25% (pre-Sandy) to 60% (post-Sandy) to a goal of 100% beneficial use

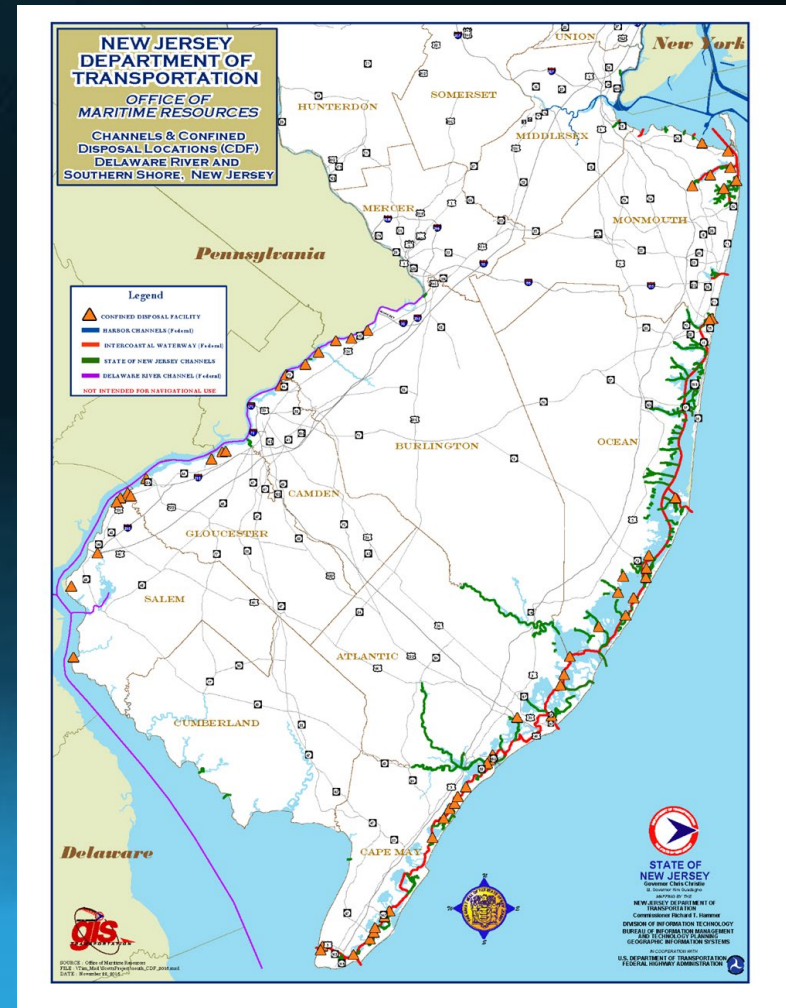
■ **Collaboration with R&D**

- RSM District since 2002
- District became Engineering with Nature Proving Ground in 2016
- Seven Mile Island Innovation Lab launched in 2019



New Jersey's Marine Transportation System

- **Federal Channels** in NY/NJ Harbor, Delaware River, and NJ Intracoastal Waterway; over 400 nm of engineered waterways
- **State Channel Network** - 215 Marked and Identified Channels; over 200 nm of engineered waterways
- **Local Channel Network** – Berths, marinas and local access channels; extent and condition is largely unknown
- **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**





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)



RSM Goals and Strategies



Reduce Upland/CDF Disposal



Bypass Backpass Sediments



Reduce Erosion

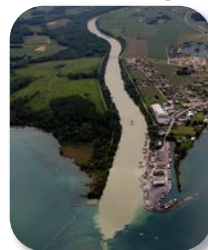


Save Capacity



- **Keep sediments in the system**
- **Mimic natural sediment processes**
- **Reduce unwanted sedimentation**
- **Environmental enhancement**
- **Maintain & protect infrastructure**

Reduce Channel Shoaling



Reduce Runoff



Ecosystem Habitat Restoration



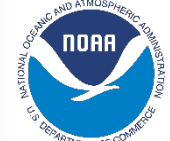
Stabilize Structures

Engineering With Nature®

...the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes.

Key Elements:

- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Broaden and extend the benefits provided by projects
- Science-based collaborative processes to organize and focus interests, stakeholders, and partners



And Many More!



GAINING MOMENTUM WITHIN USACE

WRDA 2016, Section 1122, Beneficial Use Pilot Program
(plus follow on in subsequent WRDAs)

WRDA 2020, Section 125, Beneficial Use of Dredged
Material

Climate Change and Resilience Talking Points & Focus

USACE Senior Leaders embracing BU increase from 30% to
70%!!

International Guidelines for Natural and Nature-Based
Features coming out this summer



A Sediment Progression: From Confinement to In-water Creation





Inspired by the Dutch



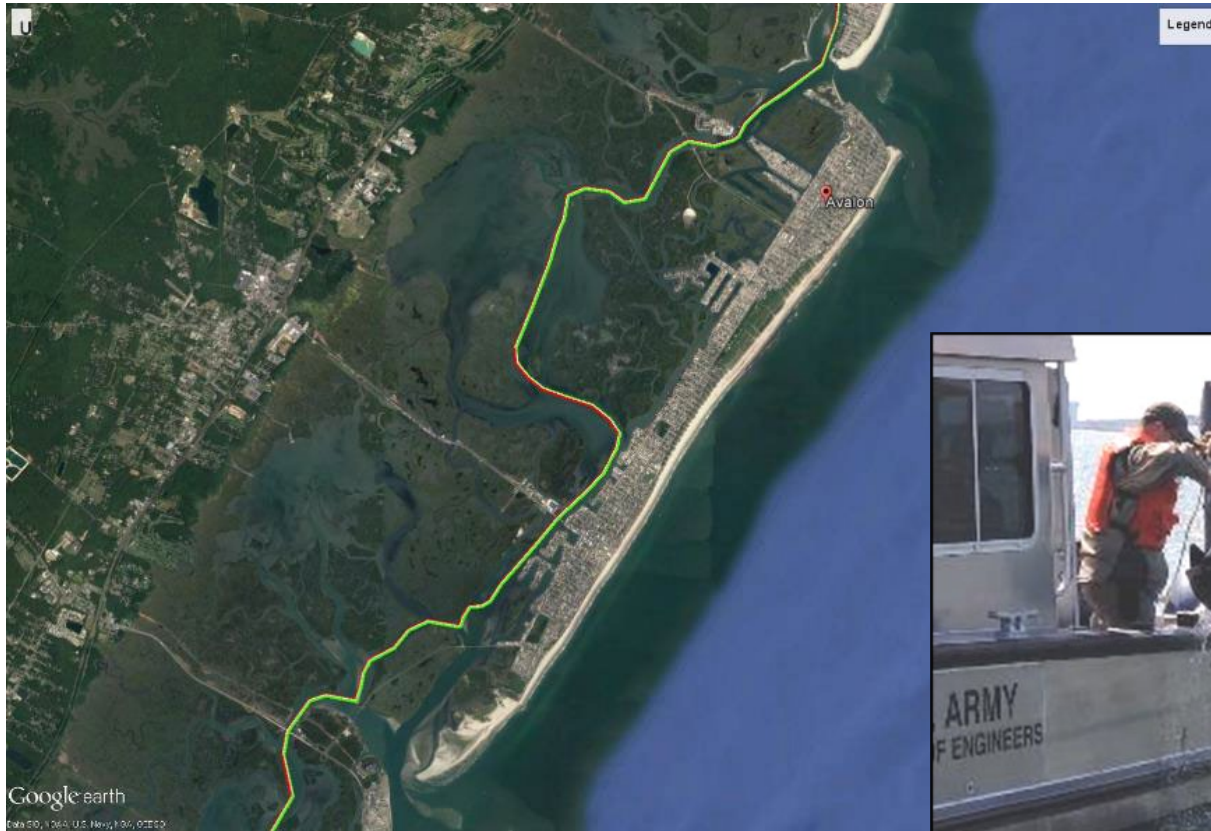
Fine sediment: from waste to resource

Throughout the world, different coasts, shores, lakes and rivers have to deal with excess sediment or sediment shortages. The natural balance between the removal and deposition of sediment is disrupted by human interventions such as dams in a river or ports in an estuary. As a result, sediment doesn't reach places where it is needed and too much accumulates in other locations. Ecosystems are affected and life becomes difficult for plants and animals. People are also pressured, for example in terms of food supplies, ports and leisure activities.

<https://www.ecoshape.org/en/projects/living-lab-mud>



SEVEN MILE ISLAND INNOVATION LABORATORY



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SEVEN MILE ISLAND INNOVATION LAB

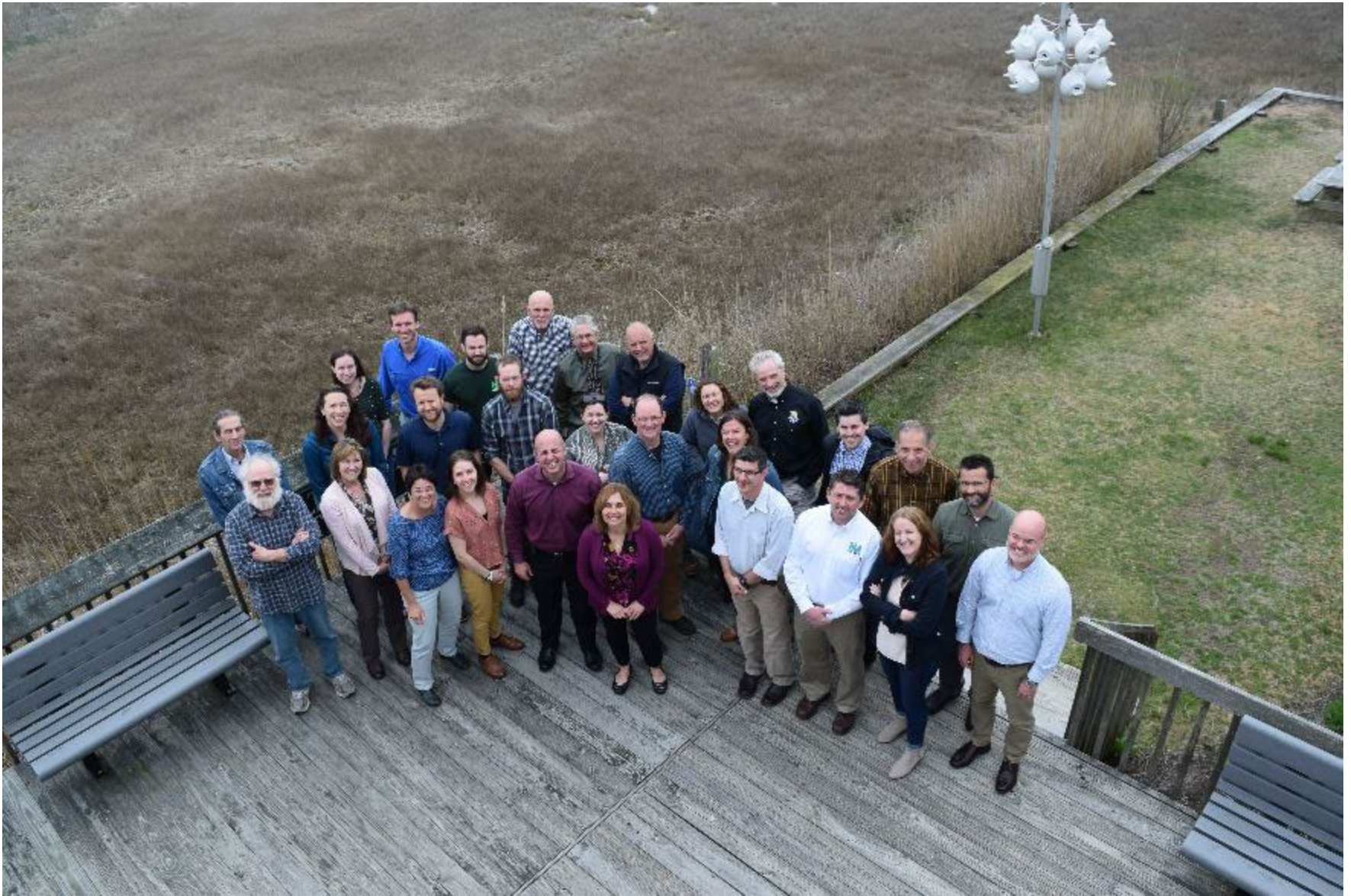


- ▶ Encompassing 24 mi², and 15,000 acres of Back Bay Tidal Marshes, Shallow Bays, and Inlets
- ▶ Bisected by the NJ Intracoastal Waterway
- ▶ Part of the Cape May Wetlands Wildlife Management Area
- ▶ Home of The Wetlands Institute

- Federal Beach Fill and Navigation Projects
- Confined Disposal Facility (CDF)
- Prior Placement Sites (PP)
- Elevated Nesting Habitat (ENH)
- Thin Layer Placement (TLP)
- Marsh Enhancement (ME)
- Intertidal Shallows (IS)
- Marsh Edge Protection (MEP)
- Tidal Flat Enhancement (TFE)



SEVEN MILE ISLAND INNOVATION LABORATORY





NJIWW DREDGING AND INNOVATIVE PLACEMENTS



Legend

Gull Island



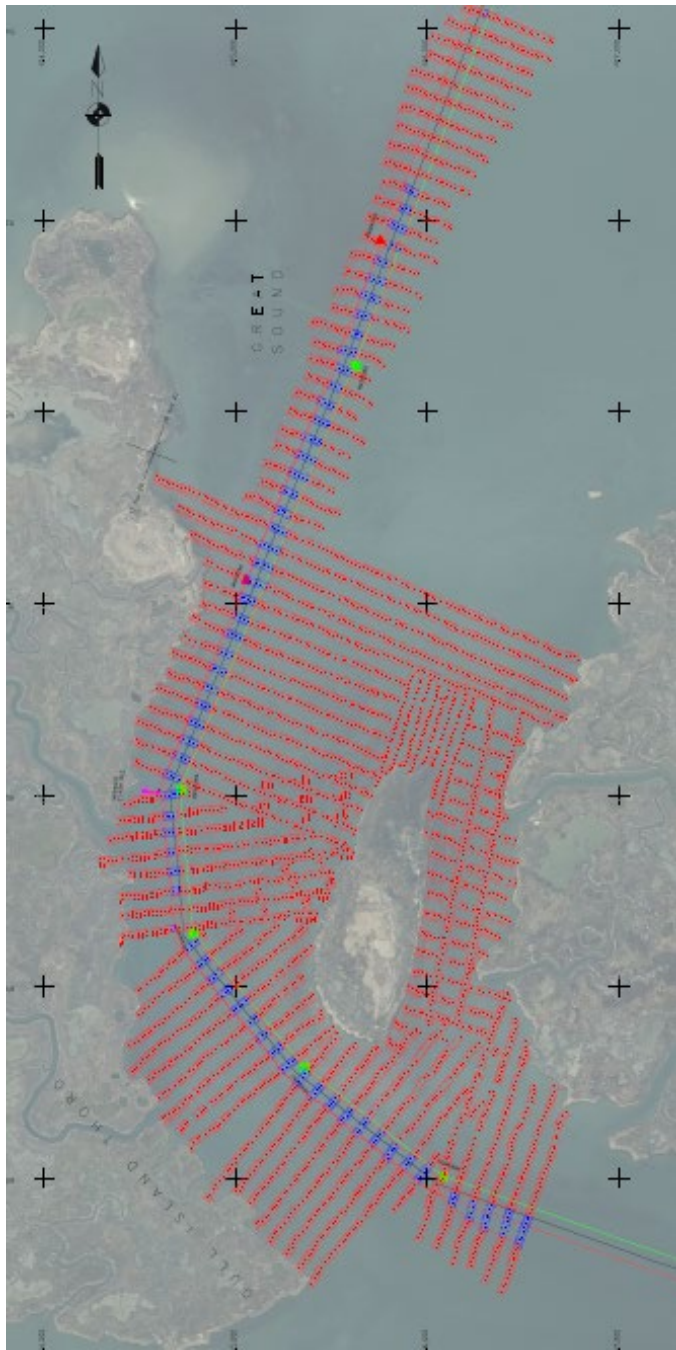
Sturgeon



Google Earth

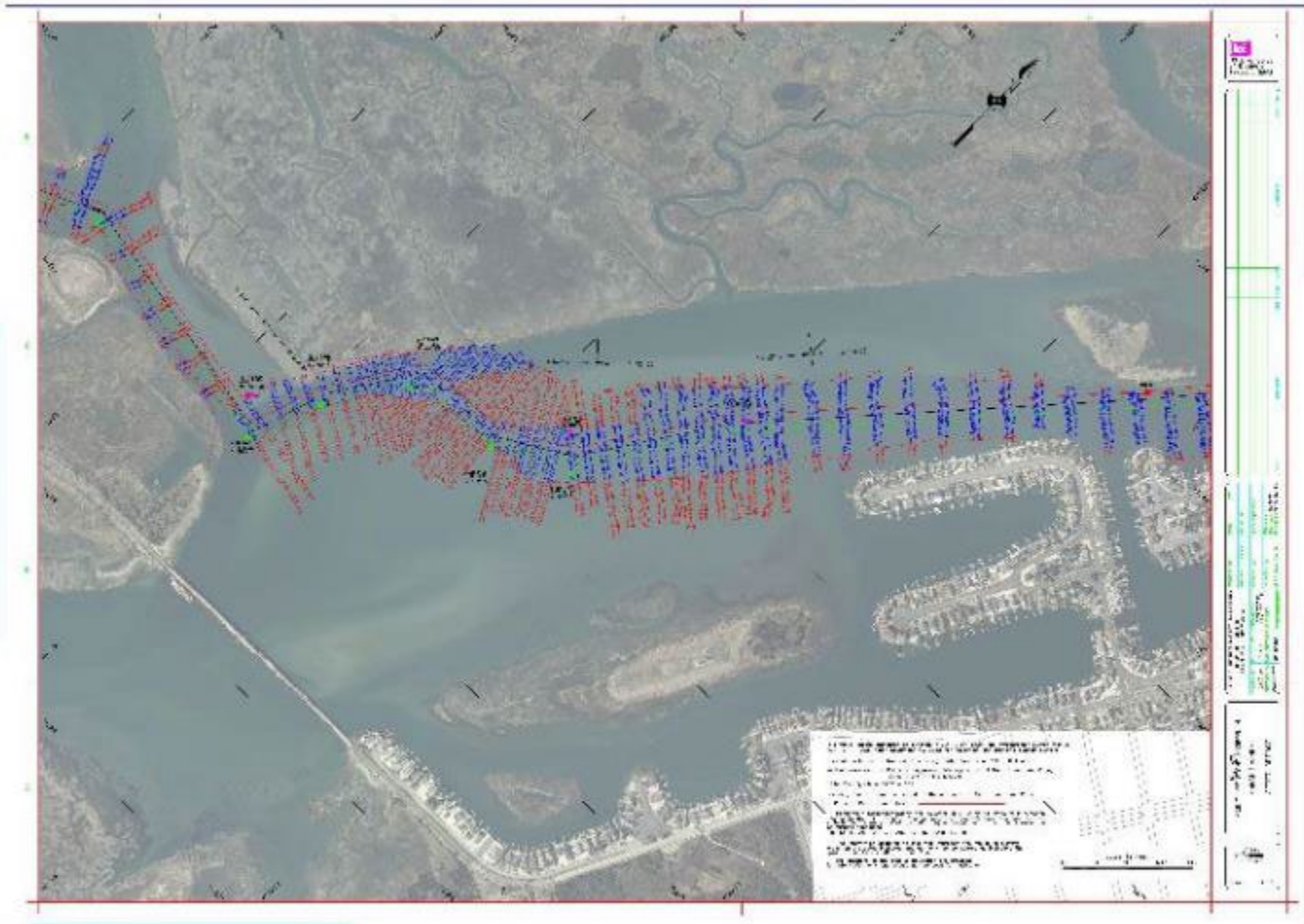


4000 ft



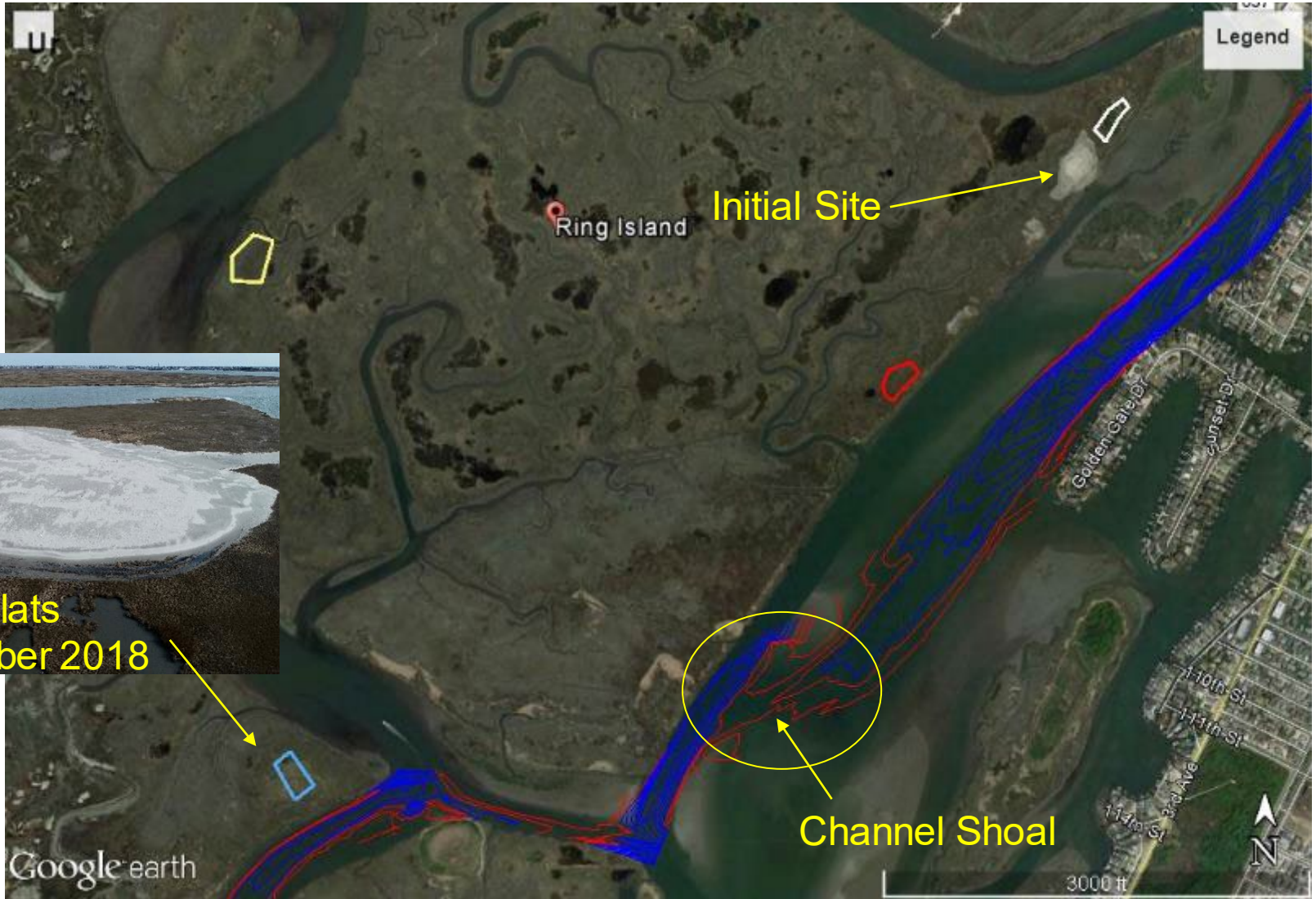


NJIWW NEAR STONE HARBOR FUTURE OF MAINTENANCE & CHANNEL MANAGEMENT





ADAPTIVE MANAGEMENT AND SYSTEMS APPROACH MOVING FORWARD FROM PILOTS TO SOLUTIONS





MONITORING TO ADVANCE BEST PRACTICES AND INNOVATE TECHNIQUES



Consolidation of
Sediments

Strategic Placement

Benthics and SAVs

Innovative Placement
Techniques

Shoreline Change

Remote Sensing in Back
Bay Environments

Vessel Wake Impacts

Turbidity Monitoring &
Sediment Profiling

Avian Use

Communications &
Social Science

Satellite Imagery based
Tool for monitoring
Coastal Evolution

Mud Flat Dynamics

Knowledge and Data
Management

Shoaling Rates & Sediment
Budget

Vegetation Monitoring



GAINING MOMENTUM THROUGH SMIL



- Growing Partnerships & Practice
- Positive Appropriations Trend
- Developing Expertise and Lessons Learned for Coastal Resilience Projects and Climate Change Science
- Developing Sustainable Systems based on best RSM & EWN Principles (bigger than BU!!)
- Development of a Sediment Budget for Back Bay and Oceanfront
- Importance of Adaptive Management and Maintenance Strategies
- Opportunities for Scaling Up or Down (bigger channels to communities)
- Can be more than just dredging!
- Policy Changes?



LEARNING FROM THE SEVEN MILE ISLAND INNOVATION LAB FOR COASTAL NJ



Seven Mile Island
Innovation Laboratory

Mouth of the Maurice River 2015

