

DETERMINING THE EFFECTS OF BARRIER ISLAND DEGRADATION/RESTORATION IN TERMS OF STORM INTENSITY AND TRACK

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A sensitivity analysis was performed to assess the impact of bathymetric and frictional resistance changes on ADCIRC-simulated peak surge elevations and STWAVE-simulated waves. Natural landscape features such as barrier islands have the potential to create frictional and bathymetric resistance and affect storm surge and wave energy even when submerged. The impact of barrier islands to the surge levels is very dependent on the intensity and track of a given storm. This study will attempt to quantify the effects of barrier island degradation/restoration in terms storm intensity and track. This will be accomplished by running (using ADCIRC and STWAVE) a suite of storms of varying intensities and tracks. Using the results from this suite of storms, a correlation will be determined between the degradation/restoration effect and the storm intensity and then separately another correlation will be determined between the degradation/restoration effect and the storm track. These relationships will be determined by examining the numerically produced fluxes that pass over the barrier islands for each given storm. Therefore upon completion of this study it will be possible to obtain an approximate effect of the restored/degraded barrier islands for a given storm track and intensity.

The modeling methodologies used throughout this study are in accordance with the unified technical approach developed as part of the Joint Coastal Surge (JCS) Analysis Study with the US Army Corps of Engineers (USACE) and the Federal Emergency Management Agency (FEMA). The circulation model ADCIRC was used to simulate storm surge and was coupled with the nearshore wave generation and transformation model STWAVE. The restored barrier island scenario represents massive restoration on an extremely large scale. Likewise, the degradation scenario is catastrophic, with entire barrier islands removed. The coupled model results indicate that the barrier islands provide some level of protection as a natural buffer and line of defense and the efficacy is reduced with degradation.

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