Revolutionizing Artificial Reefs: Recycled Foamed Glass Aggregates as a Sustainable Solution for Oyster Habitats, Year 3

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The eastern oyster is critical for coastal habitats and provides biological benefits such as improved water quality, stabilization of shorelines, and increased estuarine biodiversity, yet oyster populations have declined by more than 85% due to overharvesting, pollution, and habitat loss. Artificial reef structures offer a strategy for restoring these ecosystems. This study monitored experimental oyster mounds established in a previous year's research to evaluate whether incorporating recycled foamed glass aggregate into concrete reef structures enhanced oyster recruitment and long-term growth compared to traditional concrete controls. Mounds were deployed at two sites, Cedar Key and St. Petersburg, Florida. Three treatments were compared: open-cell foamed glass, closed-cell foamed glass, and a cement-only control. Measurements of oyster mass were collected over a one-year period, and final oyster counts and sizes were taken after one-year. Analyses showed that mounds containing foamed glass supported larger oyster populations than controls ($p < 0.01$). Oysters on foamed glass substrates also exhibited faster growth, with greater size ($p = 0.03$). These effects were likely due to improved microhabitat conditions, including enhanced settlement surfaces, increased protection from predators, reduced sediment burial from the lighter substrate, and improved moisture retention during low tides. Recruitment rates were higher in Cedar Key than in St. Petersburg ($p <0.01$), consistent with Cedar Key's healthier source population. However, oysters in St. Petersburg were larger ($p < 0.01$), likely reflecting reduced intraspecific competition on less densely populated mounds. These findings demonstrated foamed glass improved oyster recruitment in artificial reef structures.

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Third Award of $1,200

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