



Reef balls. Photo credit: Connecticut Institute for Resilience & Climate Adaptation.

Quantitative Effects of Reef Balls on Coastal Restoration: Stratford Point, Long Island Sound

Project Overview

Located at Stratford Point, Connecticut (41.154732, -73.104774), this project aimed to understand how reef balls enhance shoreline integrity and hazards mitigation by quantifying the effect of reef balls on wave energy. Dr. James O'Donnell and his team assessed baseline conditions of wave height, wave energy, and marsh erosion, then installed reef balls. The site was then monitored annually for pressure and currents, as well as wave height and direction around installation at either side of the reef balls.

Key Takeaways

- With the implementation of reef balls, the investigated site saw a reduction of wave height by more than 25%, which is much more than seen in small-scale lab tests.
- Reef ball effectiveness was comparable to traditional submerged breakwaters.
- High-resolution wave field simulations developed as part of this project may assist in designs for other sites.

Project Context

Marshes and beaches on the Long Island Sound can be impacted by high-energy waves during storm events, resulting in erosion. This study strove to examine the effectiveness of reef balls at attenuating wave action in this context, and suggests that doing so would most likely decrease marsh erosion.

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The Stratford Point living shoreline on July 25, 2022.
Photo credit: Vincent Gabrielle.

Results

With the addition of reef balls, the site saw a reduction in wave height by more than 25%. This decrease in significant wave height should be expected to lead to a reduction in marsh edge erosion.

Implications for Practice

Reef ball effectiveness was comparable to traditional submerged breakwaters, thus making them a viable alternative to the traditional hard structure while maintaining reef habitat.

Featured Researcher: Dr. James O'Donnell

Dr. James O'Donnell serves as the executive director of the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) and is a professor in the Department of Marine Sciences at the University of Connecticut. His research focuses on coastal ocean processes, involving numerical modeling, fluid dynamics, and ocean observations.



Project Location Map. Photo credit: AECOM.

Project Funding & Partners

- University of Connecticut
- Sacred Heart University Department of Biology
- CIRCA
- U.S. Army Corps of Engineers
- NOAA
- U.S. Department of Housing and Urban Development

Relevant links

- [Dr. O'Donnell's Profile - UCONN/CIRCA](#)
- [The Stratford Point Living Shoreline Project Report](#)
- [Restoration Efforts at Stratford Point: The Development of a Living Shoreline](#)



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