

Nearshore Berm Discussion

Environmental Impacts

Coraggio Maglio
ERDC

Aubree Hershorin
Jacksonville District

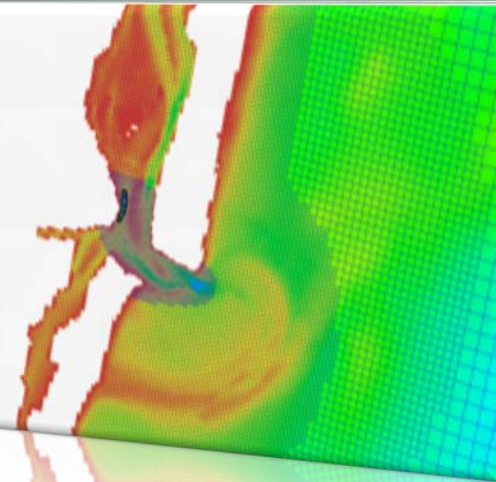
Nearshore Berm Workshop
13 February 2013



**US Army Corps
of Engineers®**



<http://myfwc.com>



Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 13 FEB 2013		2. REPORT TYPE		3. DATES COVERED 00-00-2013 to 00-00-2013	
4. TITLE AND SUBTITLE Nearshore Berm Discussion Environmental Impacts				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory, 3909 Halls Ferry Road, Vicksburg, MS, 39180				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 17	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Definitions

- **Fines** – very fine sand passing 200 sieve, silts and clays
- **Nephelometric Turbidity Units (NTU)** – Measures the Light that is Scattered at 90° from the Light Source
- **Total Suspended Solids (TSS)** - Measure of the Total Mass of Particles in a Sample
- **Turbidity** – Optical property that causes light to be scattered and absorbed rather than transmitted in straight lines through the sample*



**Standard Methods for Examination of Water and Wastewater*

Definitions

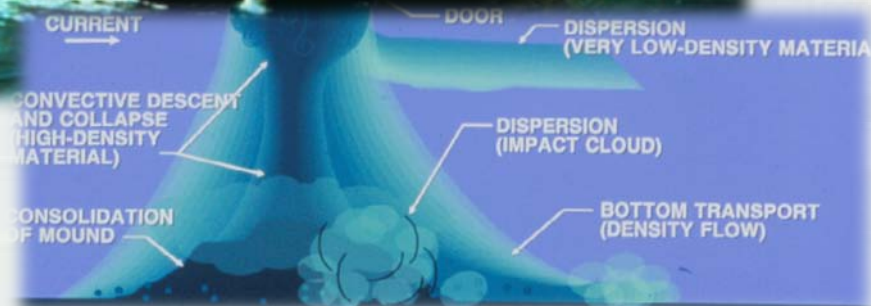
- **Traditional Placement** – placement of material to “build a beach”
- **Submerged Aquatic Vegetation** - any combination of seagrasses, oligohaline grasses, attached macroalgae and drift algae that covers 10 to 100 percent of a substrate*



* <http://myfwc.com>

Definition of Placement Operations

Hopper or Split Barge Placement



Hydraulic Placement



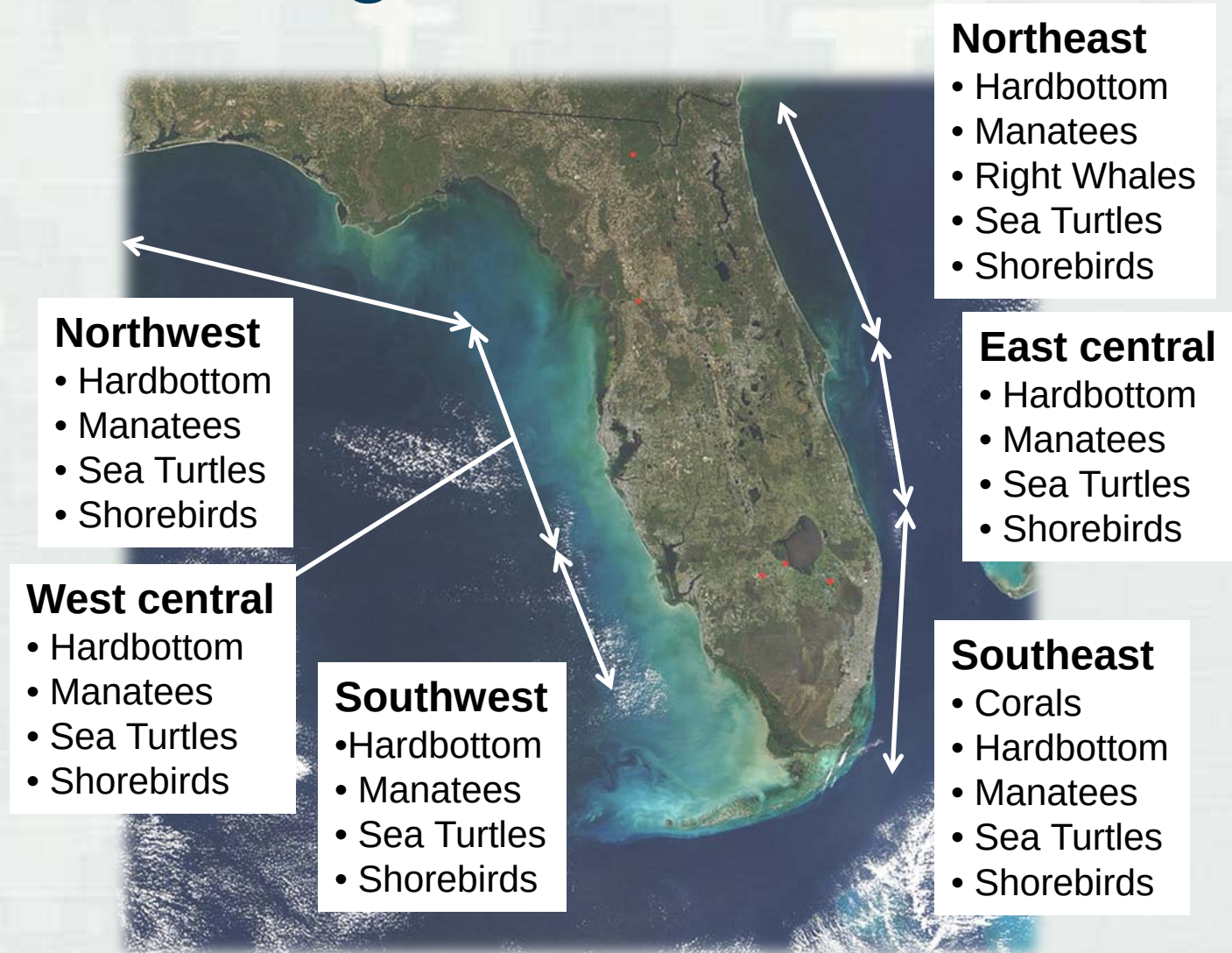
- Methodologies have very different dynamics

Topics to Discuss - Outline

- Resources of concern
- Potential environmental impacts
- Modeling & field measurements
- Reduced impacts vs. traditional placement
- Drawbacks vs. traditional placement
- Research to further
“Engineering with Nature”



Regional Resources



Potential Environmental Impacts

Corals

- Concern about sedimentation impacting corals.
- Mitigated by NMFS requirement to that placement occur 400 ft from *Acropora* spp. (Boynton Beach and south).

Shorebirds

- Nearshore placement may be preferable to beach placement:
 - ▶ May create emergent or ephemeral shoals utilized as foraging habitat; and
 - ▶ No direct impacts to beaches (nesting, foraging, roosting).



Potential Environmental Impacts

Nearshore Hardbottom

- Support diverse assemblages of algae, invertebrates, fishes, and sea turtles.
- Impacts can occur from direct burial during placement, or from movement of sand onto hardbottom habitats.
- Resource surveys required for SPPs.

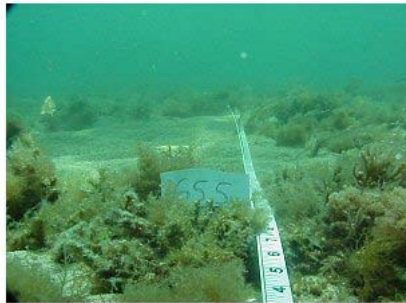


Photo Credit: Nova Southeastern University

Sea Turtles

- Nesting turtles may be precluded from reaching nesting beaches, resulting in false crawls.
- Hatchling turtles may be prevented from reaching the open ocean.
- More of an impact on the Gulf Coast due to shallow nearshore waters.
- USFWS typically requires that no sand be placed higher than MLLW.



Potential Environmental Impacts

Cultural Resources

- Cultural resources in the nearshore area must be buffered to prevent impacts from equipment or dredged materials.
 - ▶ Ponce Inlet
 - ▶ Egmont Key



Photo Credit: Kat McConnell, USACE



Potential Environmental Impacts

Turbidity

- Light attenuation – reduced photic depth
- Gill abrasion
- Settlement of suspended solids resulting in habitat coverage



Potential Environmental Impacts

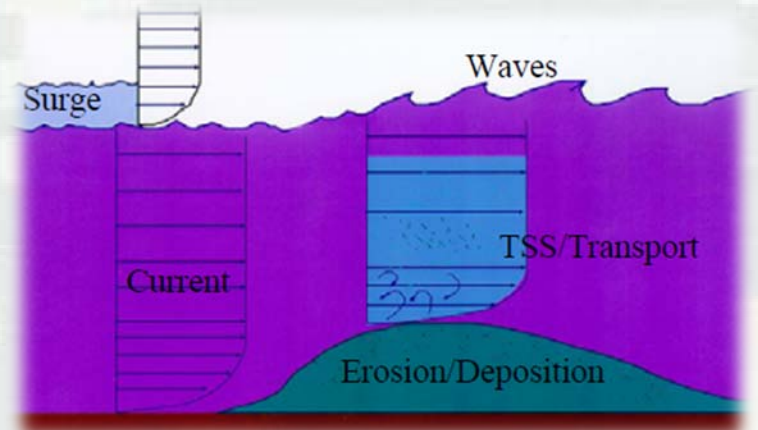
Secondary Impacts

- **Turbidity**
 - Reduced biological productivity
- **Settlement of suspended solids**
 - Reduced biological productivity
 - Larger re-suspendable bed loads



Modeling

- **Sediment transport models**
 - Based on our understanding of physical processes
 - Nearshore process are extremely complex
 - Site-Specific sediment data
 - Mixed sediments pushing the envelope of transport model capabilities
 - Based on process research/data collection
 - Must be aware of model limitations



Field Measurements

- **Process Measurements**

- Hydrodynamic conditions (tides, currents, waves, salinity,...)
- Sediment settling (disposition/sedimentation)
- Water column concentrations
- Sediment bed composition
- Morphologic evolution
- Monitor dredging process



Reduced Impacts vs. Traditional Placement

- **Lower cost**

- Construction – no beach grading equipment
- Maintenance – less escarpment, tilling

- **Reduced beach traditional use impacts**

- Sunbathing
- Water sports

- **Reduced environmental Impacts**

- Turtle nest relocations avoided
- Cemeration potential eliminated
- Beach Munsell Color change reduced as sediment is spread out and bleaches more naturally
- Shorebird impacts eliminated



Drawbacks vs. Traditional Placement

- Material is not immediately visible to public
- Remediation for unacceptable material far more difficult
- If parameters imposed on nearshore placement are overly restrictive this placement method could become more expensive than traditional beach placement



Research to Further “Engineering with Nature”

- **Modeling development efforts**

- Improve mixed sediment transport algorithms
- Improve site-specific parameterization methods
- Improve far field modeling of fines

- **Field data collection efforts**

- Long term background turbidity/ sedimentation data collection
- Site specific correlation for NTU to SSC
- Near and far field dispersion and settlement of fines
- Threshold of turbidity, SSC, and sedimentation required for resource impacts



Thank You!



Coraggio Maglio

Coraggio.Maglio@usace.army.mil

Phone: (601) 634-4150

Aubree Hershorin

Aubree.G.Hershorin@usace.army.mil

Phone: (904) 232-2136

