

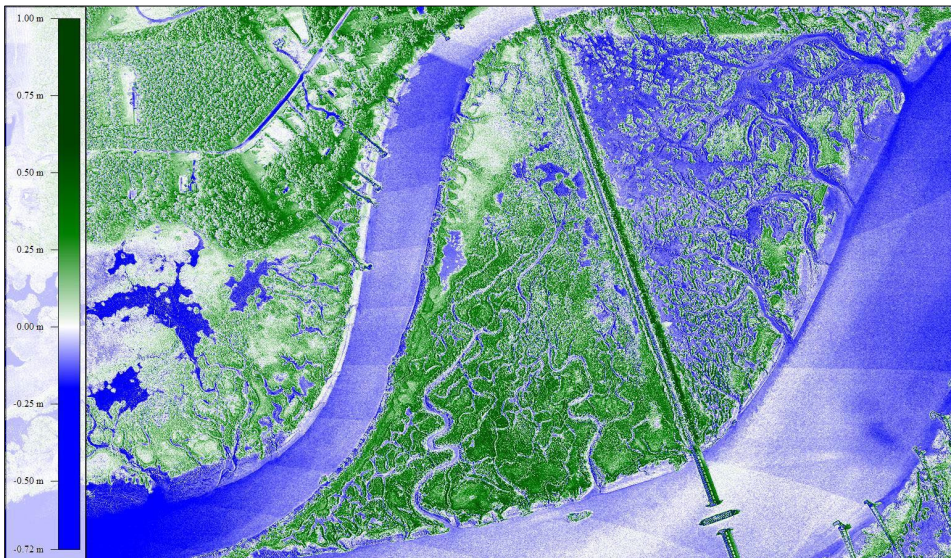
Marsh Evolution and Sedimentation Pilot Study: Defining a Method to Categorize Marsh Typologies, Accretion, Elevation, and Health for Use in Restoration Techniques.

Funded by the Port Royal Sound Foundation Research Grant Program, this study looks to define a replicable method using available data sets to categorize marsh typologies, accretion elevation, and marsh health for use in restoration techniques.

The pilot project used a small marsh island on the Whale Branch creek to model processes that control marsh health and evolution in the larger Broad River/Port Royal Sound habitats. The island lying off the Whale Branch fishing pier between Coosaw and Seabrook is the site of a railroad bridge and causeway built in ca. 1870; it was the first railway to and from Beaufort.



This historic island and the marshes surrounding it tell a larger story of the role that sediment accumulation, erosion, and sea level rise has in the marshes throughout the area. By studying the habitats (and their history and relationship to marsh evolution and elevation trends), this phase I project has provided information for the development of restoration techniques tailored to the wide variety of marsh conditions found within the Port Royal Sound. The study compared Lidar data sets (2002, 2013, 2020) along with aerial imagery to determine changes in habitat in regard to elevation and sedimentation.



One of this study's intents is to examine the techniques and processes for use over a much larger area than the 130-acre island. To facilitate the potential to scale several orders of magnitude, the study drew heavily on existing information to drive site specific findings that inform restoration decisions. Remote sensing data from both active and passive sensors is widely available and covers the entire Port Royal Sound from the 1950s to present.

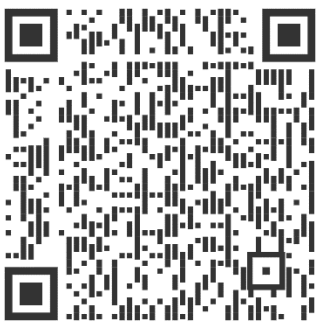
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The data was used to evaluate the changes in elevation trends, the amount of time the area is “wet”, or the marsh is submerged, and erosion and accretion patterns compounded with Sea Level Rise.

Although the study location is small, it contained a variety of environments that were created by both natural and variables from human activity. It is a unique site and at the same time provides a good summation of the processes going on in the greater Port Royal Sound. The sum of environments and variables helped to highlight the following take-aways.

For the full report scan here



Key Takeaways

Sediment deposition may not necessarily follow the common estuarine model of inland sources and an estuarine turbidity maximum where sediment deposition is concentrated.

Sedimentation rates are related to elevation and, thus, time of inundation.

Most of the areas supporting marsh had an inundation time of 31% +/- 14%. Areas below about 50% will likely become tidal flats if not so already.

Tidal flats have higher sedimentation rates than marsh areas because they are inundated longer than the marsh.

Nearly the entire island has a negative net sedimentation rate when sea level rise is included in the calculation of rates.

Man-made structures cutting across marshes (e.g., causeways) can interrupt sediment deposition and create conditions that lead to marsh loss.

The vast acreage of tidal flats in Port Royal Sound provides a framework for development of future marsh if the correct elevations can be achieved. The likelihood of upland land becoming marsh, the natural cycle, is being curtailed by current development trends in the area.

Thin layer deposition and the beneficial use of dredge material provides an avenue towards re-establishment of areas that used to be marsh.

The use of existing remote-sensing data provides high accuracy measurements.