

# Mapping and Methods Assessment of Eastern Oyster Populations in Village Creek St. Simons Island, GA

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## INTRODUCTION

The Eastern Oyster (*Crassostrea virginica*) is an invaluable marine fishery resource. It is important to monitor oyster reefs and their habitat. Oysters provide habitat and food for other marine organisms, all while filtering the water around them (Carroll et al.). In Glynn county there is a lack of quantitative knowledge regarding the status of local oyster reefs. This study was conducted at Village Creek St. Simons Island, GA. In Georgia oyster harvests were plentiful during the early 1900s, but during the mid-1900s overfishing or disease caused a decline in Georgia's oyster population (Harris, 1980). It is important to obtain and share knowledge about Georgia's oyster population.

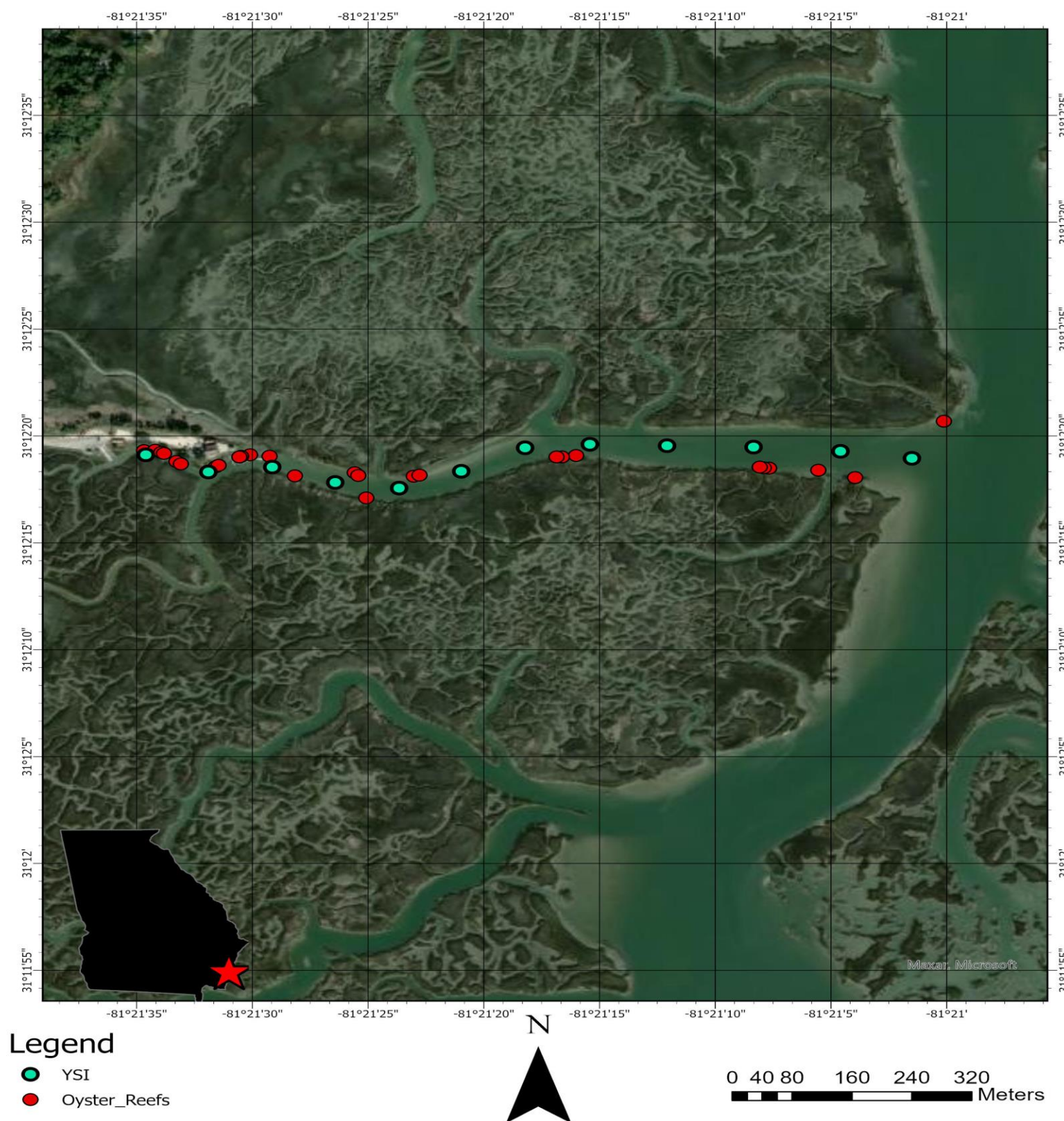


Figure 1. Site map of Village Creek St. Simons Island, GA.

## OBJECTIVES

The objectives of this study are to:

- Create a map showing oyster reef locations
- Calculate the total area of oyster reef in the measured area
- Determine the habitat suitability of the oyster reefs using a YSI
- Estimate the population density of oysters
- Determine habitat quality score (Table 1).

## METHODS

- An 86.5-inch kayak paddle was used for in-field measurements along with visual analysis (Figure 2).
- GPS coordinates were marked with ArcGIS in-field to identify and create a map of oyster reef locations (Figure 4).
- Reef measurements were taken at low tide to, exposing the full reef for measurement accuracy
- YSI measurements were conducted at high tide, ensuring the water fully covered the oysters at 12 different sites (Figure 3).
- YSI measurements were compared to (Table 1) to assess habitat quality

Table 1. Habitat Suitability Index (adapted from Atkinson and Deemy 2019).

Habitat Quality	Salinity (ppt)	Water Temp (°C)	pH
Low	<14;> 28	10-17.35	7-7.35
Medium	14-16;26-26	17.5-20	7.35-7.7
High	16-28	20-31	7.7-8.1



Figure 2. Oyster Reef with kayak paddle quadrat.

## RESULTS & DISCUSSION

- Oyster area = ~ 302 m<sup>2</sup>
- Population density = ~840 oysters per m<sup>2</sup>
- pH = 7.35 ± 0.07
- Salinity (ppt) = 25.17 ± 0.26
- Water temperature = 19.9 ± 0.11 °C

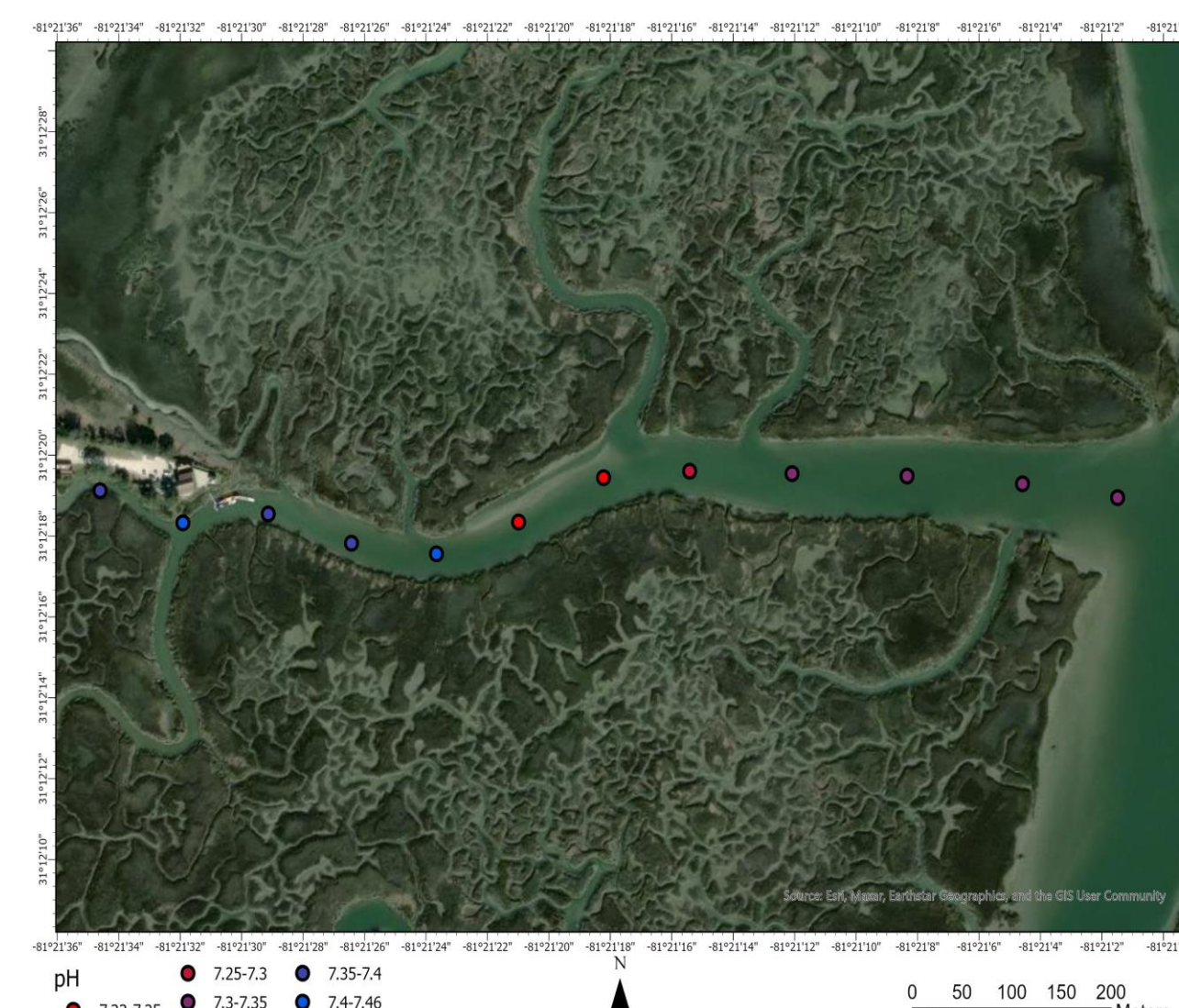


Figure 3. Locations where YSI data were collected within Village Creek.

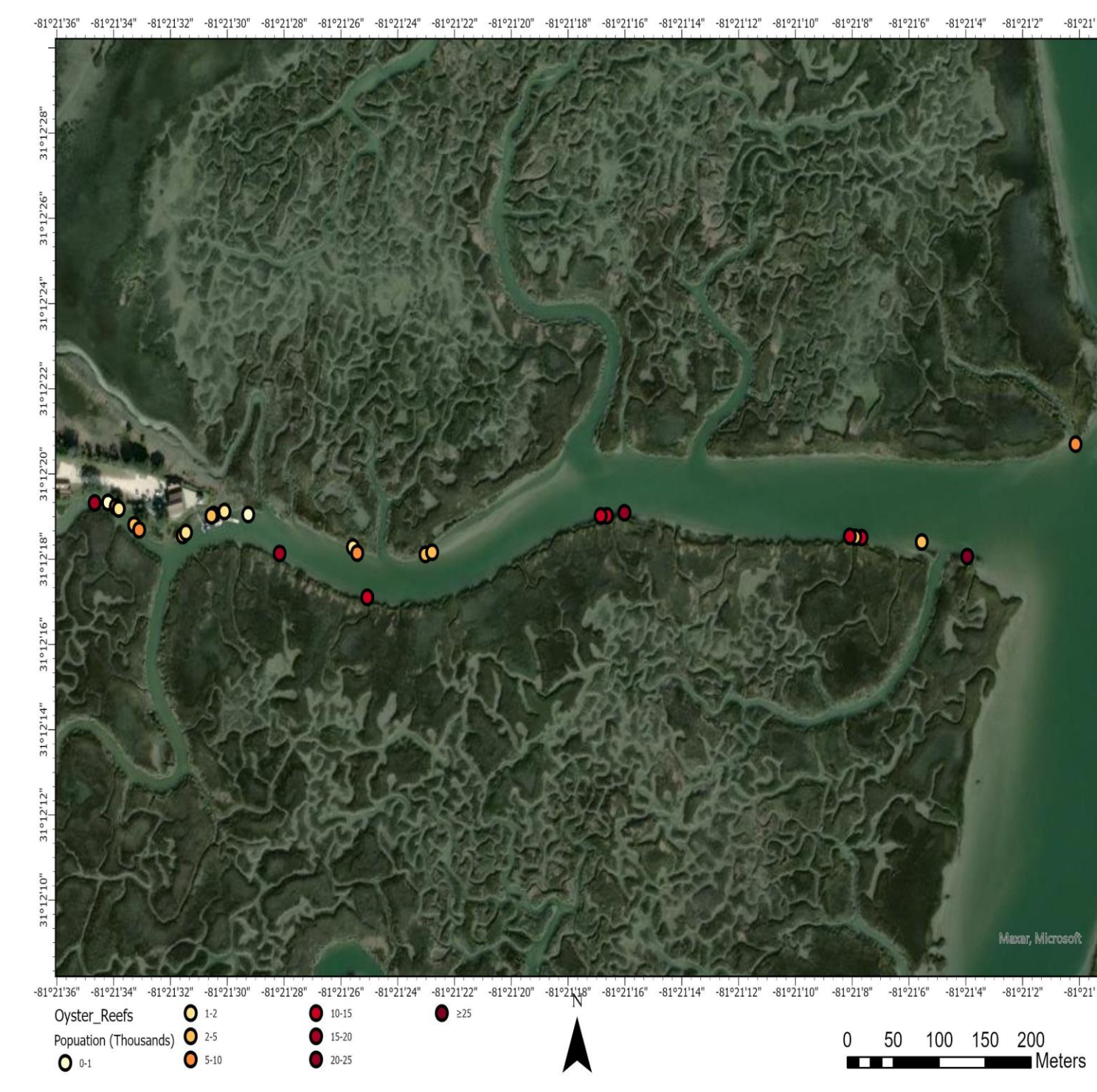


Figure 4. Oyster population densities relative to location within Village Creek.

## DISCUSSION & CONCLUSIONS

Given our results, we conclude that:

- There are 302.31 square meters of oyster bed in the measured portion of village creek
- The average pH of the area was 7.35 (low quality)
- The average salinity was 25.17 ppt (high quality)
- The average temperature was 19.9°C (high quality)
- Overall habitat quality was High
- The average population density was estimated at ~840 oysters per m<sup>2</sup>

Future insights and discussion:

- Oysters appear to be growing more on one side of the creek than the other, perhaps due to water flow. But those to the other side were larger more established reefs.
- Oyster reefs seem to be newly established, future monitoring could reveal patterns in recruitment and growth.
- Future studies could assess how much is the nearby golf course might be affecting the water quality at this site and how this, in turn, is affecting oyster populations.
- Continued investigations could assess what effect warmer water and increasing sea level do to this oyster population.
- Streamlining the methods of population density assessment should be a future priority to improve upon; involving more students and taking higher resolution photos in-field would assist in collecting more accurate data on oyster population density.

## ACKNOWLEDGEMENTS

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## REFERENCES

- Atkinson, C., Deemy, J., 2019, A Spatial Model To Identify And Prioritize Potential Oyster Reef Restoration Sites Along The Georgia Coast
- Carroll, J., Dashiell, R., Watts, J., Hunter, E., 2021. Tidal level affects the prevalence and impacts of pests and parasites on oysters (*Crassostrea virginica*) on intertidal reefs in Georgia, USA. *Marine Biology*, (2021) 168:45
- Harris, D.C., 1980. Survey of the intertidal and subtidal oyster resources of the Georgia coast. Georgia Dept. Nat. Resources., Coast. Resources. Div., ( Project no. 2-234-R ), Brunswick, GA, 44 pp.
- O'Beirn, F. X., Heffernan, P. B., & Walker, R. L. (1995). Preliminary recruitment studies of the eastern oyster, *Crassostrea virginica*, and their potential applications, in coastal Georgia. *Aquaculture*, 136(3-4), 231-242.