CTBS Newsletter
The Center for Texas Beaches and Shores
January 2017

Recent Publications

- A multidisciplinary team of researchers at CTBS collaborated on a study estimating the economic value of coastal dunes and vegetation for damage reduction during storm impact. The paper has been accepted for publication in the Journal of Coastal Research (JCR).

  Sigren, J. M., Figlus, J., Highfield, W., Feagin, R. A., & Armitage, A. R. (2017). The effects of coastal dune volume and vegetation on storm-induced property damage: A hurricane Ike case study. Journal of Coastal Research, accepted for publication.

- Dr. Jens Figlus and his former student Craig Harter recently published a numerical model study focused on barrier island morphodynamics during hurricane impact.

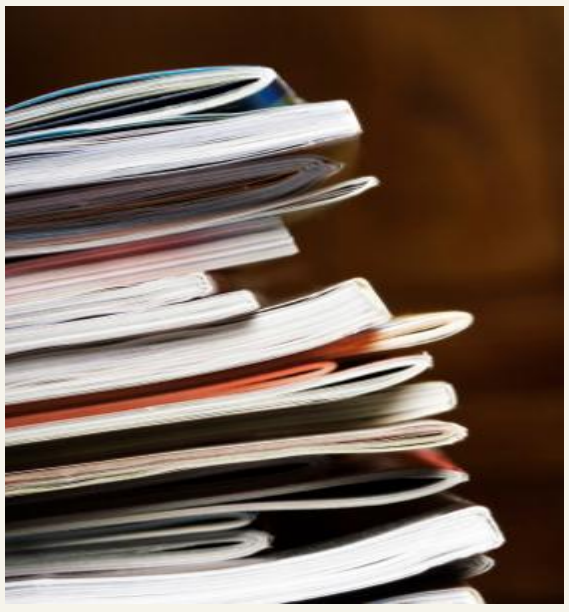
  Harter, C., & Figlus, J. (2017). Numerical modeling of the morphodynamic response of a low-lying barrier island beach and foredune system inundated during Hurricane Ike using XBeach and CSHORE. Coastal Engineering, 120, 64–74. https://doi.org/10.1016/j.-coastaleng.2016.11.005.

- Examining the efficacy of FEMA disaster programs targeting recovery and response and mitigation activities in reducing hurricane-induced economic losses, in North-Atlantic States.

  Davlasheridze, M, Fisher-Vanden, K and Klaiber, HA. (2017). "The effects of adaptation measures on hurricane induced property losses: Which FEMA investments have the highest returns?" Journal of Environmental Economics and Management 81:93-114.http://dx.doi.org/10.1016/j.jeem.2016.09.005.

- Examining how hurricane Katrina changed socioeconomic fabric of the Orleans parish.

  Davlasheridze, M. and Q. Fan. "Household Adjustments to Hurricane Katrina." The Review to Regional Studies. (Forthcoming).



Residential Flood Impact Report

This technical report describes the process and results of estimating the direct economic impact of storm surge on residential structures in the Galveston Bay area. It is part of a comprehensive project that examines the overall economic impact of a coastal spine system (aka, the "Ike Dike"), which protects the Galveston coast from the adverse impacts of storm surge. In this report, we focus on the direct economic impact of historic and proxy storm events on residential structures by developing a residential spatial damage model that integrates Advanced Circulation Models (ADCIRC) with site-specific natural and built environment characteristics. The first scenario estimates damages that would occur based on existing flood infrastructure, while the second scenario estimate damages after the installation of the proposed coastal spine system. This resulted in estimating direct economic damage avoided due to the presence of the coastal spine.

This report analyzes the impact of three proxy storm surge scenarios (10-yr/10% chance, 100-yr/1% chance, and 500-yr/0.2% chance), and a reconstruction of Hurricane Ike, which impacted the coast in 2008. The findings show that residential structures worth between $6-16 billion are exposed to potential inundation. Direct losses to residential structures range from $527 million to $8 billion, depending on the intensity of the storm.

With a coastal spine in place, there is significant reduction in both inundation exposure and direct damages to residential structures. For a 500-year event, losses would be reduced by almost 75 percent. Similarly, losses for a 100-year proxy storm would be reduced by approximately 70 percent, or $3 billion. If Hurricane Ike had occurred with a coastal spine already constructed, the avoided residential losses would have been over 95 percent, a savings of approximately $7 billion. These findings suggest that a coastal protection system would greatly reduce the expected residential losses from storm-surge events and provide a critical role in protecting the property and livelihood of residents living adjacent to Galveston Bay.

Coastal Sand Dune Field Study

A new 2-year $250k field study on coastal sand dunes in an engineered beach environment is starting now. In this study different size dunes will be built in front of the Galveston Seawall around 69th St where a recent beneficial-use dredge material (BUDM) project has created a new beach. Some of the dunes will be enhanced with mechanically compressed Sargassum seaweed bales, or "seabales", after the next landing. Monitoring of morphodynamics and hydrodynamics related to the evolution of the dunes will be monitored over the project duration and beyond to assess ideal dune restoration configurations and seabale impact on dune fortification and long-term growth.
Project sponsor: Texas General Land Office (GLO) and Galveston Park Board of Trustees;
PI: J. Figlus