

Vanishing Marshes, Fading Redfish: Louisiana's Dual Ecological Crisis

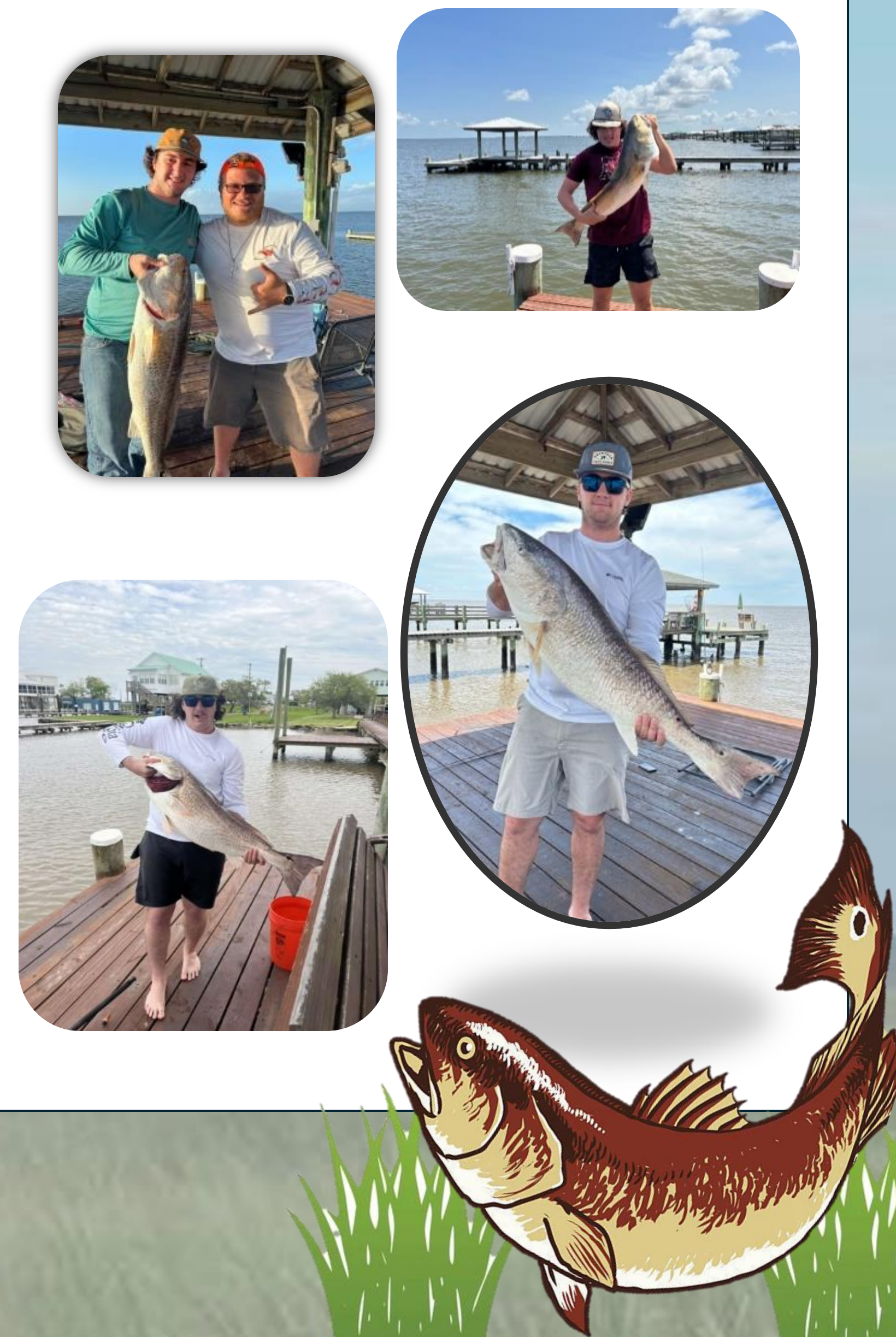
Louisiana Coastal Fish being lost along with its Habitat

Hayden M. Smith, Rodney B. Yantis, Courtney A. Poirier Chicola
NASA/UL Lafayette Regional Application Center, University of Louisiana at Lafayette

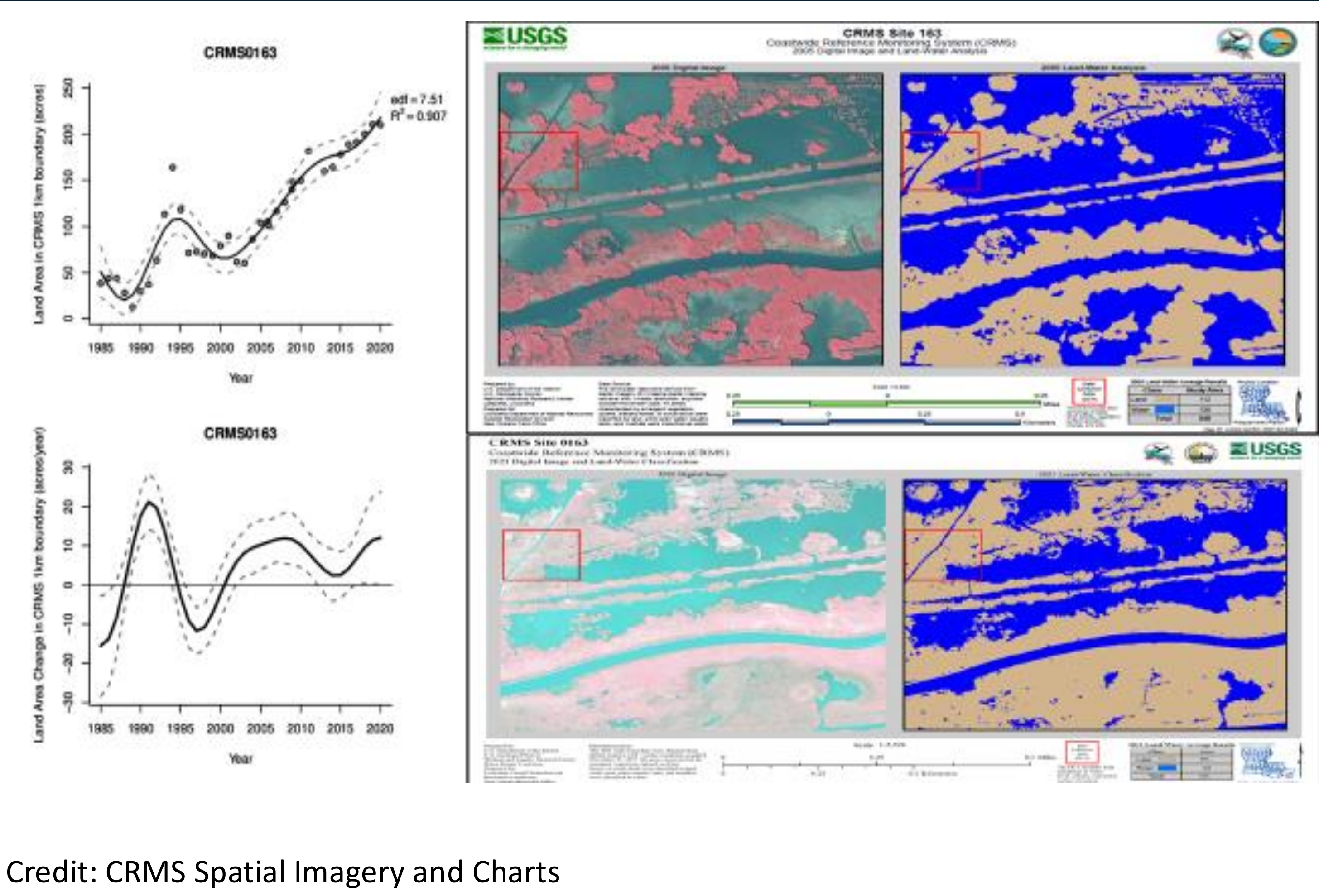
Abstract

Louisiana's coast is rapidly eroding due to both natural and human-induced factors, particularly levee construction along the Mississippi River. This coastal loss has heavily impacted the Red Drum (*Sciaenops ocellatus*), a vital species that supports local jobs and communities also commonly referred to as Redfish. Most Redfish caught are juveniles, so we analyzed their biology, escapement rate, spawning potential ratio (SPR), and age-length models. Their decline is closely tied to marsh loss, which affects both their food sources and competition. We assessed marsh loss through three key factors: land-water change over time, surface elevation changes, and the impacts of natural disasters and artificial structures. CRMS site data from key Redfish fishing areas were analyzed. Mitigation strategies for coastal erosion are included to help protect Louisiana's marshlands.

Pictures of Redfish



Land vs Water Change Over Time (2005 to 2021)



Conclusion

Redfish are a cultural icon of Louisiana, with Venice known as the "Redfish Capital of the World." However, like the disappearing marshes, Redfish populations are in decline. Species like Speckled Trout and Flounder seem to be adapting to environmental changes, but Redfish are struggling. The Louisiana Department of Wildlife and Fisheries (LDWF) has taken measures to support various fish populations, but Redfish face unique challenges. While surface elevation in marshes is increasing, some natural resistance to sea level rise exists, land loss to open water continues at an alarming rate. The data suggest that Redfish are declining due to sea level rise, subsidence, and marsh degradation, converting critical habitat into open water. This dual ecological crisis—the decline of Redfish and vanishing marshlands—threatens both Louisiana's ecosystem and cultural identity.

Methods

Species Examined

- Target Species: Redfish (*Sciaenops ocellatus*), speckled trout, and flounder
- Data Source: Louisiana Wildlife and Fisheries
- Analysis:
 - (1) Comparison of age and length data and
 - (2) Growth patterns analyzed through tables and graphs

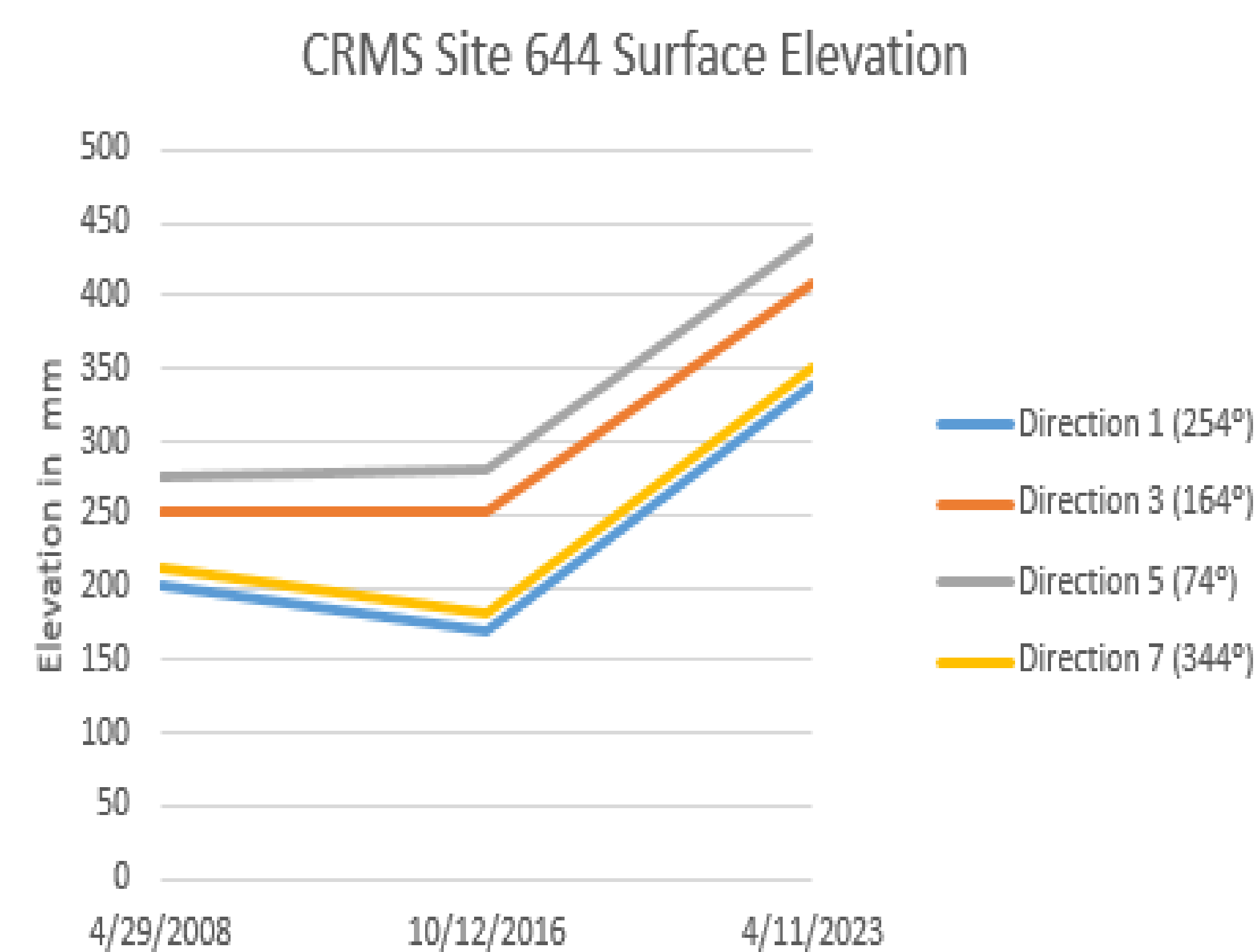
Surface Elevation and Location Analysis

- Study Locations: Venice, Grand Isle, Hopedale, Dulac, Rockefeller, Vermillion Bay, Calcasieu Lake
- Sites: Three CRMS sites selected per location
- Data: Comparison of surface elevation changes over time (from site construction, 2016, and recent CRMS records)

Land vs. Water Change Over Time

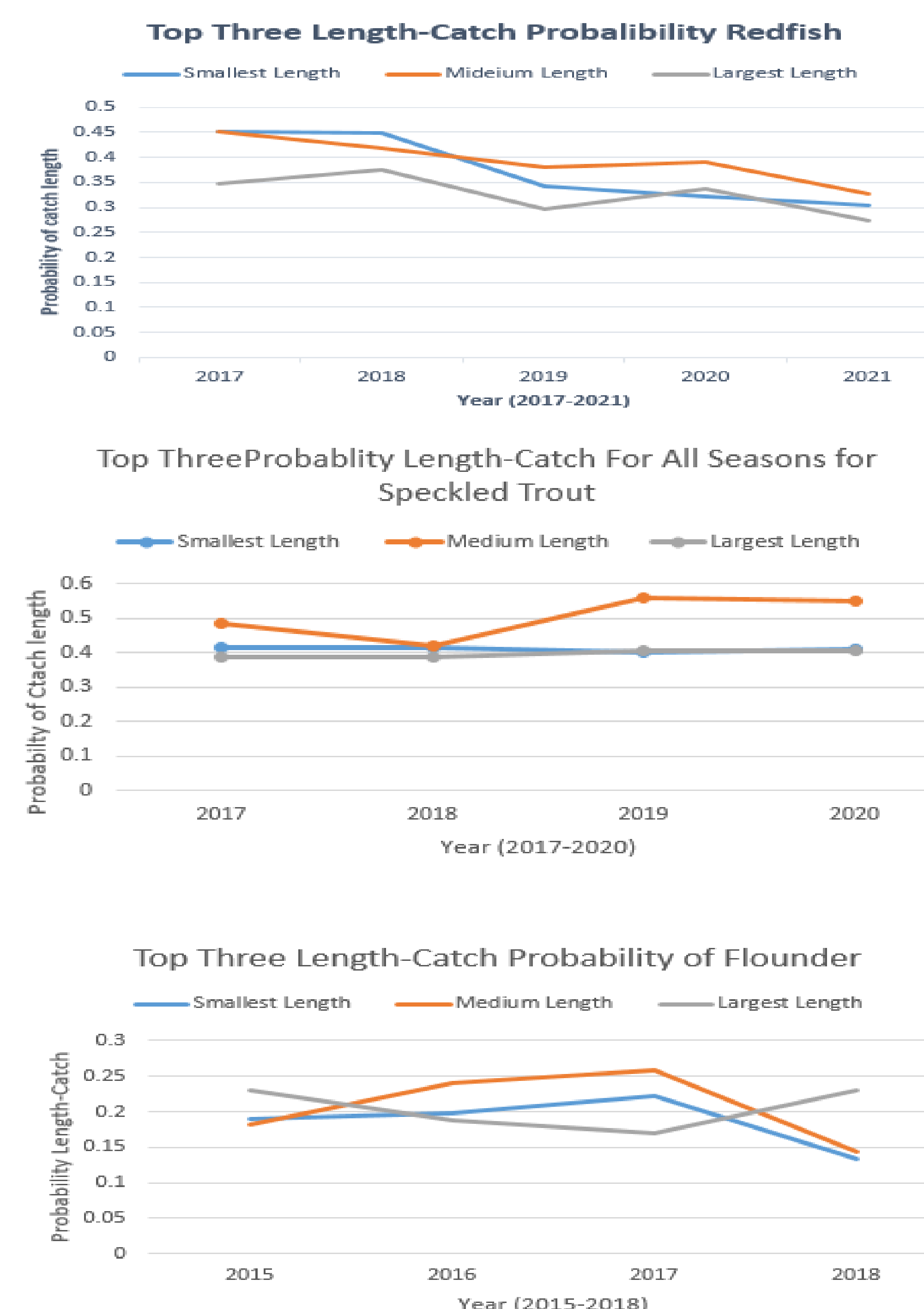
- Data Source: CRMS and USGS charts
- Analysis:
 - (1) Trends in coastal land loss over time and
 - (2) Comparison of infrared and land vs. water imagery (2005 vs. 2021)

Surface Elevation Graph



The graph has three date each about a 7–8-year gap showing how surface elevation at this site has increase over time. The legend shows the direction on a compass at which the samples were taken.

Length-Catch Probability Graphs



Acknowledgements

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Contact Information

Hayden Smith
Email: Hayden.smith3421@gmail.com
Courtney Poirier Chicola, PhD
Email: chicola@louisiana.edu