

**REPORT FOR THE UNIVERSITY OF HAWAI'I AT HILO MARINE
OPTION PROGRAM**

**Grow and Plant all the Coral
Internship at Coral Restoration Foundation and Ocean Reef Club**

Jenna Budke
Marine Science
University of Hawai'i at Hilo

MOP ADVISOR:

James Beets
Marine Science Department
University of Hawai'i at Hilo

INTERNSHIP ADVISOR:

Ashely Hill
CRF Volunteer & Education Coordinator

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Grow and Plant all the Coral:

Internship at Coral Restoration Foundation and Ocean Reef Club

Abstract:

Coral reefs are one of the most diverse ecosystems in the world. They provide many resources for the environment and currently are being threatened worldwide. Some of the highest biodiversity in shallow-water marine environments exist in coral reefs, with a large amount of all marine fish species living here. Over the past forty years in Florida and the Caribbean multiple stressors have caused a severe decrease in coral health and coral survival rate resulting in a 98% decrease in *Acropora cervicornis* and *Acropora palmata*. Coral Restoration Foundation is a non-profit organization that focuses on the rebuilding of coral reefs. Their internship program takes on four people throughout the United States each semester.

Introduction:

The ocean covers over 70% of the planet, and we as humans make up only a small portion of this earth. Coral reefs are an extremely important part of the ocean ecosystem. Corals provide a habitat and protective structure for many reef fishes and invertebrates all over the world. Without these structures, fish and invertebrates would be vulnerable to predation, and lose vital nursery space found within the corals. Coral reefs are also imperative as they provide protection to the shoreline by lessening wave action.

Over the past century, humans have been causing serious stress to the coral ecosystem with pollution, marine debris, and physical disturbances. Coral reefs in Florida and the Caribbean have become severely degraded over the past forty years with a 98% decline in *Acropora cervicornis* and *Acropora palmata* corals (NOAA 2014).

Coral Restoration Foundation (CRF), based in Key Largo, Florida is a non-profit restorative organization focused on shifting the reefs back to how they used to thrive in the 1990's. CRF offers four to five internships per semester (fall, spring, summer) to undergraduate and graduate students. Interns spend between 4 to 6 days a week either in the field or office assisting the foundation. Field work includes working in one of the five offshore coral tree nurseries (see trees below in figure 2,3), planting corals, leading volunteers into the ocean to assist with the CRF mission, or doing miscellaneous activities under the ocean.

Objectives:

My goals throughout this internship were to gain experiences planting and taking care of coral fragments, expanding my knowledge on Florida and Caribbean species, develop a more expansive networking pool, and to mature my SCUBA diving leadership skills further.

Methods and Materials:

Study site:

I worked with Coral Restoration Foundation, a non-profit restorative foundation based out of Key Largo, Florida, founded in 2003. CRF's mission statement is to develop effective strategies for restoring endangered coral reefs while inspiring, educating, and empowering others to use the methods within their own coastal communities to better our ocean. The goal is to help the reefs move back in the direction of where they were roughly 30 years ago, so that nature can once again take over and regenerate the ocean without human assistance. The major stressors that pushed the reefs in this direction include coastal development, ocean warming, pollutants, overfishing, and inadequate sewage treatment. Coral Restoration Foundation works with staghorn coral, elkhorn coral, blade fire coral, and a type of brain coral. Currently their most successful outplanting species is *Acropora cervicornis* or otherwise known as staghorn coral. Because it has a growth rate roughly of 10 to 20 centimeters per year, and covers over 70% of the coral trees in the nurseries belonging to CRF, it is currently the most planted species in the Florida Keys. CRF has a total of five offshore nurseries (Fig 1) spanning up and down the Florida Keys. In one nursery there is between 35 to 3,500 PVC pipe trees lining the ocean floor (Fig 2) with coral fragments (new fragments to ten months old fragments).

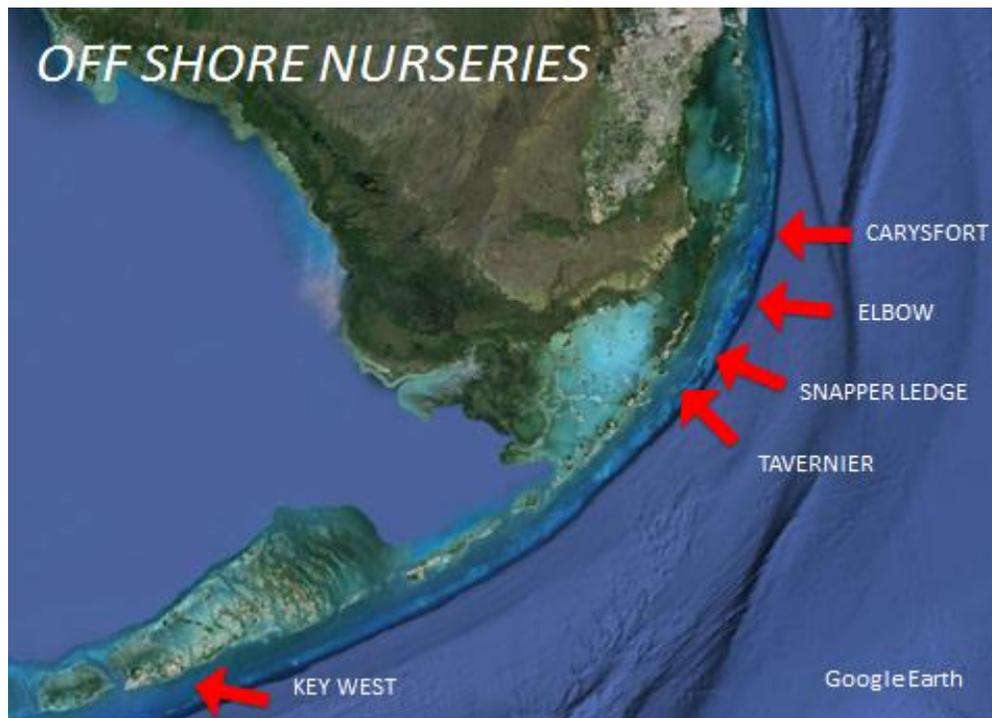


Fig 1. Map of five offshore nurseries in The Florida Keys belonging to Coral Restoration Foundation.



Fig 2. PVC pipe trees filled with staghorn coral at the end of 9 months after fragmentation.

At CRF I was one of five interns during the summer of 2015, and was one of two interns that were still working on their undergraduate degree. I also traveled the furthest to participate in the internship. My responsibilities at CRF ranged from ocean, to classroom, to the education center. The location of the education center was in the marina and was located perfectly for tourists, guests, and locals to be able to learn more about CRF and what they accomplish on a daily basis.

For the other part of my internship I was the Marine Biology Conservation Intern at Ocean Reef Club in Northern Key Largo, Florida. I became the liaison between the club and CRF to help get a larger range of people involved with the mission of CRF. At Ocean Reef Club I spent part of

my days leading Eco-kayak tours and the other part in the nature center with many species of animals.

Coral Restoration Foundation:

Morning Dive Presentations

Each morning before the new divers entered the ocean to help with the coral tree cleaning and planting process, they were given a PowerPoint presentation along with a hands on training session so they would understand the most important details before they entered the ocean.

Lead Diver

Before entering the ocean with the volunteer divers as a dive leader of a group I would give them a small briefing, go over once again what we would be doing, answer any questions, teach them how to plant coral while in the ocean, and assist with anything else they needed while diving.

Education Center

In the Education Center (EC) at CRF the interns were in charge of answering phones, taking messages, returning emails, giving tours of the EC, getting the mail, fish tank maintenance, running errands, and setting up and taking down for meetings or dive presentations.

Spawning Season

Because early August was the spawning season for the staghorn coral I had the opportunity to assist researchers from Florida State, Georgia Aquarium, and Florida Aquarium with their research. During these five days I spent part of my time in the ocean monitoring the corals and collecting their gametes, and the other portion in the lab assisting the researchers with mixing certain genetic lines of corals (See Fig 3,4).



Fig 3: Scientist from Georgia Aquarium extracting coral gametes from container to mix with another.



Fig 4: Bottles full of coral gametes after removing from ocean.

Ocean Reef Club:

Nature Center

As the Marine Biology Conservation Intern I was a part-time worker in charge of taking care of many different animals including; ball pythons (Fig 5), alligators, rabbits, guinea pigs, skunk (Fig 6), bearded dragons, water dragons, tortoises, double crested geckos, parrots, fish and many other types of animals. I was in charge of keeping their cages clean, feeding them, and showing them to guests and educating them on their importance. I also brought certain animals to special events like 4th of July parties and birthday parties.



Fig 5: Showing Camo (Ball Python) to children at Ocean Reef Club.



Fig 6: Flower the skunk at ORC being held by one of the members.

CRF Presentations

As Ocean Reef Club and its members was one of Coral Restoration Foundation's biggest monetary supporters I was in charge of presenting about CRF to ORC members. Being a liaison between ORC and CRF, I would answer questions and accompany them on boats to talk about planting and nursery sites.

Lead Eco-Kayak Tour Guide

At Ocean Reef Club I was trained to be the lead Eco-Kayak Tour Guide Fig 7. I led two tours every week (private tours also available) and I learned many Florida wildlife species, Florida history, and all about the construction of Ocean Reef Club. I also utilized this time to talk to visitors about the importance of the underwater world, but especially the importance of Coral Restoration Foundation, their work, and how people could get involved.



Fig 7: Leading a kayak tour through the mangroves in Key Largo.

ORSea Dive Camp Helper

During the summers at Ocean Reef Club there are many camps occurring for young children as well as adults. I had the opportunity to give presentations to new Junior PADI SCUBA divers on the importance of the coral reef ecosystem as well answer many questions about the ocean. For their final dive, I led the kids into the Carysfort coral nursery (nursery closest to ORC), and taught them how to clean the trees and re-hang new coral pieces (Fig 8) onto the trees for continued growth.



Fig 8: Assisting a camper with replacing coral fragments back onto the coral “tree.”

Conclusion:

Being a co-intern between Coral Restoration Foundation and Ocean Reef Club was an amazing experience and allowed me to get my feet wet in many different areas in my field and also dab in areas not marine science related. My favorite part about this internship was actually doing a job that I could be doing in my future. Over time I am realizing more and more how completing an internship has helped me in so many aspects of my daily life. I expanded my networking pool, learned all about Florida and Caribbean species, I drastically matured my SCUBA diving skills, and I gained experience and knowledge I could not have received from anywhere else in the world. Thank you Coral Restoration Foundation and Ocean Reef Club for giving me such an amazing opportunity.

References:

NOAA fisheries (2014) Accessed 28 Sep.

<http://www.nmfs.noaa.gov/pr/species/invertebrates/staghorncoral.htm>