ERDC
Engineer Research and Development Center

Nearshore placement monitoring St. John's County, FL

Katie Brutsché, Jase Ousley, Jason Engle (SAJ), Coraggio Maglio, Brian McFall

Coastal Hydraulics Laboratory

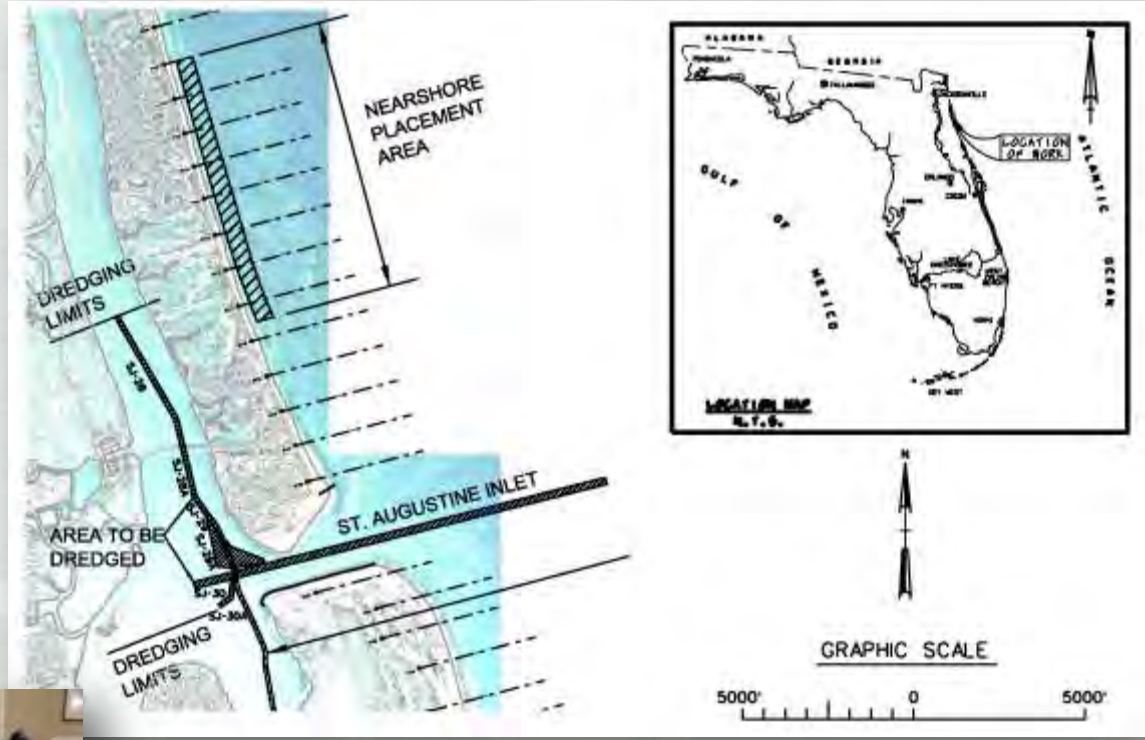
20-Aug-2015

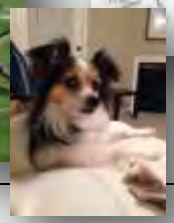
US Army Corps of Engineers®

Project and Objectives

Can we observe, document and make conclusions about beneficial placement of dredged materials in the nearshore?

- Concentrate the placement area
- Understand the sediments
- Visually document changes to the shoreline (photogrammetry)
- Use Sediment Mobility Tool
- CMS model





Pre-Construction

Camera array set up at R-114

Morgan & Eklund survey the nearshore for the county prior to placement

- Set up two camera arrays, T-114.5 and R-116.5
- 180 view of the coastline
- Cross shore topo and multi-beam bathy
- Collected cross shore profile sediment samples

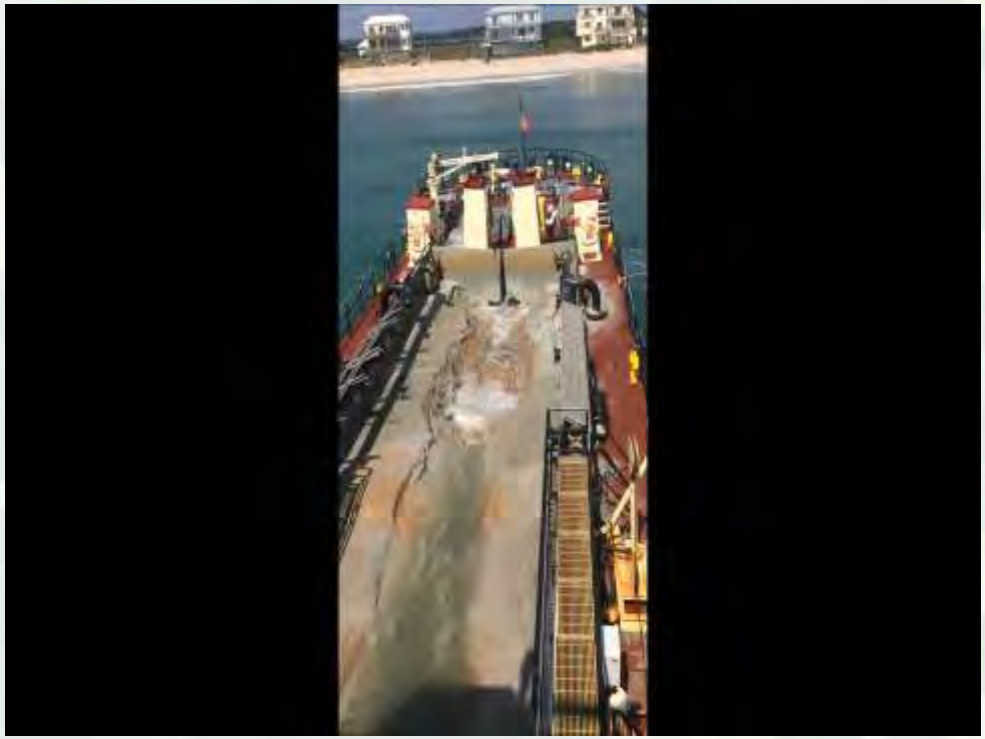
Dredging

- 150,000 cy
- St. Augustine Inlet ebb shoal, flood shoal and part of the IWW
- *Murden* 500cy hopper, light loaded for NS access ~350-400cy
- Sediment coarse sand-sized shell hash and fine to medium sand
- Plume is composed of shell and fine sand

Placement Plan

- Between T-114 and R-115 and R-116 and R-117
- In front of the two property clusters
- Worked with SAJ and HOA
- Two berm methods to see if there is a differing outcome

Nearshore placement

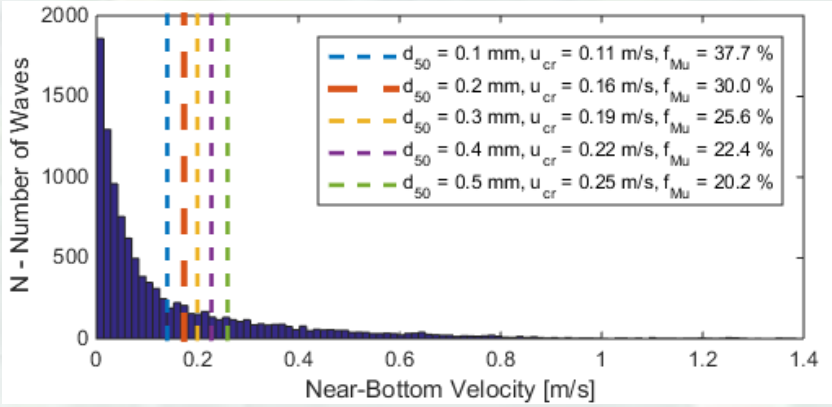


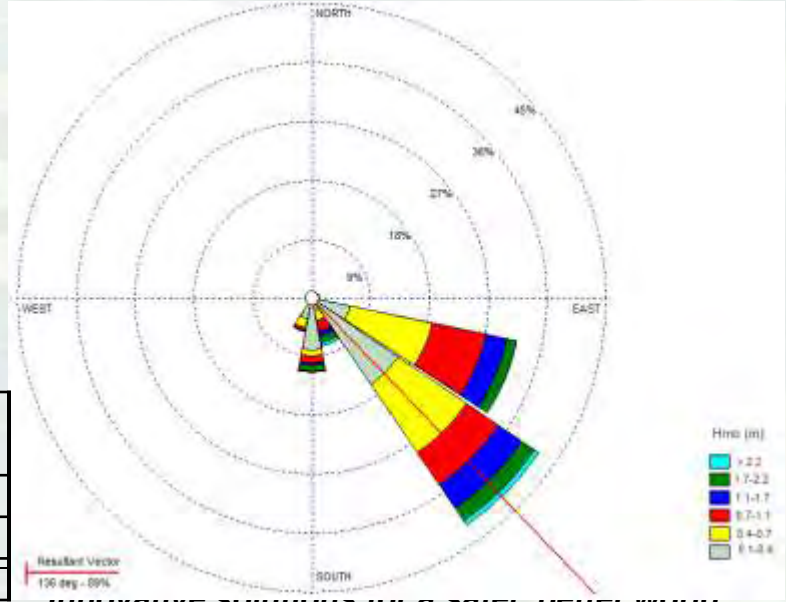
Drag tender duty

- Between -5 to -12 feet
- 300 to 500 feet offshore
- Sampling the materials in the hopper from each dredge area

Sediment Mobility Tool

- Estimates
  - ► Frequency of sediment mobility
  - ► On/Offshore migration direction
  - ► Dominant axis of wave dominated migration
- Preliminary tool to make educated decisions with little data

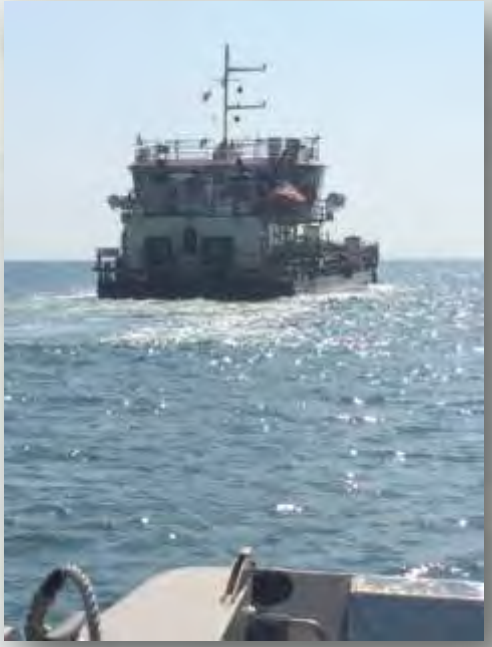




d_{50} (mm)	Frequency of Mobilization	Predicted Sediment Migration
0.1	16 – 38%	83% Offshore
0.2	14 – 30%	60% Onshore
0.3	12 – 26%	84% Onshore

Early Findings

Future work and products



- Post placement sampling
- Two series of post-placement topo and multi-beam surveys
- CMS modeling using existing model inputs from SAJ study
- Geo rectify photos and look at shoreline change
- Sediment Mobility Tool
- Present findings and publish a tech report detailing positive BU outcomes