

A Green and Gray Approach: A Sustainable Solution to Storm Water Surging in Miami, Florida

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H30F: Cities and Sustainability

Introduction

- Increasing intensity of storms will cause significant environmental damage to critical infrastructure, housing, and habitats
- Miami, Florida is in an area that experiences storm damage each year
- U.S. Army Corps of Engineers' proposed seawall leaves majority of Miami-Dade County exposed to harsh storm conditions
- Permanent loss of protective corals, mangroves, and seagrass beds, a loss of biodiversity, and further degradation of the city's natural environment and tourism



Fig 1: SEAHIVE With Concrete, Mangroves and Corals for Natural Protection

Findings/Solution

- SEAHIVE project utilizes environmentally safe concrete mix to create hollow structures as an alternative to traditional seawalls
- SEAHIVE structures allow for coral reef (fig. 2) and mangrove (fig. 1) growth
 - Mangroves and corals dampen waves.
- Allows structures to provide an aesthetic view to tourists/locals and provide habitat for surrounding species
- Placed along the entire coast as well as areas around Miami that struggle with progressive flooding
- Chosen areas will be based on data from past hurricane reports and National Weather Service damage assessments.
- SEAHIVE structures and natural barriers will be monitored for damage and storm protection effectiveness

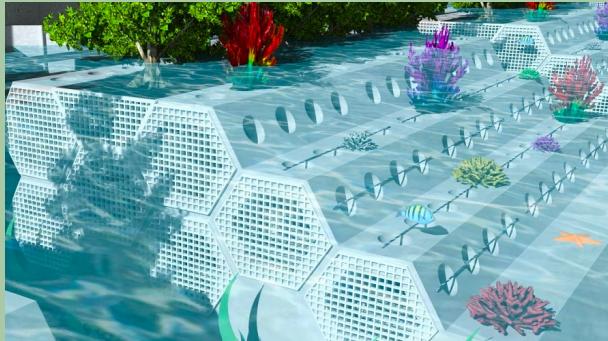


Fig 2: SEAHIVE Structure at Wahoo Beach Educational Marine Park, Miami

Cost/Benefit Analysis

- Proposed seawall costs \$3 billion; SEAHIVE seawall costs \$67 million - \$101 million
- Includes mangrove and coral growth, planting, SEAHIVE construction, and monitoring
- Mitigation of wave energy
- Protection of critical infrastructure
- Preservation of tourism/environmental (beach erosion, coral reefs)
- New habitats for local wildlife

Conclusion

- Compelling alternative to the Army Corps of Engineers' expensive seawall plan for the Miami area
- Both economically feasible alternative and a self-sustaining, environmentally contributing solution

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