Introduction

- Natural and hybrid infrastructure (NHI) mitigate coastal flooding and erosion caused by waves and storm surge.
- The design and implementation of NHI for coastal protection are severely hindered by inadequate knowledge on the response and recovery of NHI from extreme events.

Research Objectives

1. Observe the effects of the sequential landfalls of Hurricanes Laura and Delta on a natural and hybrid shoreline at Rockefeller Wildlife Refuge (RWR).
2. Compare the post-storm hybrid shoreline to historical locations and elevations.

Methodology

- Elevation profiles were collected in RWR using GPS-RTK before Hurricane Laura (Aug 2020), after Hurricane Laura (Sep 2020), and after Hurricane Delta (Oct 2020).
- Profiles were collected along two transects: one with a natural shoreline and one with a breakwater (hybrid).
- NAIP imagery collected in 2008, 2013, 2017, & 2022 was analyzed in QGIS to observe historical locations of hybrid shoreline.
- Bathymetry collected in 2008, 2013, 2017, & 2021 was analyzed in QGIS to compare historical elevations at hybrid shoreline.

Historical Comparisons

- Less shoreline receding after installation of breakwater.

Summary and Conclusions

- The hybrid shoreline experienced less inland deposition following Laura and Delta than the natural shoreline, although the mechanisms controlling this are not well-understood.
- Rate of shoreline receding appeared to decrease after installation of the breakwater and the greater change in elevations between 2017 – 2021 may be a result of Laura and Delta. Further analyses are necessary to validate.

Acknowledgements

This work was supported by NSF through a Graduate Research Fellowship to Jasmine H. Bekkaye and through NEER (Award No. 1939275).

References