Background Information and Project Relevance

- Project Location
- Delicate Environment
  - 55,000 acres of marshlands
- Recent Environmental Changes
- Project Purpose/LJA’s task
Data Collection and Design
Parameters

- Existing Data
- MetOcean Data
  - Wind, Waves, Sea Level Rise, Water Level/Extremal Statistics
- Survey
Preliminary Evaluation

- Sediment Characteristics (DoC)
- Sand Source Investigation
- Design Life
- Model Inputs
Previous Studies

Units: MJoules/Year
(Flow of wave energy parallel to shoreline)

Note: Negative values indicate net potential transport eastward
Hotspot Detection

Erosion Detection, difference from initial beach fill

Alongshore distance (ft), Clam lake on left

Accretion (ft)
Longshore Transport Modelling

20 Year Sediment Size Sensitivity

Amount of Nourishment (ft)

Alongshore Distance (ft), Clam lake on left
Longshore Transport Bracketing

Approx 225' Fill 1 mi width centered on Hotspot

Approx 60' Fill from White's Levee to Vastar, Depth of closure is 9ft
Cross Shore Transport Modelling, Wind Waves

Wind Waves Response, 100 foot fill

- Final Profile: Wind Waves 5 Months
- Final Profile: Wind Waves 1 month
- Nourished Profile
- Pre-Nourished Profile
Cross Shore Responses to Storms

Storm Response, 100 foot fill

- Final Profile: TS Edouard 2008
- Final Profile: Hurricane Rita 2004
- Final Profile: TS Josephine 1996
- Nourished Profile
- Final Profile: TS Fay 2002
- Pre-Nourished Profile, 0.12mm Grain Size
Future work

- Beach profile final shape
- Simulate more storms (Ike and Tropical Storm Bill)
- All other necessary permitting and construction (discussed in earlier presentation)
- Maintenance plan
TAKE AWAY POINTS!

- Erosional Hotspot location
- Beach Nourishment best alternative monetarily and environmentally
- Bracketed beach nourishment spreading rates
- *Weaker storms can erode beach much more than stronger storms*
References

- http://www.pilebuckinternational.com/chapter-7-roads-areas-receding-shorelines/
- http://www.outerbanksofnc.org/rodanthe-beach-nourishment-project-completed/
Thank you!

- Are there any questions?