

# THE ROLE OF OYSTER RESTORATION AND AQUACULTURE IN NUTRIENT CYCLING WITHIN A RHODE ISLAND ESTUARY

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Coastal ecosystems are increasingly impacted by over-enrichment of nutrients, which has cascading effects for associated organisms. Oyster aquaculture and oyster reef restoration are hypothesized to mitigate excessive nitrogen (N) loads via benthic denitrification. However, this has not been examined in New England, where oyster aquaculture and oyster reef restoration are increasing and nutrient runoff is high. Using 50 L chambers, we conducted benthic experiments to examine benthic metabolism and net N<sub>2</sub> fluxes across the sediment-water interface. In a shallow (~1 m) estuary in southern Rhode Island, we collected samples seasonally in 2014 using the N<sub>2</sub>/Ar technique. Preliminary results indicate oyster reef restoration and aquaculture had greater denitrification rates than bare sediment, but the degree to which they were different was highly seasonal. We relate our net N<sub>2</sub> fluxes to differences in site-specific environmental factors, such as sediment oxygen demand, sediment chlorophyll a, dissolved inorganic nutrient availability, and associated benthic organism abundance and diversity. Our results demonstrate that oyster reef restoration and aquaculture can increase denitrification rates, but nutrient processing varies dramatically over small spatial scales.