



# ERDC, Field Implementation of Belowground Biomass (BGB) for Increased Dune Stability and Resiliency

**BLUF:** The aim of this proposed project is to observe and document the response of a man-made dune to incrementally added belowground biomass. Recent research at ERDC shows the value of belowground biomass in dunes, and it is hypothesized that including biomass during the construction project, or adding biomass incrementally as the dunes naturally accrete, will greatly increase the stability of the dune, especially while vegetation is establishing.

## Objectives

- Increase BGB utilizing natural wrack
- Monitor the beach/dune system
- TN summarizing groomed/man-made dune maintenance practices
- Continue the study to FY21 & publish

## Approach

- Site selection & define experimental zones
- Pre-treatment & periodic terrestrial lidar surveys
- Incremental wrack placement at dune toe & adjust beach grooming practices.
- Field inspection post-storm event (TS Cristobal)





## ERDC, Field Implementation of Belowground Biomass for Increased Dune Stability and Resiliency

### District/Other USACE PDT Members

Eve Eisemann, CEERD-HN-C, Res. Physical Sci.  
 Mary Bryant, CEERD-HFC-S, Res. Hydraulic Eng.  
 Dr. Duncan Bryant, CEERD-HFC-T, Res. Hydraulic Eng.  
 Elizabeth Godsey, CESAM-EN-HH, Coastal Eng.  
 Richard Allen, CESAM-EN-HH, Civil Eng.

### Stakeholders/Partners

#### Mobile District Team

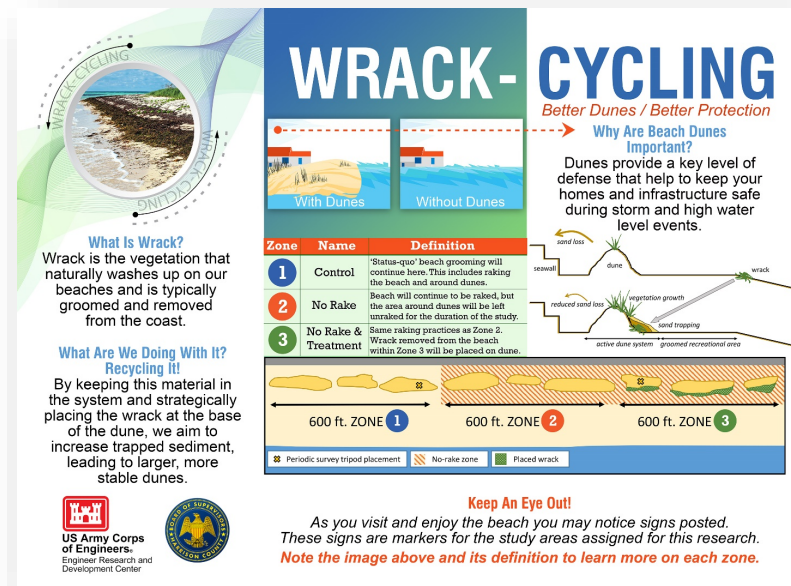
Alison Fitzgerald, CESAM-EN-HH, hydraulic engineer,  
[Alison.A.Fitzgerald@usace.army.mil](mailto:Alison.A.Fitzgerald@usace.army.mil)  
 Angelia Lewis, CESAM-PD-EC, biologist  
 Brian A. Zettle, CESAM-PD-EI, senior biologist

#### Harrison County, MS Sand Authority

Charles V. Loftis, Director, [CLoftis@co.harrison.ms.us](mailto:CLoftis@co.harrison.ms.us)

### Leveraging/Collaborative Opportunities

- Mobile District Mississippi Coastal Improvements Program (MsCIP) re-planting of Harrison County Dunes.
- Harrison County Sand Authority beach maintenance project



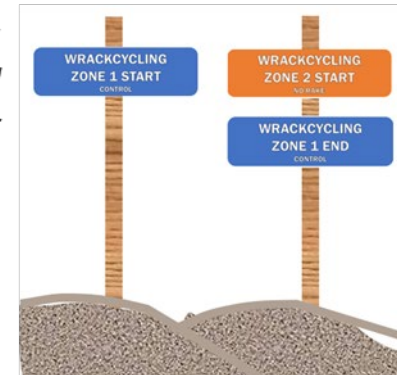


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### Accomplishments/Deliverables

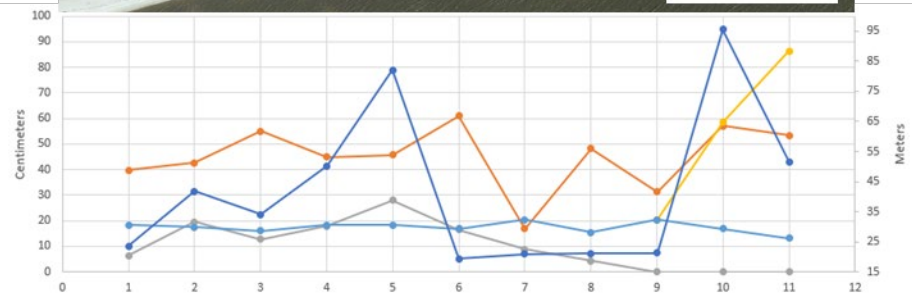
- Site selection and approval
- Creation of signage
- Field measurements post-Cristobal
- Preliminary terrestrial lidar surveys completed
- placement of signage [to happen this week]
- Initiation of wrack placement and changes in grooming practices [to happen this week]
- TN summarizing groomed/man-made dune practices [in progress]

*Zone-designating signage printed and delivered, ready to post*



### Lessons Learned

- Importance of close communication with local and district stakeholders
- Travel delays due to COVID-19



*Field datasets collected post-TS-Cristobal*

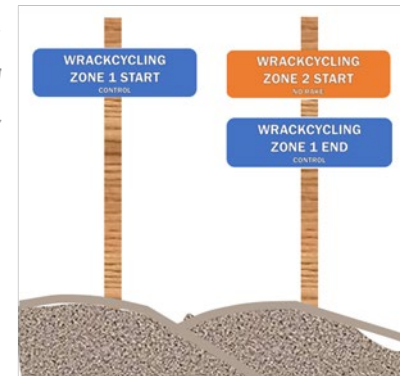


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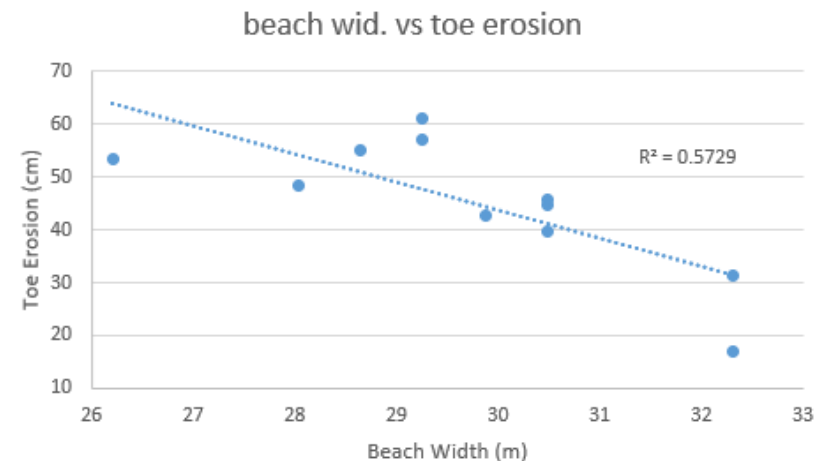
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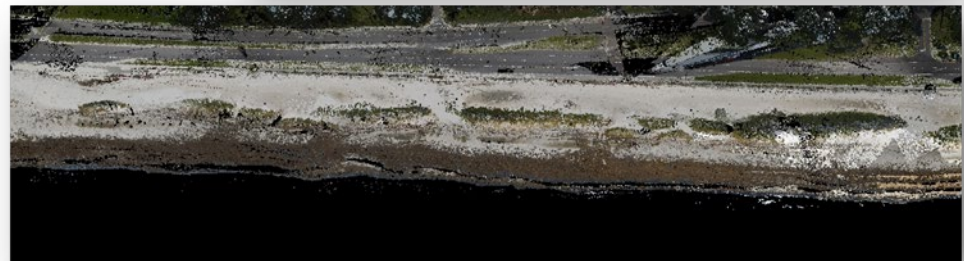
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*Colorized lidar point cloud of a single dune segment (top)  
and the whole study site (bottom)*



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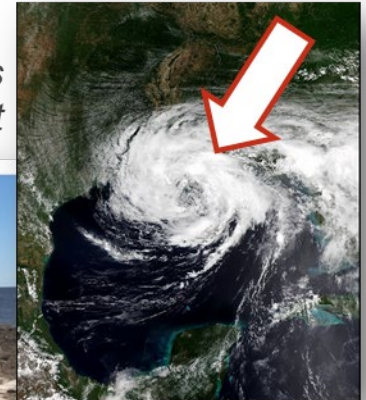
What challenges did you face to get your project to implementation and how did you move past them?

- Travel restrictions/delays
- TS Cristobal

*TS Cristobal & impacts observed on the MS Gulf Coast*



*JALBTCX intern Cass Hankins estimating vertical erosion based on vegetation coloration*



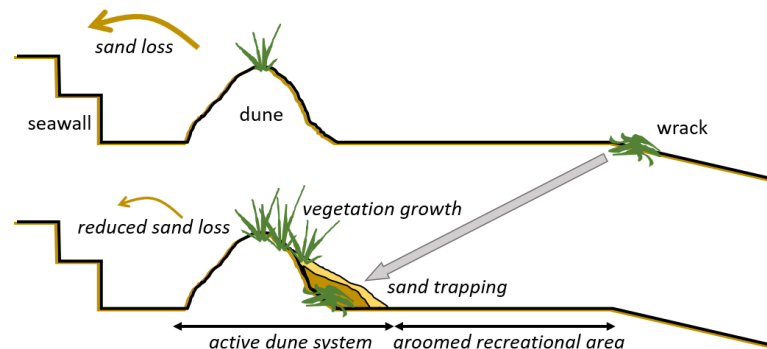


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### How is this project benefiting the USACE and Nation?

This project has the potential to greatly improve the sediment retention of nourishment projects with man-made dunes by augmenting the dunes' ability to capture and retain sand. This method may be an effective sediment management strategy, improving the efficiency of beach re-nourishments and man-made dunes.

- The use of wrack material for dune improvement will reduce costs to the local stakeholders associated with beach grooming and disposal
- With increased biomass, aeolian sediment trapping will increase, preventing sand loss
- Added biomass may enhance dune vegetation growth (Sigren, Figlus & Armitage, 2014)
- Increased dune stability and resistance to erosion





# Thank you!

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