



U.S. ARMY

NEARSHORE NOURISHMENT ADVANCEMENTS INLET GEOMORPHIC EVOLUTION

Brian McFall, Doug Krafft, Rachel Bain,
Cody Johnson, Brian Harris, Brooke
Walker, Mitch Brown, Jeff Melby, Brad
Johnson, & Austin Hudson (NWP)

District Advisory Group (DAG)

Rod Moritz, Lisa Winter, Monica Chasten, Kevin
Hodgens, Austin Hudson, Elizabeth Godsey, Jim
Selegan

COASTAL INLETS RESEARCH PROGRAM

FY21 IN PROGRESS REVIEW

**Tiffany
Burroughs**

HQ Navigation Business
Line Manager

Eddie Wiggins

Technical Director

Morgan Johnston

Acting Associate Technical Director,
Navigation



Sediment Mobility Tool (SMT)

Sediment Mobility Tool (SMT)—Scoping-level tool that displays Depth of Closure (DoC) and sediment mobility data for the US coastline to help in determining how best to use dredge material and where to site nearshore placement areas. Click help for additional details.

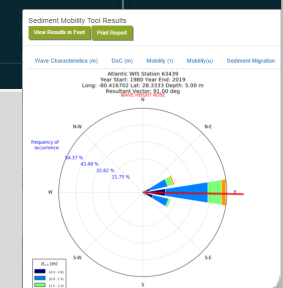
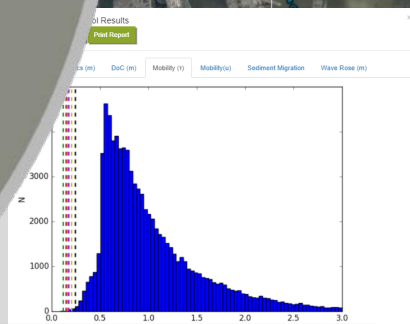
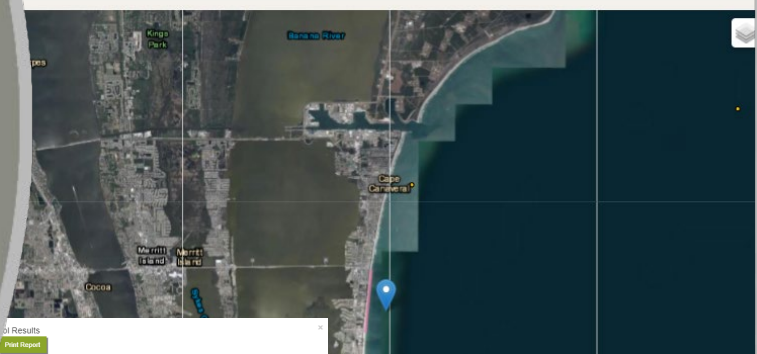
to the appropriate 2. **Draw Shoreline Angle** 3. **Select Placement Site** Or Latitude: 4. **Find WIS / Calculate Angle**

Longitude:

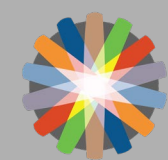
Angle: 186° Closest WIS ID: 63439

Shore Placement Depth m Current 1m (~3ft) above the bed m/s Temperature °F Salinity psu

6. **Submit**



US Army Corps
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ENGINEER RESEARCH & DEVELOPMENT CENTER

Nearshore Nourishment Challenges

OBJECTIVE: Further the state of the science in nearshore placement of dredged material through public outreach, numerical models, rapid tools development, physical models, and field monitoring

ADDITIONAL FY21 TASKS:

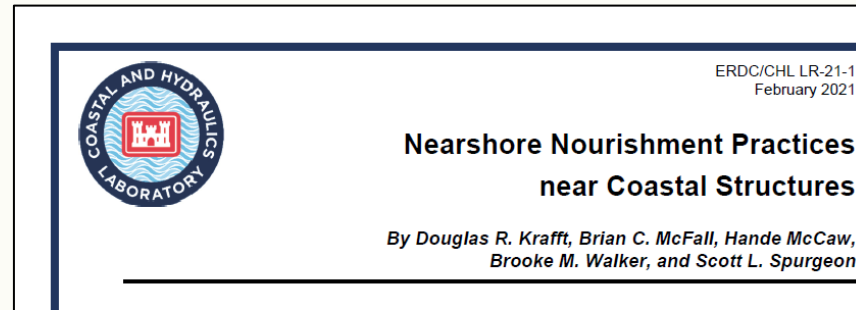
- 1. Nearshore Nourishment Practices SR (Brooke Walker & Doug Krafft)**
- 2. Co-located Beach and Nearshore Nourishments (Doug Krafft)**
- 3. SMT Improvements and Updates (Brian McFall)**
- 4. Harvey Cedars Monitoring (Brian Harris & Brian McFall)**

STATEMENTS OF NEED

- 2020-N-1564: Increasing Beach Nourishment Lifespan with Nearshore Nourishments
- 2020-N-1481: Improving scoping level estimates of the lifespans and deflation rates of nearshore nourishments
- 2019-N-1386 Strategic Nearshore Placement of Dredged Material to Sustain Coastal Beach & Dune Resilience
- **2021-1739: Enabling Reliable Evaluation of Wave Interaction with Submerged Structures**
- **2021-1726: Nearshore Nourishment Best Management Practices** **Highly Ranked!**

Nearshore Nourishment Practices

- Nearshore nourishment projects are common in the USACE, but information on placement techniques, monitoring data, construction plans, etc. for the entire USACE remain predominantly isolated.
- Nearshore Nourishment Practices discussed with each coastal and Lake USACE District
 - **TN and LR Published!**
- Information from the sprawling FY20 White Paper is being synthesized into a more distributable Special Report
 - **Draft nearing completion**



ERDC/CHL SR-21-??



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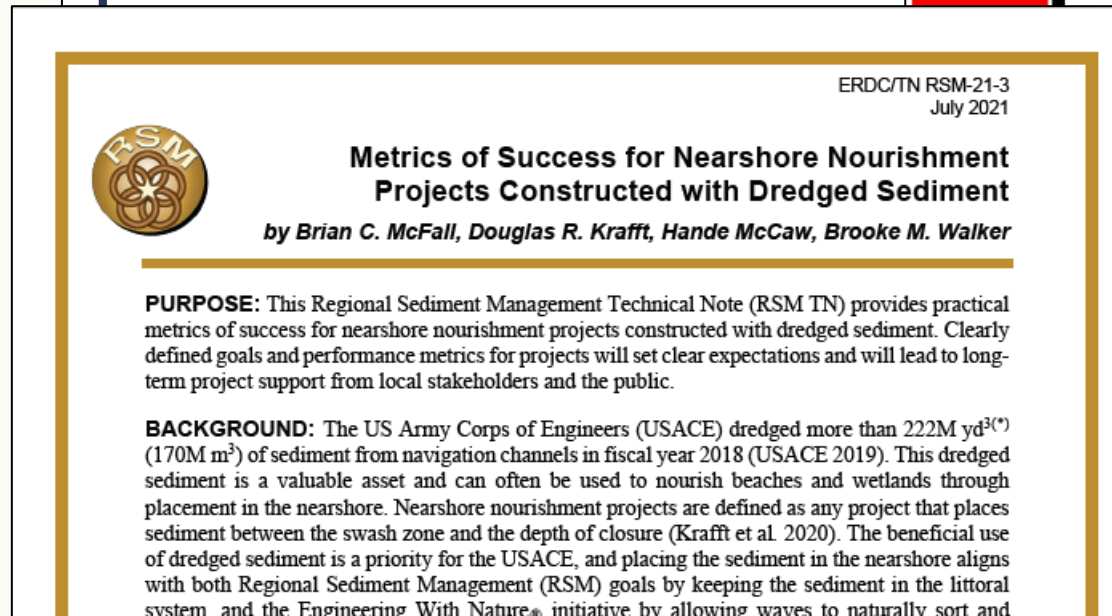


Dredging Operations and Environmental Research

Current State of Practice of Nearshore Nourishment for the United States Army Corps of Engineers

Brooke M. Walker, Douglas R. Krafft,
Brian C. McFall, Hande McCaw, and Scott L. Spurgeon

September 2021



ed for public release; distribution is unlimited.

Co-located Beach and Nearshore Nourishments

Overview:

- Add annual nearshore nourishments to StormSim simulations

Beach Nourishment Lifespan:

- Sediment deeper than 4 ft had no impact on the beach

Wave Energy:

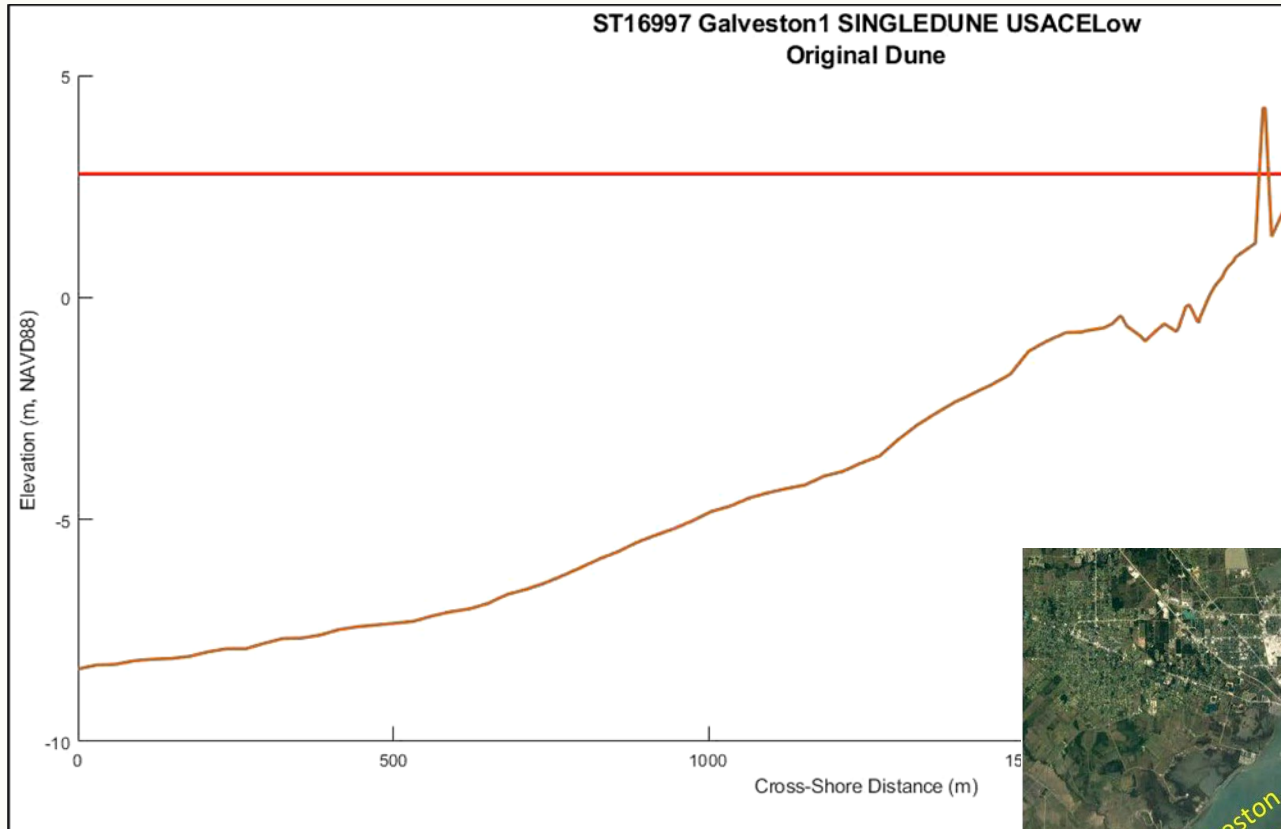
- Region of wave sheltering, but similar waves near the shoreline

Alongshore Sediment Transport:

- More transport at the nearshore nourishment
- Less in the region of wave sheltering

Cross-shore Sediment Transport:

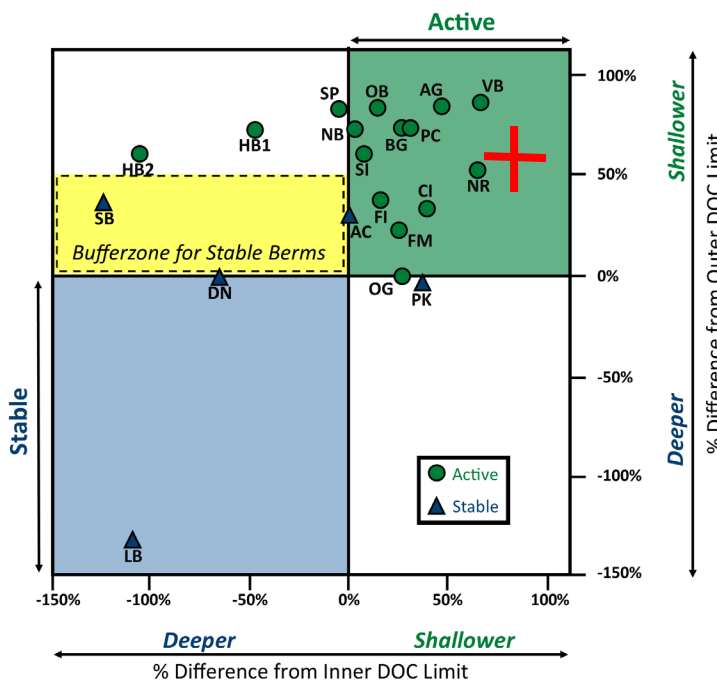
- Also report the quantity of sediment remaining in the placement footprint



Sediment Mobility Tool Upgrades

- JP on the SMT has been Published
- Additional Features
 - Updated Hands & Allison Chart
 - Advanced Tab with
 - ▶ Month Selection
 - ▶ Nearshore Berm Transport Rate

- Legend:**
- AC = Atlantic City, NJ
 - AG = Silver Strand, CA
 - BG = Brunswick, GA (Mound "C")
 - CI = Chetco Inlet, OR
 - DN = Dam Neck, VA
 - FI = Fire Island, NY
 - FM = Fort Myers Beach, FL
 - HB1 = Humboldt, CA (15.8 m depth)
 - HB2 = Humboldt, CA (21.3 m depth)
 - LB = Long Branch, NJ
 - NB = Newport Beach, CA
 - NR = New River, NC
 - OB = Ocean Beach, San Francisco, CA
 - OG = Ogden Dunes, IN
 - PC = Port Canveral, FL
 - PK = Perdido Key, FL
 - SB = Santa Barbara, CA
 - SI = Sand Island, AL
 - SP = South Padre Island, TX
 - VB = Vilano Beach, FL
- DOC = Depth of Closure



1. Scroll to the appropriate location.

2. Draw Shoreline Angle

3. Select Placement Site Or

4. Find WIS / Calculate Angle

Latitude:

Longitude:

Shoreline Angle: 188° Closest WIS ID: 63439

5. User Inputs.

d_{50} mm

Nearshore Placement Depth m

Current 1m (~3ft) above the bed m/s

Temperature °F

Salinity Fresh Water Salt Water

6. Month Selection

<input type="checkbox"/> January	<input checked="" type="checkbox"/> July
<input type="checkbox"/> February	<input checked="" type="checkbox"/> August
<input type="checkbox"/> March	<input type="checkbox"/> September
<input type="checkbox"/> April	<input type="checkbox"/> October
<input checked="" type="checkbox"/> May	<input type="checkbox"/> November
<input checked="" type="checkbox"/> June	<input type="checkbox"/> December

7. Estimate Transport Rate

Yes No

Nourishment Height (h_n) m

Nourishment Width (b_w) m

Cross-shore distance to landward edge (x) m

8. Submit

Advanced

Nourishment Length Parallel to Beach m

Harvey Cedars, NJ

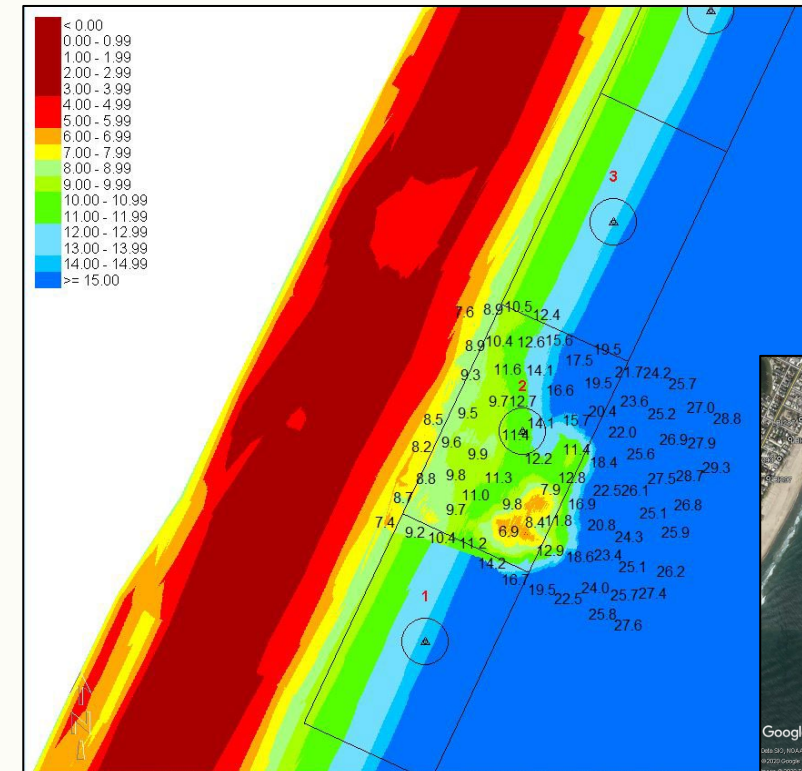
- 1122 Project
- FY21: Nearshore Berm Monitoring
- FY22: Analysis & Tool Evaluation

Goals:

- Capture Morphological Evolution
- Quantify Wave Energy Reduction Due to Nearshore Berm

Data:

- Bathymetry data: 4 full-scale surveys
- Wave data: onshore & offshore
- Current data: possible current meter deployment onshore of the nourishment after construction



Summary

Major FY21 Advances in Capability

- Harvey Cedars, NJ, data collection
- Nearshore nourishments in StormSim
- Special Report synthesizing information from extensive FY20 Nearshore Nourishment Practices Teleconference Series
- Update and added feature implementation in the SMT

Major FY21 Products & Collaborations

- Journal Papers
 - ▶ Evaluation Techniques for the Beneficial Use of Dredged Sediment Placed in the Nearshore
- ERDC Reports
 - ▶ SR: Current State of Practice of Nearshore Nourishment for the United States Army Corps of Engineers
 - ▶ TN: Estimating Nearshore Nourishment Impact on Sub-aerial Beach Nourishment Lifespan in StormSim
- Collaborations
 - ▶ StormSim collaboration
 - ▶ OPJ collaboration to implement SMT updates
- Leveraging with work in RSM, DOER, and Section 1122
- Presentations at ASBPA & in a CIRP Tech Discussion

Final FY21 Products/Advances

- TN presenting results from example StormSim simulations with nearshore nourishments
- Additional data collection at Harvey Cedars, NJ