



Community Coastal Resilience Reef Balls™

J.W. McFarlane



Abstract

Reef Balls™ first hit the Gulf of Mexico in 1995 off Hernando County, Florida. Since that time the Reef Ball™ and Reef Ball™ Technology has been used across the Gulf of Mexico. Shoreline Protection and Resilience is enhanced by using Reef Balls™. I will share some of the project's successes and best practices for using Reef Balls™. And emphasis will be on resilience in front of seawalls, and mixed with docks and seawalls. Wave attenuation, absorption of reflected waves at the same time as enhancing habitat are part of the successes from using Reef Balls™.



Reef Ball™ breakwater Airport Rd Cedar Key in 2020. This was designed to protect the road, homes and enhance the habitat for marsh grasses and oysters.



One week after Hurricane hit Cedar Key in 2023. You can see the marsh grasses took hold, and no impact for storm waters that were 10ft higher than in this photo. Oysters between shore and Reef Balls, did not get



Reef Ball



Layer Cake



Eco-Rap



Smart Reef

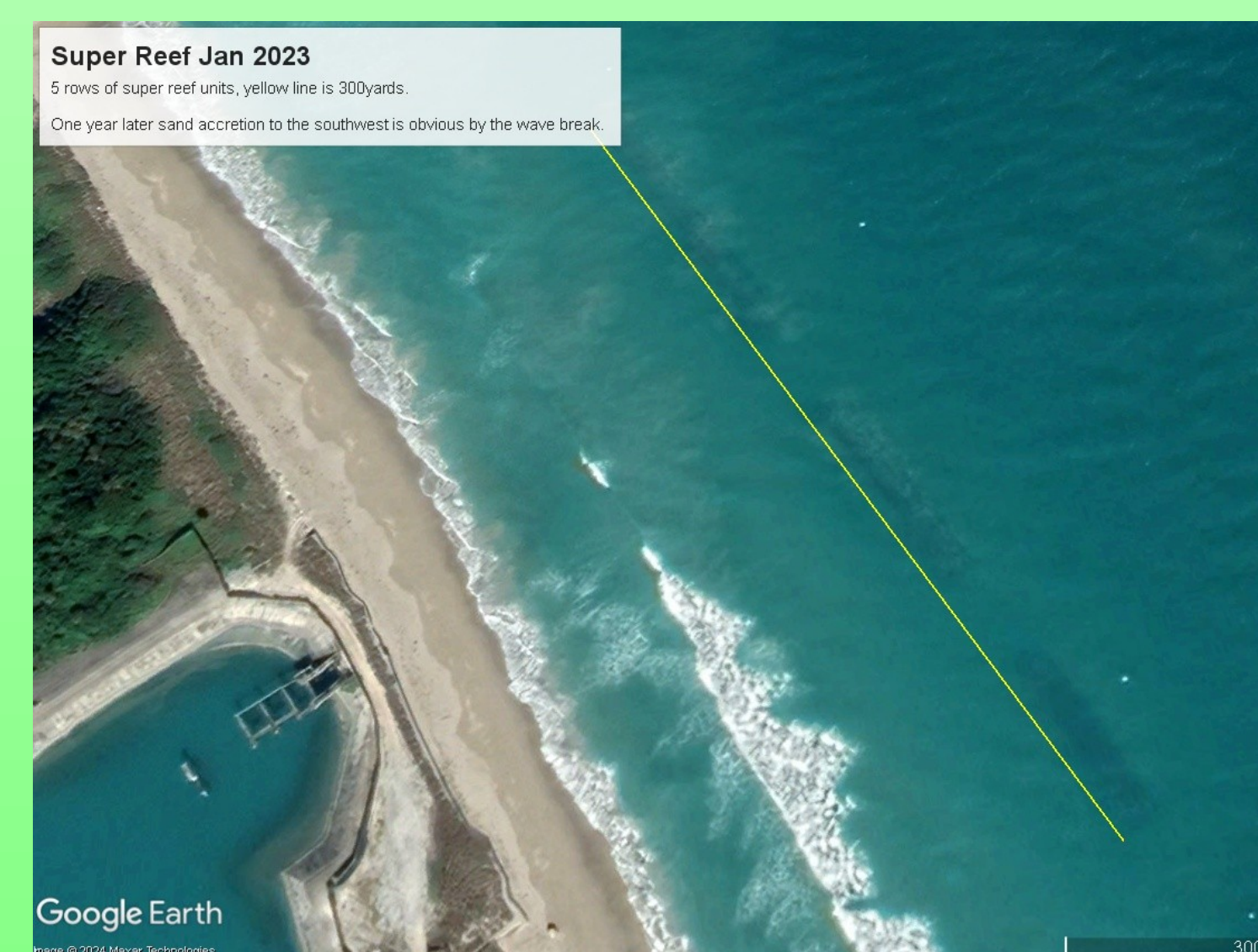
Case Studies

Coastal communities that have used Reef Balls™ to protect their shorelines since the 90s. Projects include breakwaters, and placements along seawalls. Included in the research are surveys and observations at comparative materials sites. Monitoring from analysis of satellite images, as documentation of changes over time. In addition to on sight visits over a 10 year period.

1. Lee Harris Caribbean
2. Stratford Point, CT
3. Bird Island Hillsborough, FL
4. Green Bridge Palmeto, FL
5. O'Learys Sarasota, FL
6. Oyster Lake, Galveston, TX
7. FL Power Plant, St Lucie, FL
8. Nature Coast Biologic Station, Cedar Key, FL
9. McDill Airforce Base, Tampa, FL
10. Morris Landing, NC
11. Fantasy Island, Tampa Bay, FL
12. Seawall, Bayshore Blvd, Tampa, FL
13. Mississippi Delta, LA
14. Coffee Island, AL
15. Airport Road, Cedar Key, FL
16. Under docks, Tampa Bay, FL
17. Under Dock, Fort Myers, FL

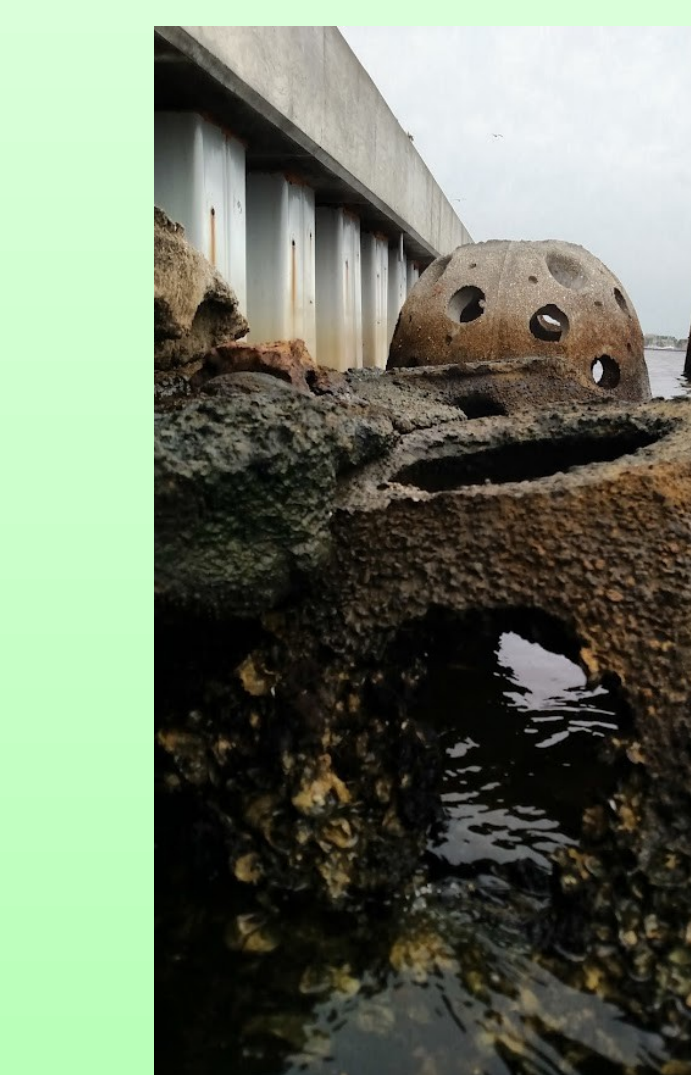
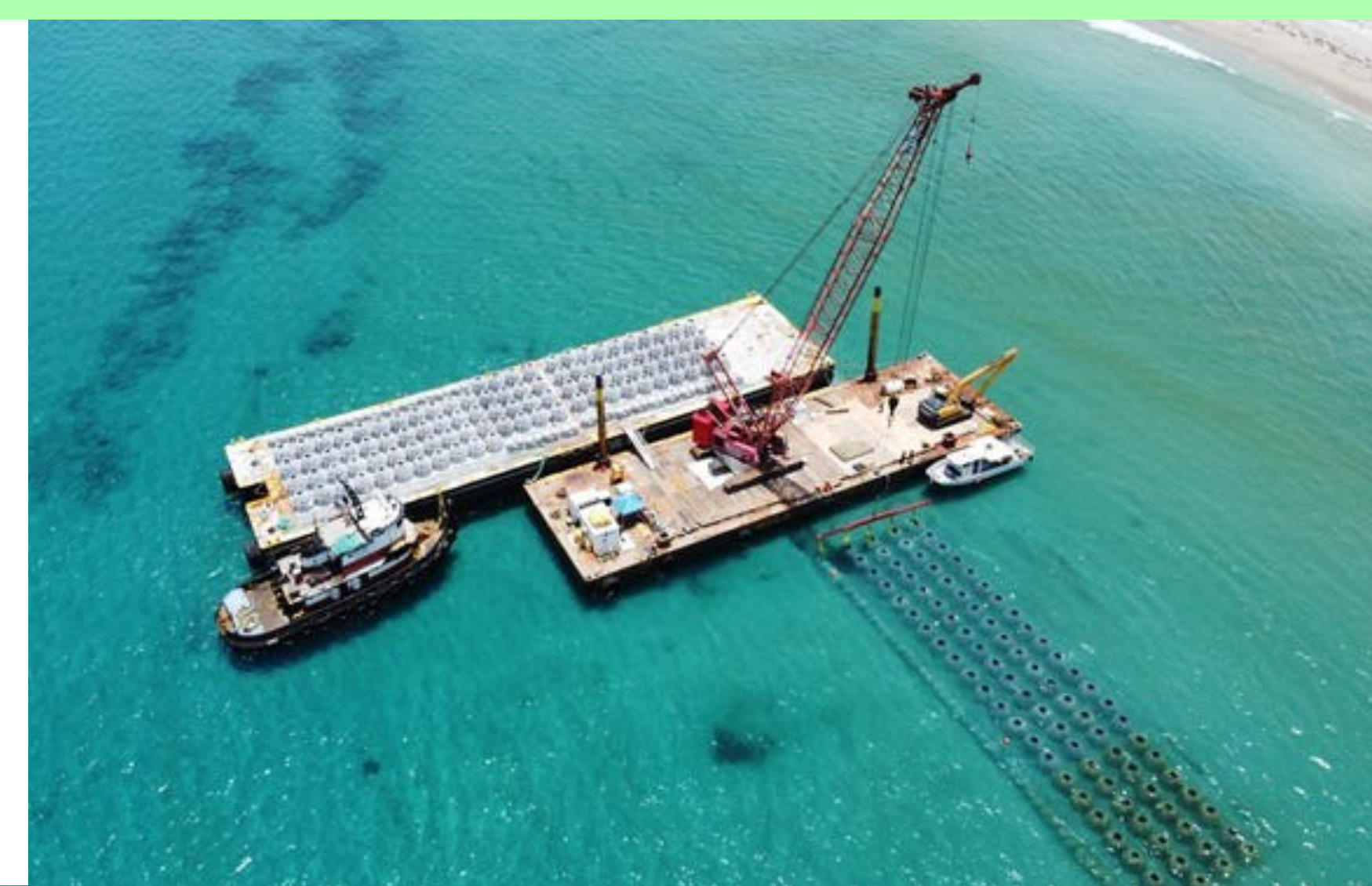


Eco-Rap™ incorporates Reef Ball™ for habitat, and resilience Florida



Super Reef Jan 2023
5 rows of super reef units, yellow line is 300yards.
One year later sand accretion to the southwest is obvious by the wave break.

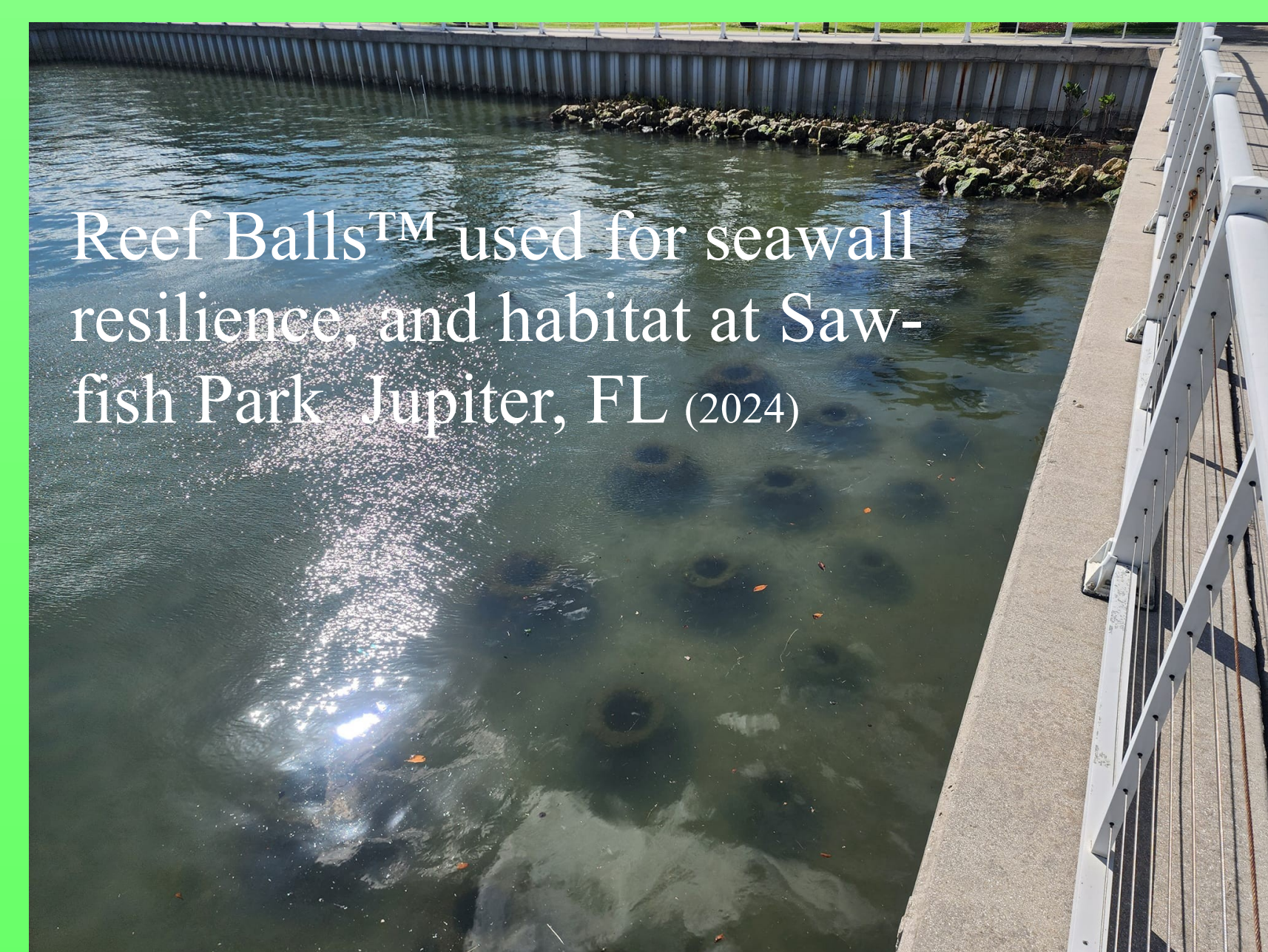
300 yard long offshore Breakwater for infrastructure protection at Florida Power Nuclear Plant, FL 4 extended Galioth Balls on an articulating mat. This is a high energy coast.



Conclusion

Best practice would move Reef Balls further from existing seawalls, allowing more accretion, and the addition of marsh grasses or mangroves, thus having the ultimate in protection. Many projects permits are limited to 10 ft from the seawall. Even when placed in a random pattern Reef Balls provided protection allowing marsh grasses to take hold. Recruitment of oysters increased the effectiveness and added additional biodiversity to the system. Recent research is indicating these systems are carbon sinks. Yet, exact numbers need further research.

The outcome from early breakwater projects included accretions of sand, and wave reduction. More recently is the Eco-Rap™, using Reef Ball technology. The wave attenuation was obvious from the initial days, providing reduced turbidity, and later the return of SAV. Most recent is the success at protecting the shoreline on Airport Road, Cedar Key, FL. I have not documented any movement of Reef Balls along side rip rack that has shifted in the storm. In Tampa Bayshore Blvd, placement of two rows of Reef Balls along the seawall, stop the scouring and added resilience to the seawall.



Reef Balls™ used for seawall resilience, and habitat at Sawfish Park Jupiter, FL (2024)



Sawfish Park Jupiter, FL
Reef Balls being moved into position.