

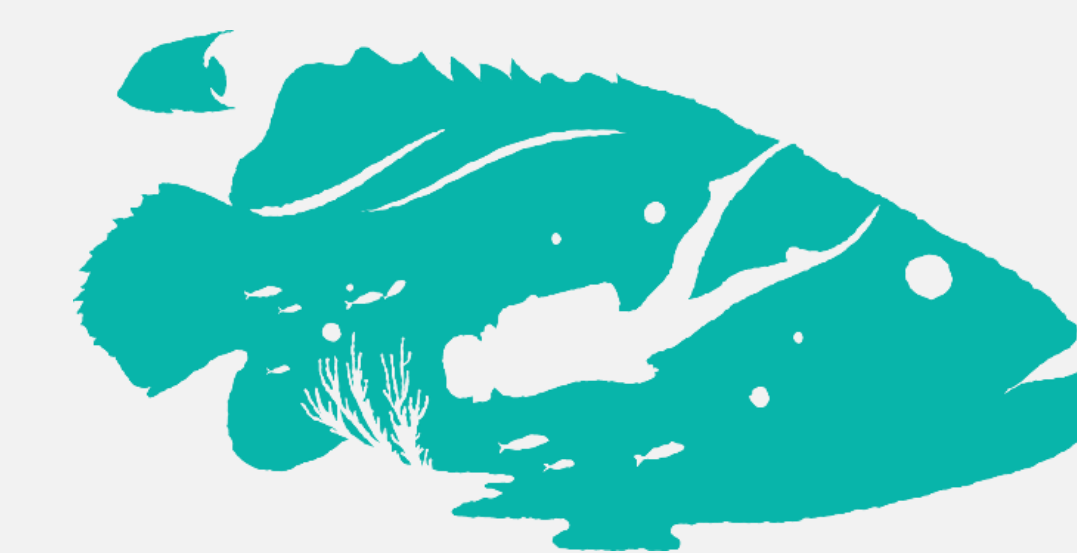


Palm Beach County
Board of County Commissioners

ARTIFICIAL REEFS OF THE LAKE WORTH LAGOON

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REEFS

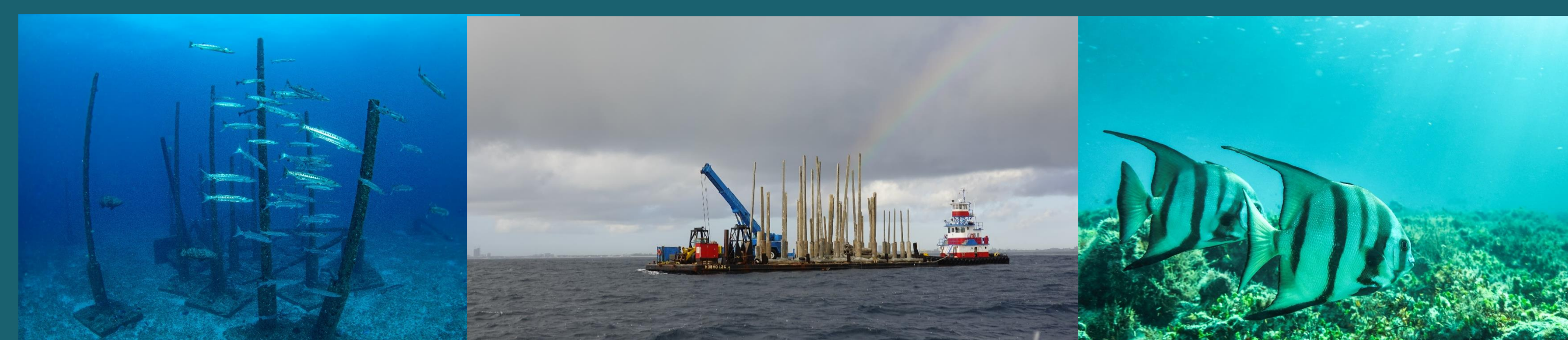
ABSTRACT

Palm Beach County is home to 47 miles of natural reef habitat and over 150 artificial reefs. Of those artificial reefs, 20 are located within the Lake Worth Lagoon (LWL). Each with a slightly different design, these man-made structures have been intentionally placed to enhance fisheries with new habitat and improve recreational opportunities for fishing, SCUBA diving, and snorkeling. This field-based study looked at 1) the various locations of artificial reefs currently located in the LWL, 2) how each structure varies by material, depth, and overall design, and 3) what type of marine life they are supporting.

INTRODUCTION

Within the LWL, water quality and ecosystem health varies with proximity to major drainage canals as well as Palm Beach County's four ocean inlets. Given the Lagoon's 477 square mile watershed and position within a dense urban area of Palm Beach County, naturally occurring reefs in the area are under constant anthropogenic pressure. While artificial reefs do not replace lost habitat or remove anthropogenic pressure, the hope is that introduced reef material will improve the productivity of the altered system and reduce pressure on naturally occurring reefs. Since 1991, the County has placed 20 artificial reefs of varying designs within the LWL and has been monitoring their ability to attract and support marine and estuarine life.

*Artificial reef construction can only be completed by state or local coastal governments in authorized permitted areas. Palm Beach County Environmental Resources Management (PBC ERM) holds the necessary state and federal permits to construct artificial reefs in a set number of areas void of exposed hardbottom or other natural resources.



OBJECTIVES

1. Review and document the location of each artificial reef within the LWL.
2. Compare material, depth, and design of each reef within the LWL.
3. Record the status of each artificial reef within the LWL.

METHODS

1. REEF LOCATIONS

Using PBC ERM data on the location of each artificial reef deployed in the LWL, staff created a map of the lagoon with each artificial reef symbolized (Figure 1).

2. REEF DESIGN

Using the artificial reef map, photos of each reef pre or post-deployment, and historic records of what was deployed according to permit files, staff compared the material type, depth, and design, of each reef.

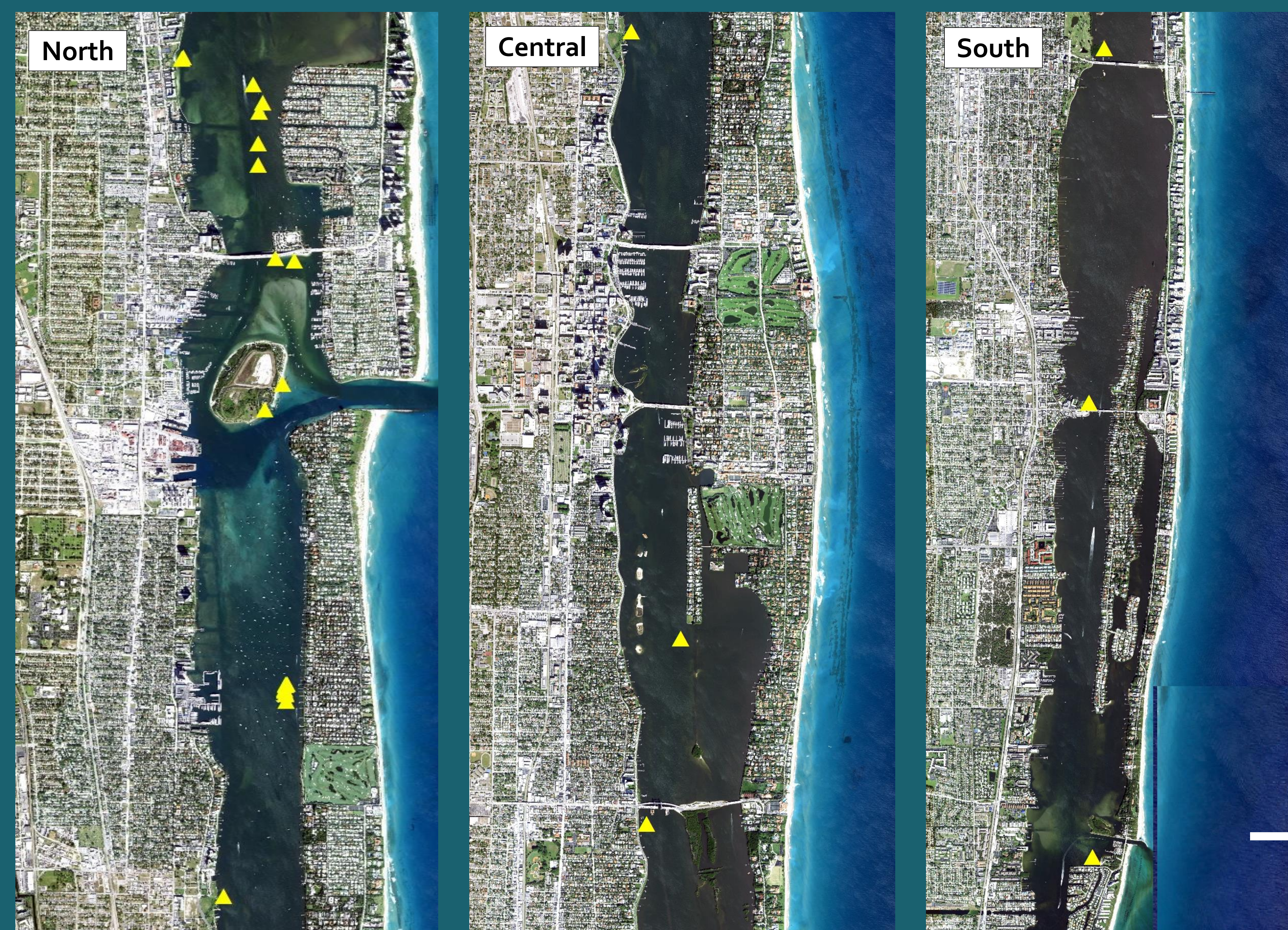
3. REEF STATUS

Staff reviewed photos and videos taken of each reef in the last 5 years (since 2018) to assess for benthic and fish diversity, sedimentation, settlement, and resilience

KEY FACTS DISCOVERED

- Reefs vary in depth from 4' to 29'
- The first LWL reef was placed in 1991 at the Sugar Sands Dive Site (Pyramids)
- Artificial reefs in the lagoon are made of 5 materials and placed in 11 combinations
- The most common reef material is limestone rock (16 sites include rock)
- The least common reef material is a ship (2 sites include ships)
- Material is holding up well in all locations, including at sites deployed in the 90's
- Fish and coral diversity is highest at sites within two miles of the Lake Worth Inlet

Figure 1: Artificial Reefs of the Lake Worth Lagoon



DISCUSSION

Artificial reefs within the LWL create new substrate for benthic marine life to settle on and provide nursery habitat for many marine and estuarine species. From the data collected as part of this study, we know that the artificial structures placed in the LWL vary in age from 31 years to just 16 months and that each unique structure is performing as satisfactory habitat. While it's clear that a more formal monitoring schedule would benefit our program, past monitoring reports and recent dive encounters tell us that sites in close proximity to the Lake Worth Inlet see the highest diversity in fish and stony coral species - Peanut Island, Phil Foster, Sugar Sands, and Rybovich. This is the County's largest inlet with the greatest tidal exchange volume.

Artificial reefs throughout the Lagoon are made up five materials (limestone rock, prefabricated concrete modules, reused concrete, decommissioned ships, and other donated material). Each material is performing well with regards to benthic growth (sponges, algae, gorgonians), fish (ranging from frogfish to common grunts, snapper and parrotfish), and even stony corals (18 species have been recorded at Peanut Island alone) beginning to grow as early as 2 weeks post-deployment. Reefs with higher relief tend to attract larger fish species and schools, whereas lower relief structures are most productive when they provide porous textures and an abundance of interstitial spaces for juvenile species and invertebrates (e.g., Peanut Island Snorkel Reef). Anthropogenic debris is evident on several reefs, but seems to collect in heavily utilized areas (e.g., Phil Foster Snorkel Trail) and on reefs at the extreme extent of tidal influence where sediment fallout is also more evident (e.g., Sugar Sands, Roach Reef).



ACKNOWLEDGEMENTS

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- Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, and the U.S. Army Corps of Engineers, who permit our artificial reef sites
- All past artificial reef partners and donors who make these projects possible