WEDA Dredging Summit & Expo
July 25-28 2022

Recipient Site Selection And Environmental Coordination - Key Elements In Successful Coral Relocation, Survivorship, And Resiliency During Jetty Reconstructions In South Florida

Background – Port Everglades and Port of Palm Beach

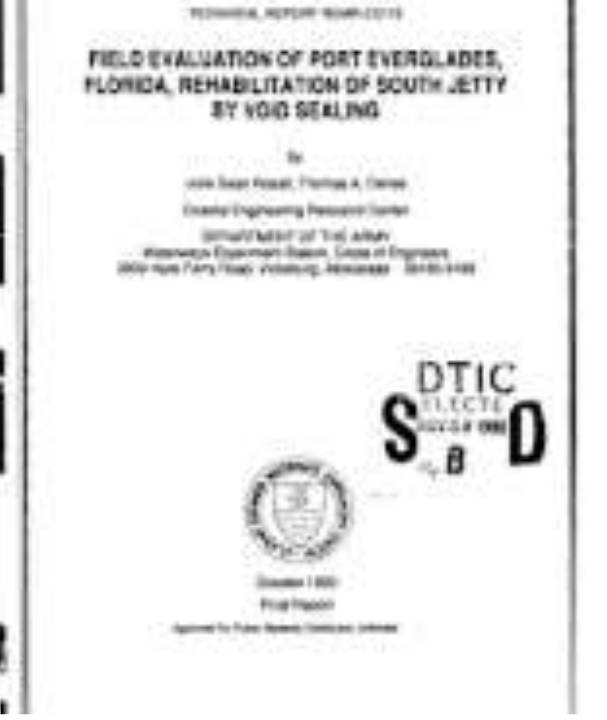
- Port of Palm Beach (Palm Beach County)
- Port Everglades (Ft. Lauderdale, Florida)
- Manmade inlets bound by rock jetties
- Originally constructed in the 1920's and 1930's
- Undergone several improvements and repairs over their lifespan

Background – Port Everglades and Port of Palm Beach

- Critical federal navigation projects
- Important commercial processing hubs facilitating $Billions in cargo
- Vital gateways for international trade
- Cruise ships with thousands of passengers
- Crucial coastal defense stations

Hurricane Damage

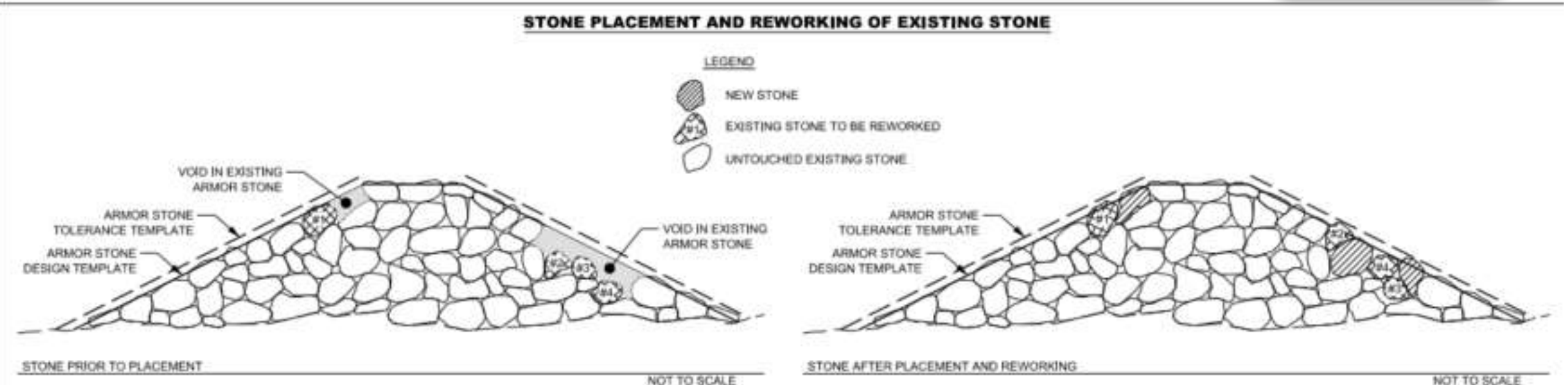
- 2017 - Hurricane Irma
- Damage at both inlet jetties
- Displacement and physical impacts to boulders and stones
- Navigation and safety concerns
- Port Everglades south jetty closed to all foot traffic



Jetty Rehabilitation

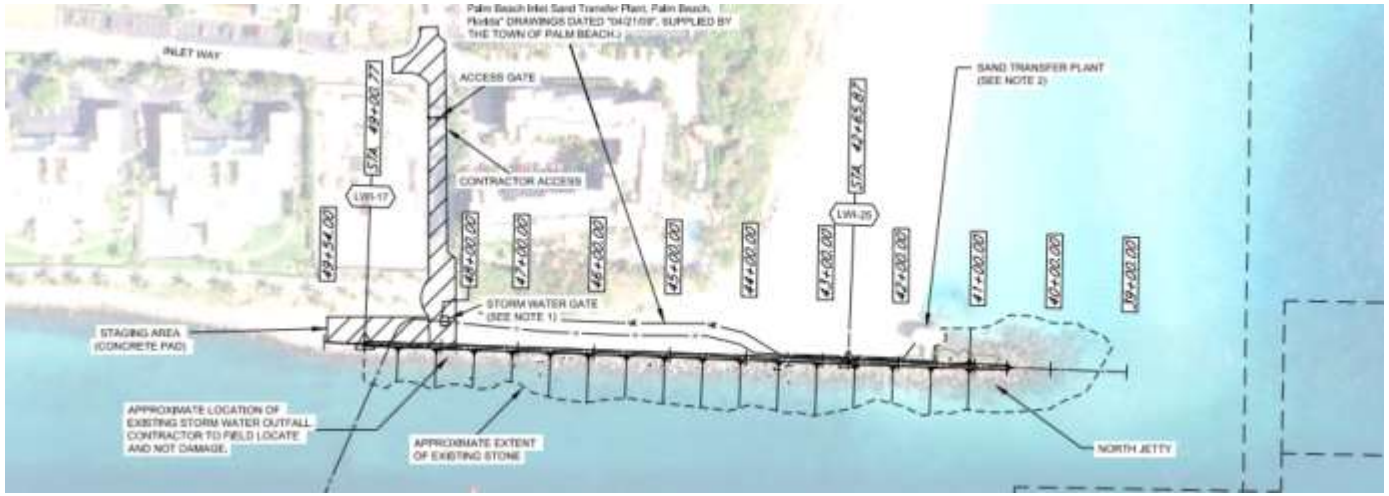
- Jetties needed significant rehabilitation before continued degradation
- 2020 - US Army Corps of Engineers (USACE) contracts
- Substantial manipulation of existing stones
- Placement of new stones
- Restore to their original design templates

ARMY CORPS OF ENGINEERS CONTRACTOR



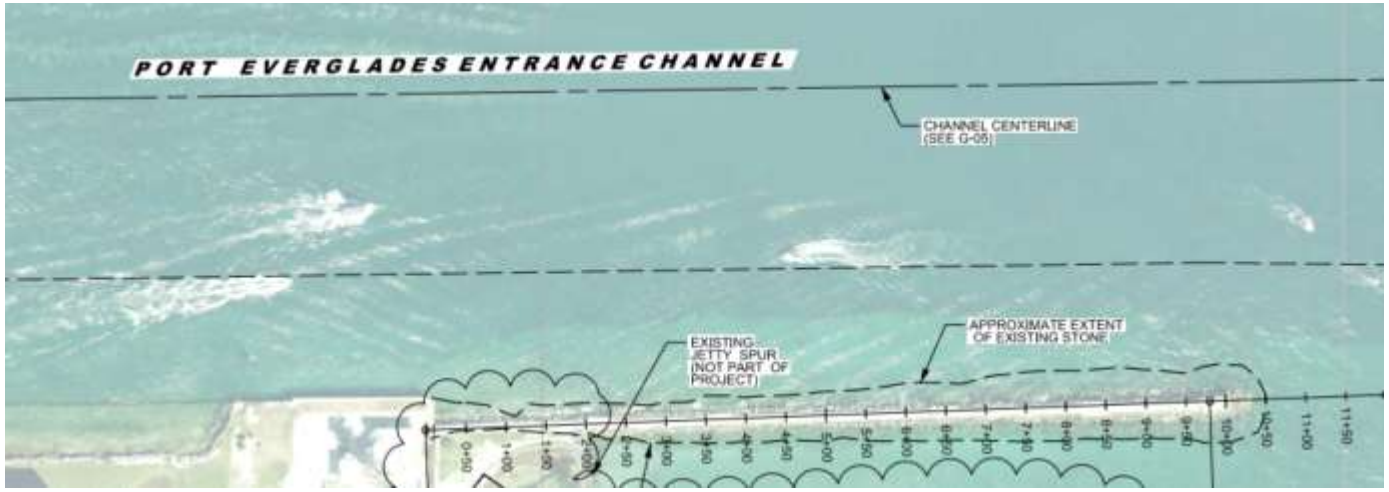
Contract Awarded

J.E. McAmis
Heavy Civil Marine Contractors



US Army Corps
of Engineers
JACKSONVILLE DISTRICT

LAKE WORTH INLET
NORTH JETTY REHABILITATION
PALM BEACH COUNTY, FLORIDA



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PORT EVERGLADES
SOUTH JETTY REHABILITATION 2020
BROWARD COUNTY, FLORIDA

Permit Requirements

- USACE contract specifications
- Florida Department of Environmental Protection conditions
- In-water surveys to document sensitive marine resources
- Relocation of protected coral colonies
- Post-transplantation monitoring

FLORIDA DEPARTMENT OF
Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Noah Valenstein
Secretary

Special Activity License
Florida Fish and Wildlife Conservation Commission
Division of Marine Fisheries Management
620 S. Meridian St., Mail Station 4B3, Tallahassee, Florida 32399-1600
Phone: 850-487-0554 • email: SAL@MyFWC.com
https://myfwc.com/license/saltwater/special-activity-licenses/

- Coral transplantation is a common requirement in south Florida and the Caribbean
- Responsibility often placed on the contractor
- Hiring an experienced and knowledgeable team
- Identifying suitable coral recipient remains one of the biggest challenges in coral relocation projects

Coral and Octocoral Relocation and Monitoring

5. Pre-construction Survey – Prior to commencement of construction on the jetty, a benthic survey shall be completed of all areas expected to be impacted by the work. Coral colonies meeting the below criteria shall be relocated to a pre-determined location approved in writing by the Department.

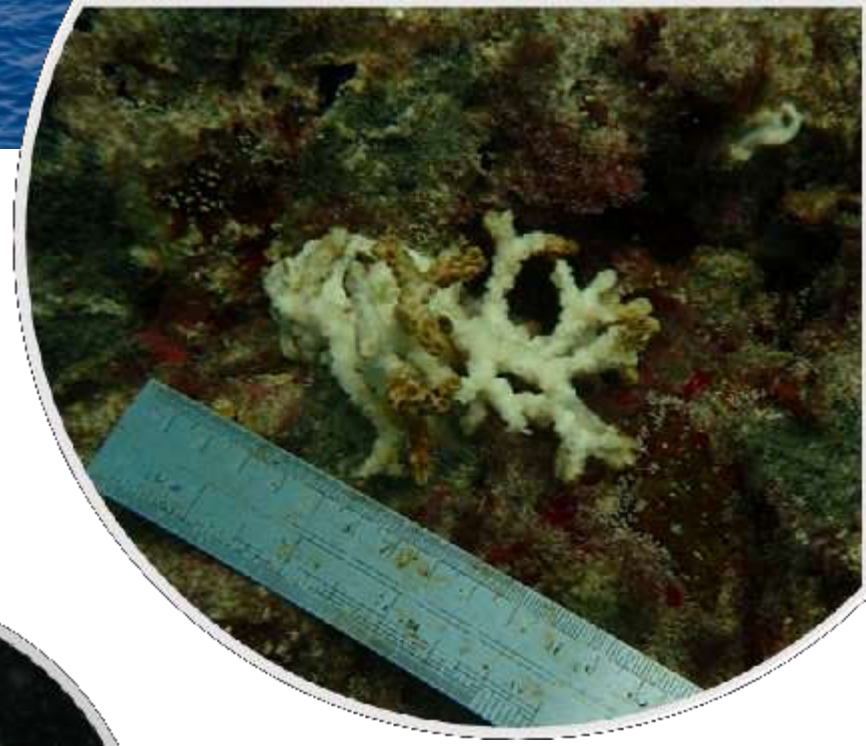
In-water Survey

- Over 250 coral colonies (>5 cm) documented
- Investigate the presence of listed species under the Endangered Species Act
- Develop a coral relocation and monitoring plan
- Agency review by Federal, State, and County regulators

Site Selection

- US Coral Reef Task Force Handbook on Coral Impacts - Guidelines
- Florida Fish and Wildlife Conservation Commission – Recommendations

- Failed projects are often due to poor site selection
  - Sedimentation
  - Excessive UV radiation and heat
  - Unsuitable water depths
  - Incompatible substrate
  - Excessive currents
  - Heavy predation (e.g., parrotfish)
  - Current or future exposure to disturbances

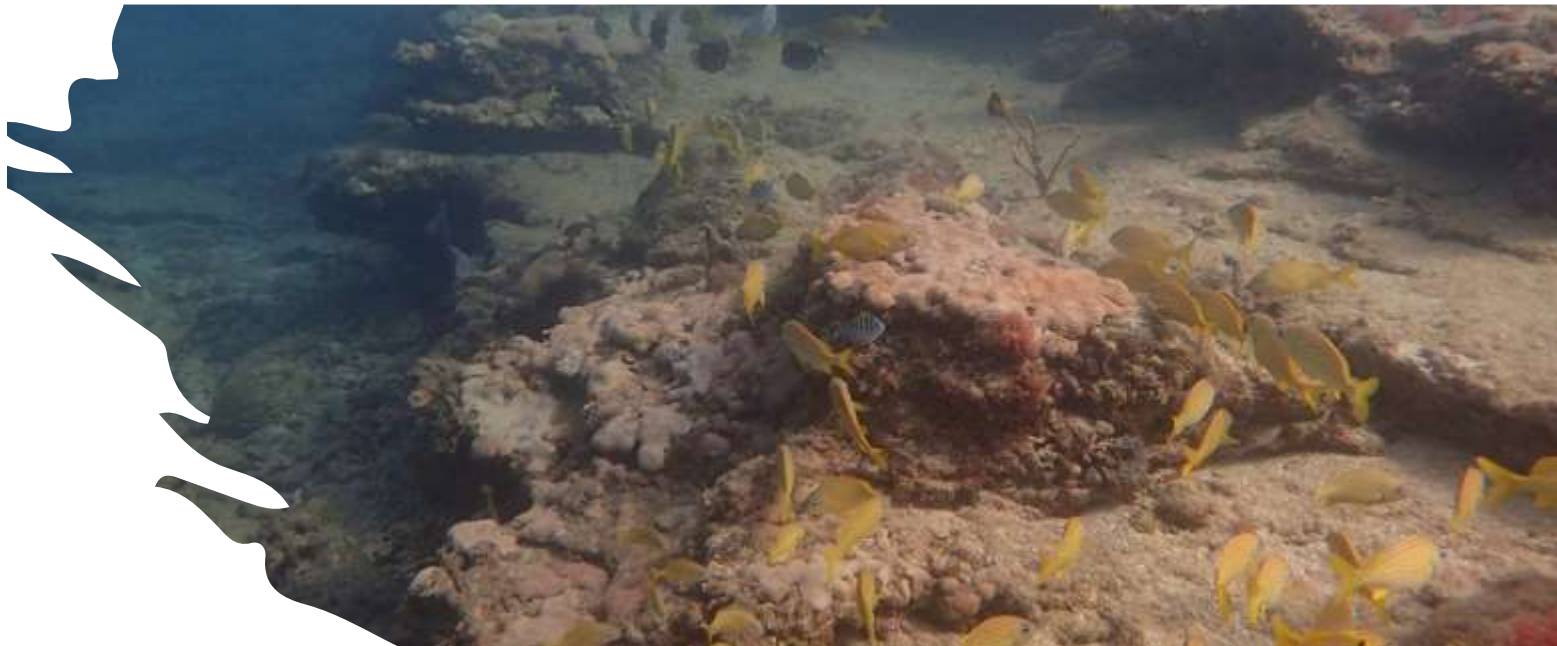


Site Selection

- Overlaid data layers in ArcGIS to assess water depth, distance from project area
  - Bathymetry
  - Habitat maps
  - Artificial reef locations
  - LIDAR
- Consulted with local government offices
  - Permitted or potential activities
    - Dredging (deepening project)
    - Beach nourishment
    - Pipeline/cable installation

Site Selection

- Grids placed over the areas of interest
- Reconnaissance surveys
- Site selection criteria
  - Similar coral species
  - Absence of coral disease
  - Substrate suitability & availability
  - Similar water depth
  - Lack of obvious corallivores
  - No observed predation
  - Low to moderate macroalgae coverage



Dive Safety Concerns

- Heavy commercial and recreational traffic
  - Cargo ships
  - Cruise ships
  - Commercial fishers
  - Sport fishers
  - Day boaters
- Strong incoming/outgoing currents
- Narrow inlets
- Wave-current interactions - risk of injury to divers near jetty rocks
- Hazardous marine life

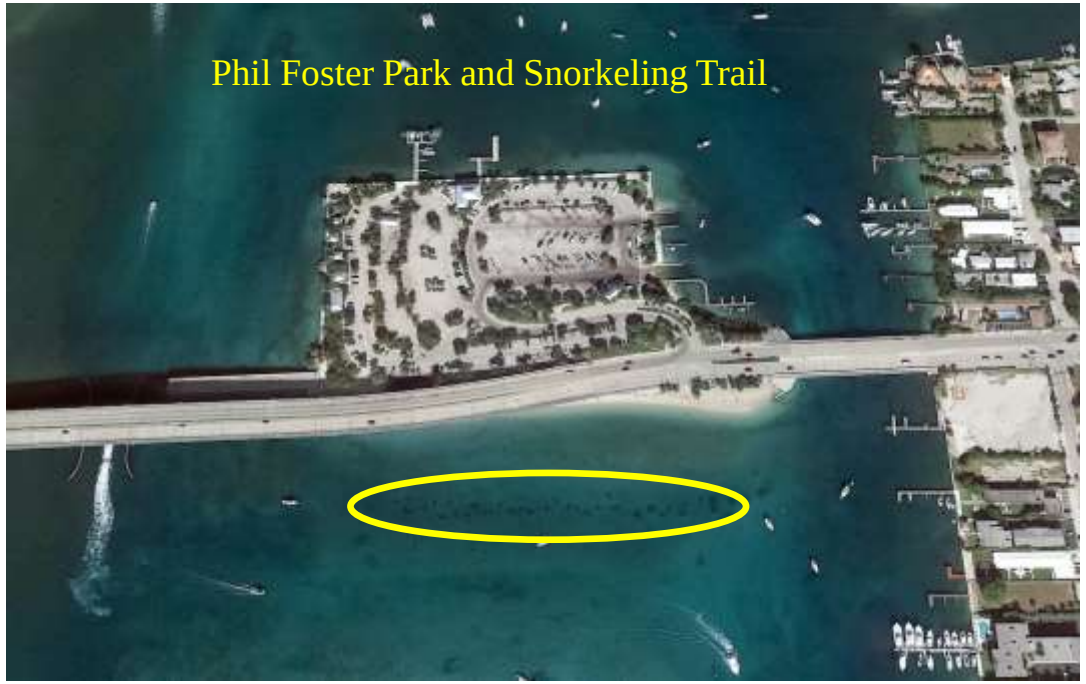
USACE and EM-385

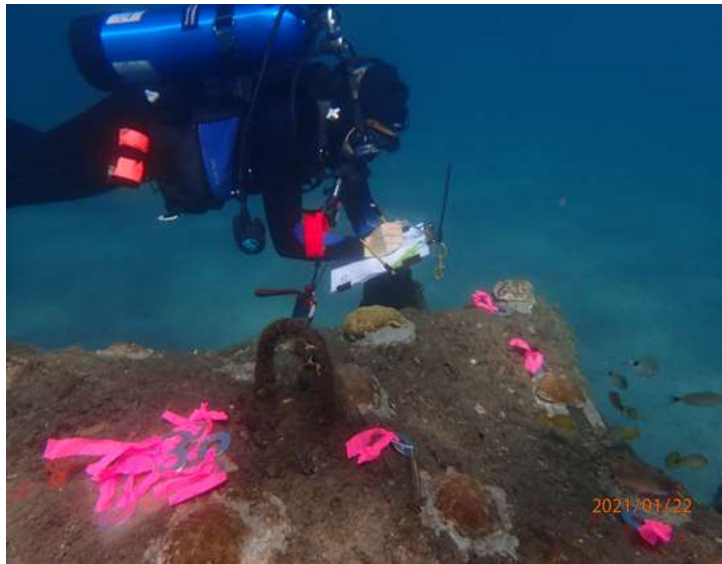
Lake Worth Inlet – Coral Relocation

- Daily USACE safety meetings/AHA review
- Corals temporarily tagged
- Removed using small hand tools
- Transported in baskets from inlet to recipient site via small survey vessel
- Corals kept moist and out of direct sunlight as much as possible

Lake Worth Inlet – Coral Relocation

- Reattached to 54 coral colonies in “snorkel trail” at local County park
- Assessed for size and condition
- Used Portland II cement and epoxy
- Collected pre-transplant and post-transplant information on each coral colony



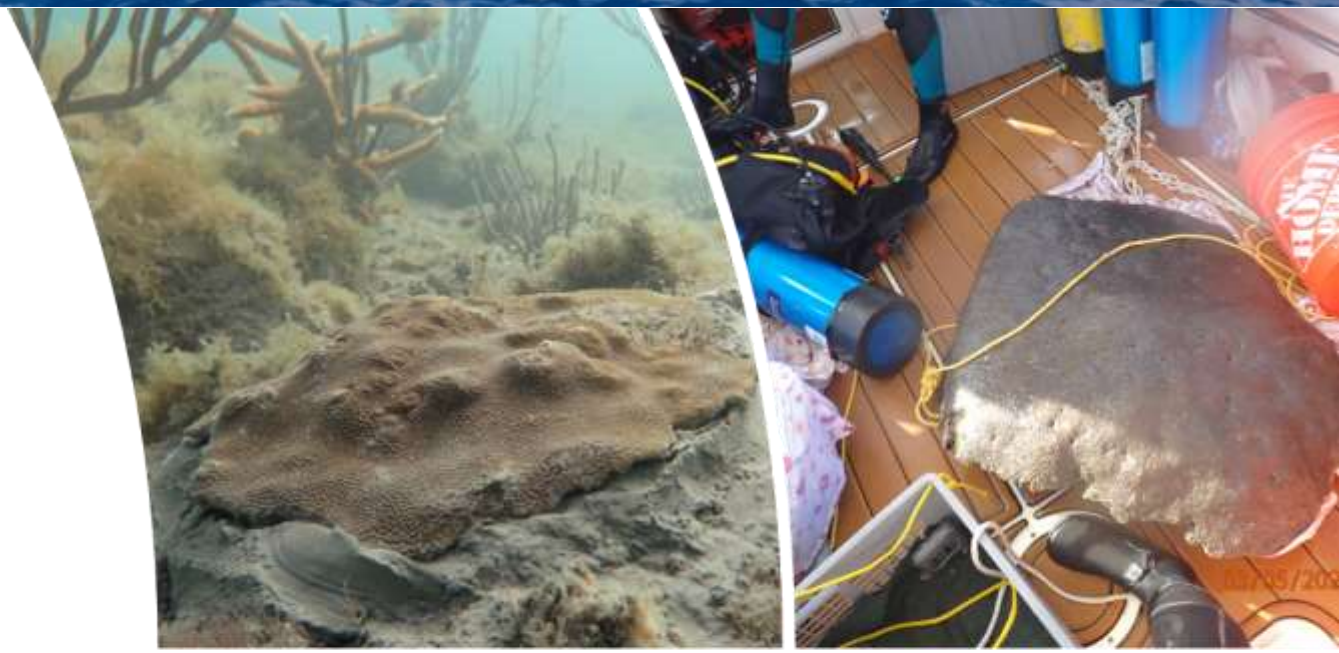


Port Everglades – Coral Relocation

- Larger coral colonies, more numerous
- Coral donation methods required slightly different process
- Several corals diseased, or overgrown and not relocated

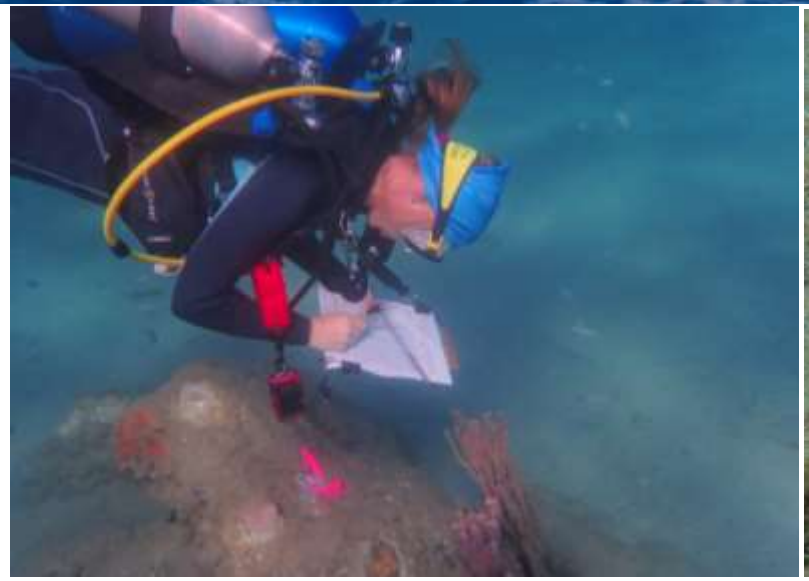
Port Everglades – Coral Relocation

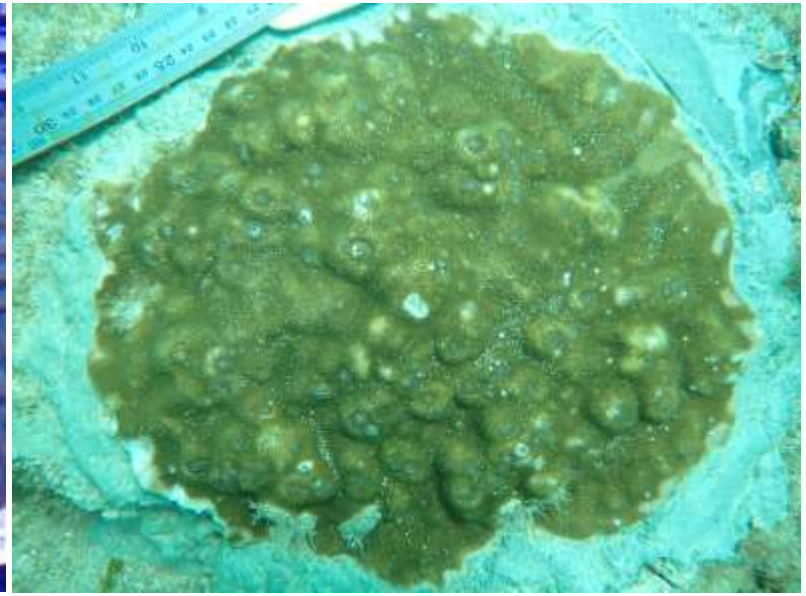
- Colonies up to 1 meter in diameter were transported directly on deck
- Substrate prepared by removing sediment/algae and attached using prepared cement
- 64 colonies transported to local university
- Broken coral colonies were united as a single colony
  - Self-recognition
- Nearly 150 colonies reattached to natural hardbottom south of project area



Post-Construction Monitoring

- Sites tagged with single marker
- One-week post-relocation
- Each relocated colony was assessed
  - Reattachment status
  - Bleaching
  - Disease
  - Partial mortality
  - Sedimentation
  - Predation
- 100% corals remained attached
- Slight paling from stress of transplantation
- Donated coral colonies thriving in aquarium environment





Port of Palm Beach – Construction

- Coral relocation work conducted in January 2021
- Construction conducted in February 2021
- Mobilization by barge and land
- 350 tons of stone placed by crane
- 4 to 14-ton stones
- Pre-construction bird surveys required
- Marine Mammal Observer on-board

Summary

- Coral transplantation common in south Florida
- Contractor often responsible
- Successful coral relocation often dependent on:
  - effective coordination with client and regulators
  - scientific-based site selection
- Opportunities for conservation, resiliency research, and education
- Timing, knowledge, and logistical experience are important factors
- Safety and EM 385-1-1

Environmental Compliance Manager, Port Everglades wrote: *No parrotfish predation or other significant corallivory was observed, and good site selection appears to be much more important for the survival of relocated corals than predator exclusion.*

Thank You

Anne Laird, M. Sc., Senior Project Manager/ Marine Scientist

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