

# MIAMI BEACH

City of Miami Beach, 1700 Convention Center Drive, Miami Beach, Florida 33139, [www.miamibeachfl.gov](http://www.miamibeachfl.gov)

## COMMITTEE MEMORANDUM

TO: Sustainability and Resiliency Committee

FROM: Jimmy L. Morales, City Manager

DATE: June 26, 2019

SUBJECT: **Discussion on Artificial Reefs**

### **BACKGROUND**

At the City Commission meeting on May 16, 2018, the Mayor and City Commission referred a discussion to the Sustainability and Resiliency Committee (SRC) on artificial reefs. The item was sponsored by Commissioner Ricky Arriola.

At the SRC meeting on November 28, 2018, the University of Miami's Laboratory for Integrative Knowledge (ULINK) Coastal Resilience Team presented a partnership project with the City of Miami Beach to develop and test coastal resilience strategies that combine grey and green infrastructures to reduce the vulnerability of coastal communities. The project will investigate the role of healthy coral reefs on wave attenuation and how they impact mitigation on coastal structures using a set of tank-based validation tests through the Surge-Structure-Atmosphere-Interaction (SUSTAIN) laboratory. At the meeting, the SRC passed a motion directing staff to develop a long-term strategic plan on how to make a viable artificial reef system that enhances resiliency, decreases beach erosion, and create an eco-tourism base for our economy.

The ULINK research will help inform a future long-term approach that complements strategies that are being explored by the United States Army Corps of Engineers (USACE) and Miami-Dade County. The USACE in partnership with Miami-Dade County are looking at long-term strategies for beach renourishment in a two-year planning study. As this project progresses, staff will provide updates to this Committee.

### **ANALYSIS**

City staff has been working with the ULINK Coastal Resilience Team and Miami-Dade County's Regulatory and Economic Resources (RER) team on test project that looks at artificial reefs and natural reefs restoration to reduce storm surge risk.

On June 10, 2018, City staff visited the University of Miami's Surge Structure Atmosphere Interaction Facility (SUSTAIN), where the ULINK Coastal Resilience team demonstrated how they are using a one-of-a-kind wave tank to test different man-made reef designs (including different berm heights and shapes, as well as different coral species, sizes) under simulated storm wind and wave conditions. The goal of the simulation is to identify which design would best perform breaking up wave energy before it gets to shore. During the visit, city staff discussed working with RER team in order to permit a test site off Miami Beach to investigate the performance of the designs.

City staff is working with the RER team on the potential for piloting reef structures with and without transplanted corals, deploying the units off-shore of Miami Beach, and the potential for utilizing off-shore structures to enhance habitat and provide storm surge protection. The potential pilot will test the performance of coral fragments mounted onto modules under natural conditions and then, coral survivorship and growth will be monitored at pilot sites. Along with the model being tested at the SUSTAIN lab, the ULINK team will be able to compare the results under the modelling and under natural conditions. The pilot will provide first-ever actual measurements of reductions in wave energy as a result of deployment both with and without restored coral. The goal is to have a pilot completed within the next 12 months.

The innovative aspect of the ULINK activities is the specific deployment of these structures with coastal protection in mind and the results of the pilot will assist with the identification of places where nature-based solutions for coastal defense can be deployed cost-effectively. Although there may be permitting complexities to further extend the pilot along our coast, the long-term results would be extremely beneficial to assist the city deploying both grey and green infrastructure mechanisms for coastal protection and storm surge risk reduction.

## **CONCLUSION**

The following is presented to the members of the Sustainability and Resiliency Committee for discussion.

JLM/SMT/ESW/fct

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