

Spatial analysis of water quality data to prioritize sites for oyster reef restoration

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Water quality data has proved vital in enhancing the understanding of estuarine environments and the biodiversity they support. Oysters are a keystone species in many estuarine environments throughout the globe and contribute to the formation of productive ecosystems. As oysters are sessile filter feeders, they rely upon the maintenance of optimal water quality for their recruitment and propagation. With an emphasis being placed on restoring oyster reefs globally, it is important that water quality data be considered before the onset of restoration projects. Here, we highlight an approach that utilizes water quality data to identify sites of high habitat quality and high restoration suitability for the eastern oyster (*Crassostrea virginica*). Our objectives are to 1) identify critical physicochemical parameters as well as optimal ranges for *C. virginica* establishment and success and 2) create a GIS index that maps low, medium, and high habitat quality for *C. virginica*. Water quality data collected by the Georgia Department of Natural Resources: Coastal Resources Division from 2000-2018 was interpolated to produce a GIS habitat suitability index for *C. virginica*. We found that the water quality analysis of the coast of Georgia (United States of America) indicated distinct sites of high and low habitat/restoration quality for *C. virginica*. Water quality data should be used to drive models for restoring habitat especially for a sessile ecosystem engineer such as *C. virginica*. We believe similar analysis and spatial modeling efforts could improve understanding of ecosystem restoration globally.

Keywords: Water Quality, Oyster Reef Restoration, Spatial Analysis , GIS