

Effects of Hurricanes on Oyster Rakes and the American Oystercatcher (*Haematopus palliatus*)

Amber Marquette, Hope Garrie, Jackson Krasny & Madeleine Doiron



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Introduction

Oyster rakes are mounds of dead oyster shells made into long, berm-like structures. They are known as a common nesting site for the American oystercatcher, a threatened species in the state of Florida. These natural structures are susceptible to changes due to hurricanes which can affect the nesting of oystercatchers. The goal of our research was to see if hurricanes influence the size of oyster rakes and therefor also American oystercatcher nesting.

Site Location

We selected 7 oyster rakes along the Tolomato River north of the Bridge of Lions. The Tolomato River is one of the most productive nesting sites in Florida. Our sites were on the east and west sides of the river.



Methods

- Elevation measurements
- GPS coordinates used to map the oyster rake perimeters in ArcGIS Pro
- Heads up digitizing used on historical aerial images in ArcGIS online
- Area measurements of each oyster rake calculated in ArcGIS Pro
- Florida Shorebird Database used for American oystercatcher nesting data on the rakes



Results

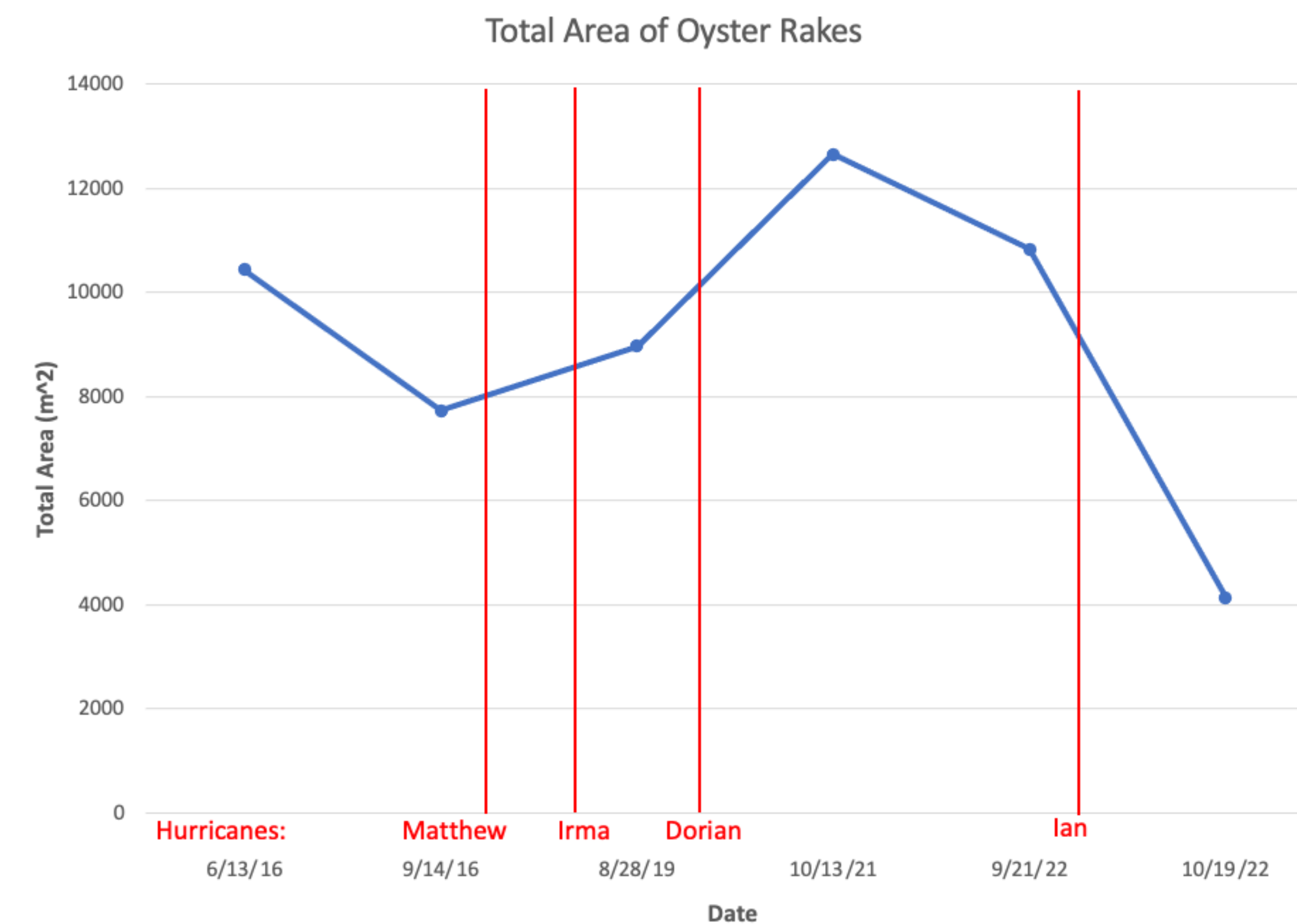


Figure 1: The change in the total area of oyster rakes was analyzed over time based on the dates of the historical aerial data and the ground truthing. The relative date of each of the hurricane events that we studied are illustrated to compare these events to the changes in area.

Site 1 Pre and Post-Hurricane Ian

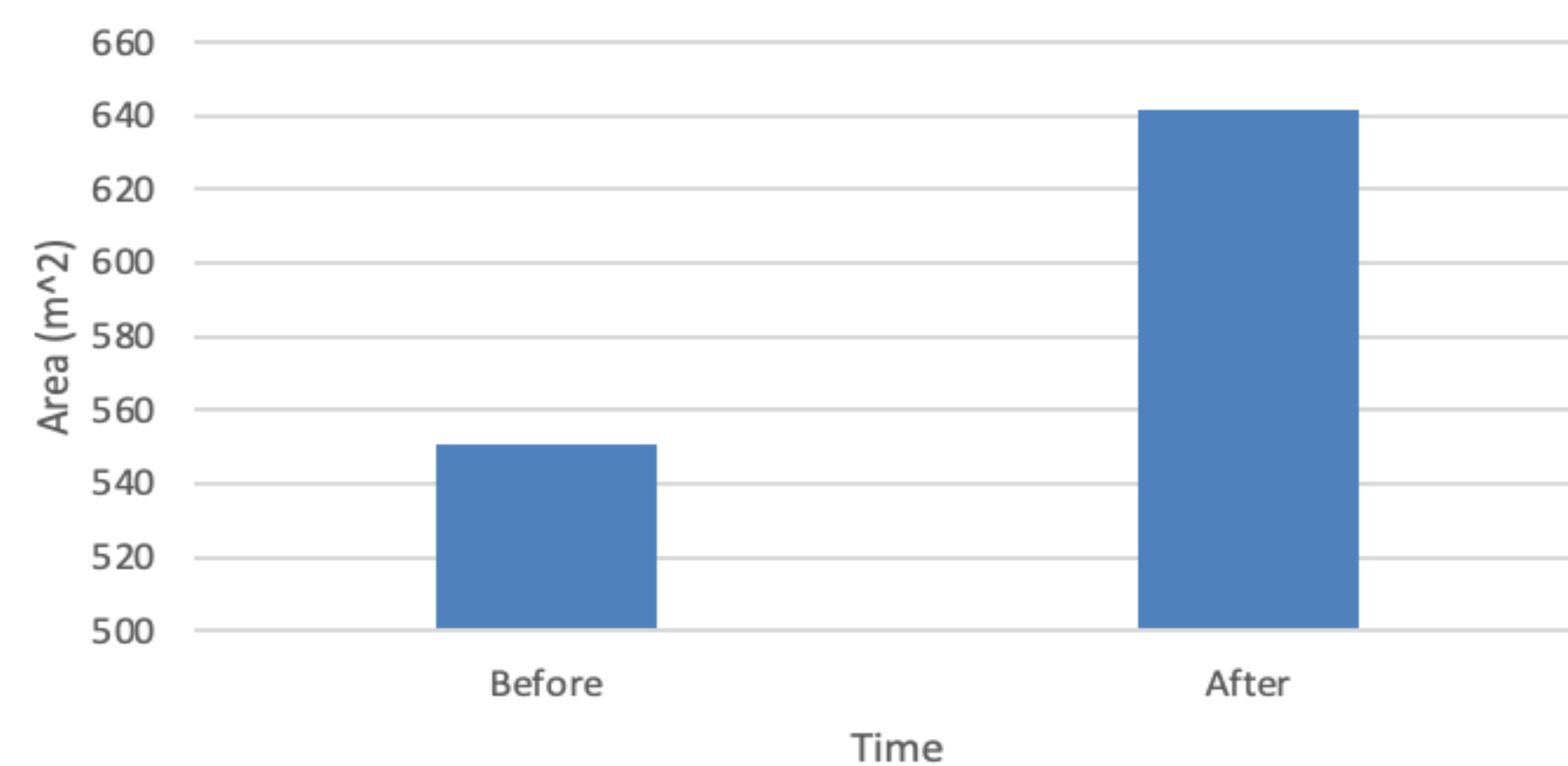


Figure 2a: The change in the area of Site 1, based on groundtruthed data, was compared before and after Hurricane Ian.

Site 2 Pre and Post-Hurricane Ian

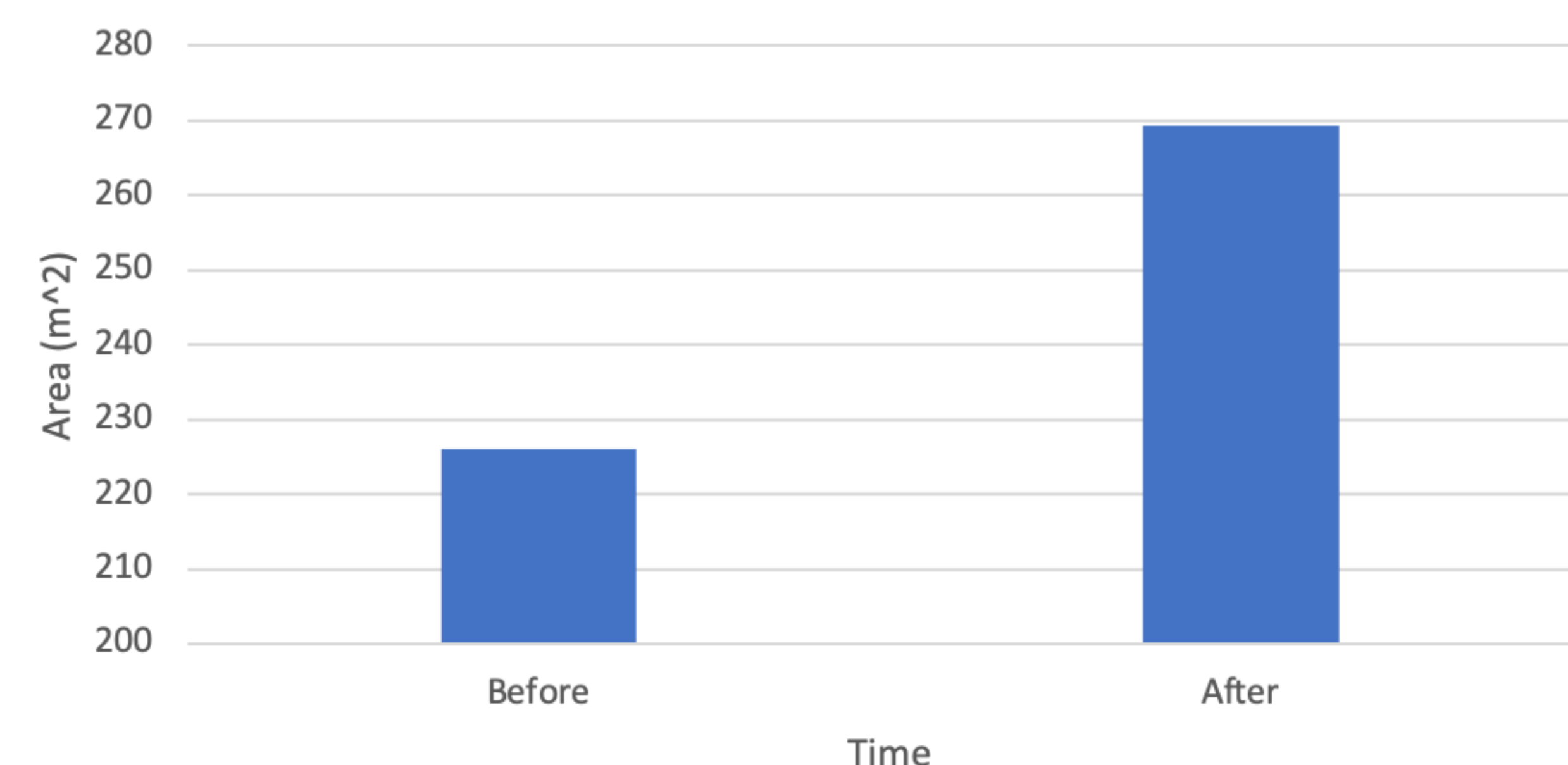


Figure 2b: The change in the area of Site 2, based on groundtruthed data, was compared before and after Hurricane Ian.

Nest Count Vs Rake Area

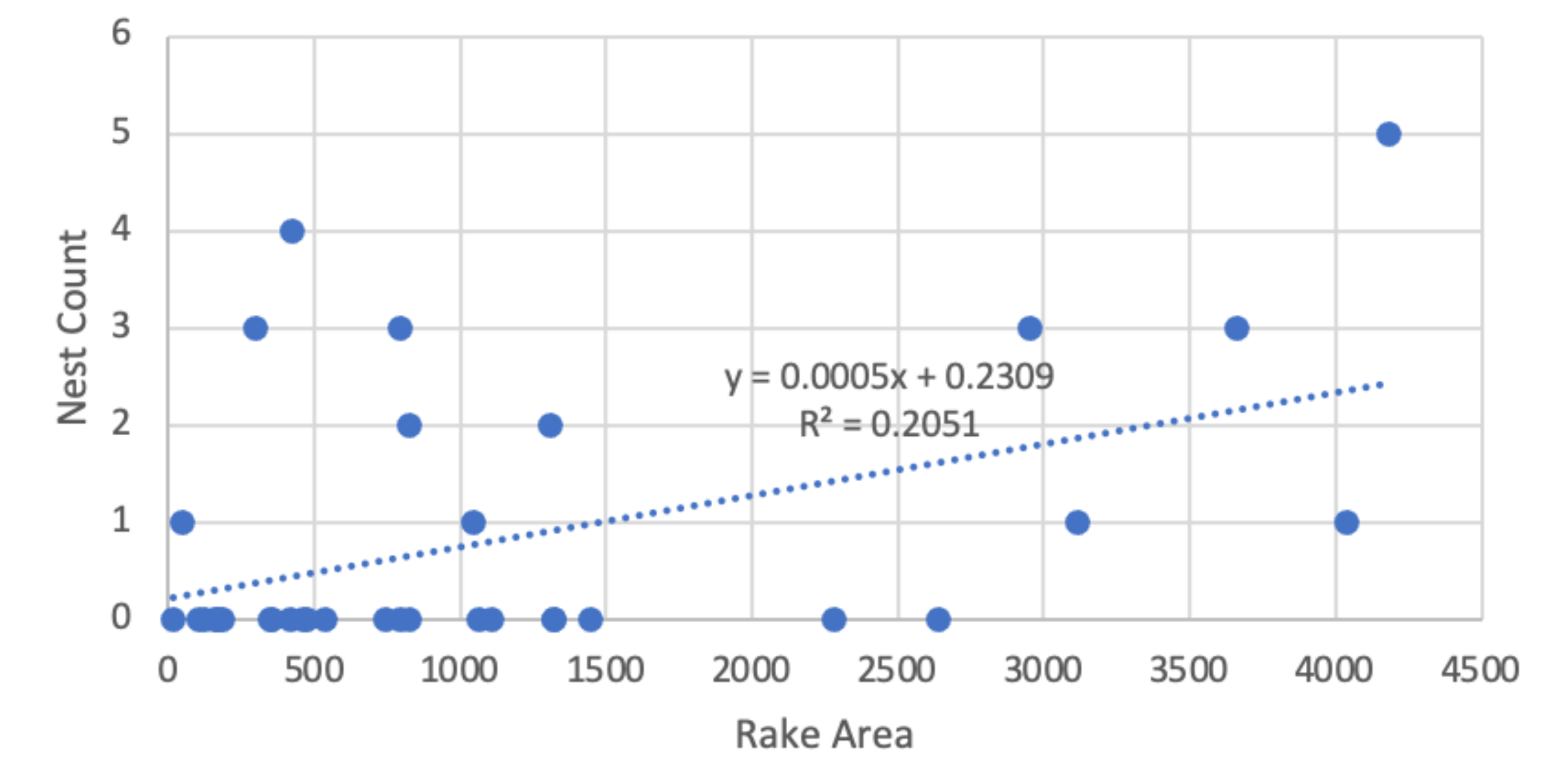
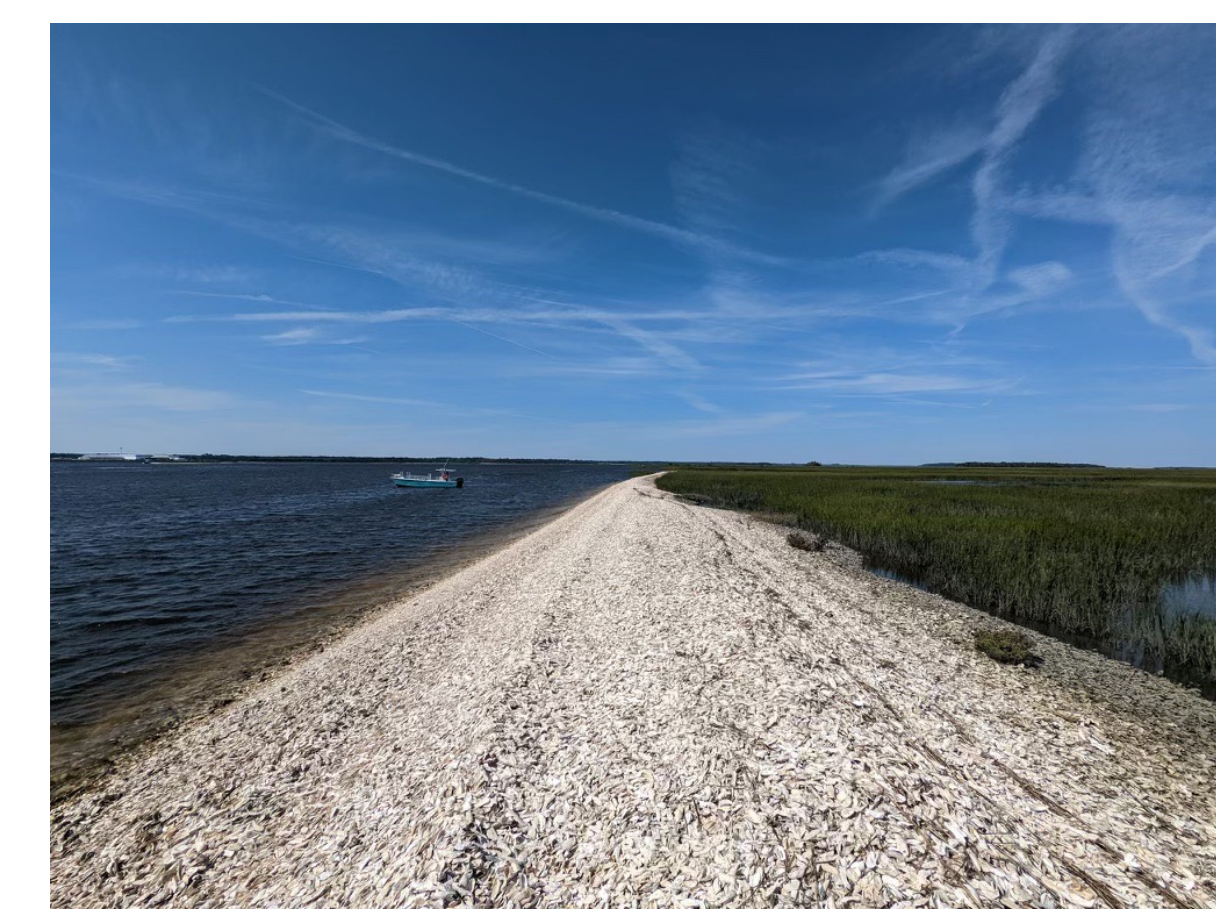
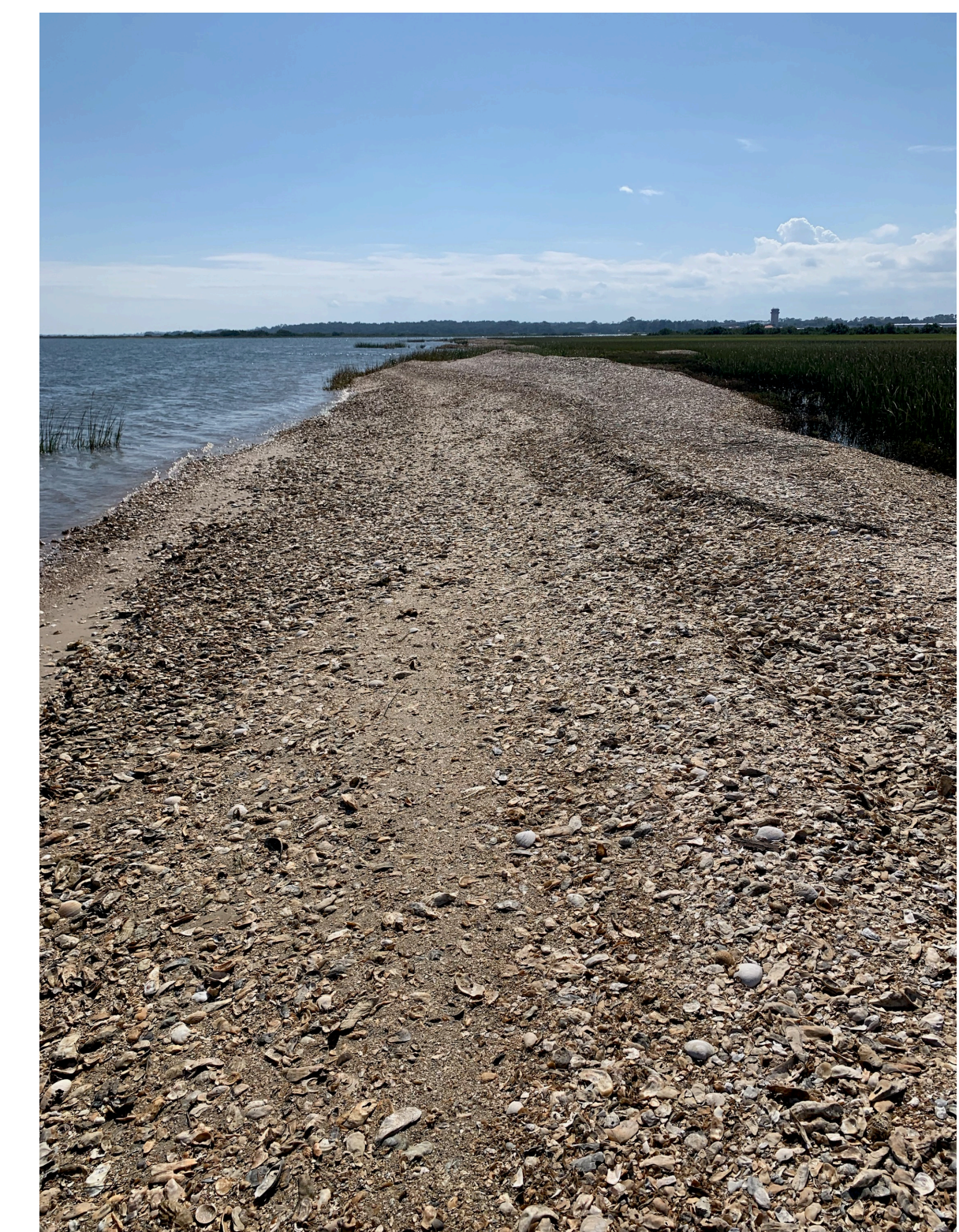


Figure 3: The area for each of the oyster rake measurements was compared to the number of nests on that rake.

Model Coefficients - Number of nests on rake				
Predictor	Estimate	SE	t	p
Intercept	0.231	0.294	0.784	0.439
Rake area (m ²)	5.26e-4	1.80e-4	2.918	0.006

Discussion

- After hurricane events there was a considerable increase in the total area of the oyster rakes.
- Oyster rake area is not a good predictor of the number of nests on a rake. However, smaller rakes are more likely to have zero nests on them.
- The sites that we groundtruthed before and after Hurricane Ian showed an increase in the area of the rake after the hurricane event.
- Our work provides more information to the scarcely researched topic of oyster rakes as nesting habitat for the American oystercatcher.



References

Florida Shorebird Database. 2022. Florida Fish and Wildlife Conservation Commission. <https://app.myfwc.com/crossdoi/shorebirds/>

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