

Tracking Coastal Wetland Loss in Southern Louisiana from Tropical Storms

Background: Shoreline and wetland loss in Louisiana threatens the future of the state's economy, which is heavily dependent on coastal activities. This study builds on previous satellite remote sensing studies over the Mississippi Delta region to make increasingly detailed assessments of damage inflicted on coastal wetlands of southern Louisiana from tropical storms of different categories.

Main Findings: Landsat image analysis results show that more than 680 km² of Louisiana coastal wetland area was transformed to open water following Hurricane Ida in 2021, which is over twice as great as the wetland loss estimated after Hurricane Katrina in 2005.

Analysis of biweekly [Landsat 8 Normalized Difference Water Index](#) (NDWI) images between the years 2000 and 2011 for the Mississippi River Delta study region suggests that there have been increases in water coverage and corresponding losses of wetland coverage over most of the marsh shorelines facing the Gulf of Mexico across the Barataria Basin.

The extensive erosion of marshland edges in northern Barataria Bay has continued from 2013 to 2022. Oiling from the Deepwater Horizon spill event in 2010 has contributed to high erosion rates observed after recent tropical storms in Barataria Bay.

Impact: The combination of Landsat NDWI trend mapping with high-resolution image segmentation of marshland edges and interior features demonstrates that different types of biophysical damage inflicted on coastal wetlands of southeastern Louisiana from tropical storms can be characterized using this combination of satellite and aerial remote sensing.

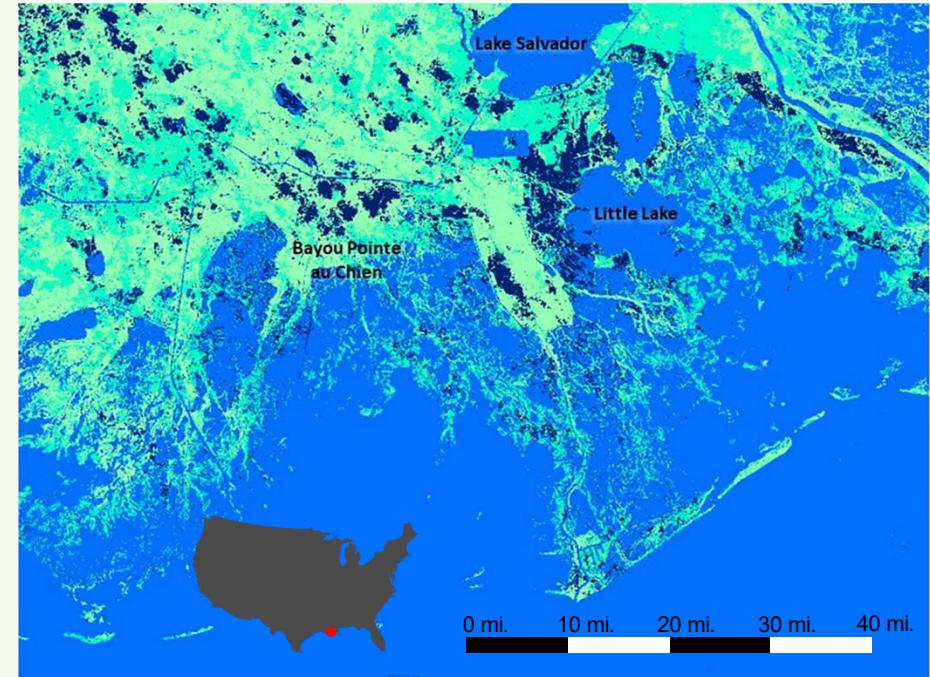


Figure. Map of wetland loss (dark blue pixels) across Barataria and Terrebonne Basins detected by comparison of Landsat 8 NDWI images from June of 2021 to September of 2021.

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