

Summer 2012

# The Reef Environmental Education Foundation

## Internship Report

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The internship with REEF far exceeded any expectations I had for the summer. I have had an amazing time living and working in Key Largo and will be very sad to see this experience come to an end. With that being said there are several people who have been instrumental in helping and supporting me along the way. A special thank you to all of the REEF staff, especially Martha, Lad, Jane, and Janna, Stephanie Roach, my fellow interns, Jana, Joel, and Jessi, and OWUSS for making this opportunity possible.

## 1. REEF's Volunteer Fish Survey Project

REEF's [volunteer fish survey project](#) began in 1990 and has since accumulated over 160,500 surveys. The project (and REEF itself in a way) is built on the idea of the “citizen scientist”—everyday people who have a passion for the ocean can contribute to scientific research and marine management without having any formal training. In other words, the survey method was designed so anyone, not just a seasoned researcher, can get in the water and do a fish count. All they have to do is be able to identify one fish!

At first I was actually a little nervous about the whole “being able to ID one fish” concept because I spent the last two years of my life in the western Pacific and lets face it, I was usually more focused on the coral and nudibranchs... Turns out you pick up the IDs really quickly. After only a few survey dives I became fairly confident on the most common sightings, so to keep things interesting I gave myself the task of finding a new species (unknown to me that is) on every dive and/or learn my gobies and blennies

Because survey dives are designed for anyone REEF uses the [Roving Diver Technique](#) which is basically get in the water and swim around—no line transect or quadrat to worry about—it's very user friendly! My favorite aspect of the survey project is that it uses common names, not scientific, which for a student whose foreign language skills are completely absent it is nice not to have to learn Latin. Each survey records both the name and density of species identified using abundance codes such as: S-Single (1), F-Few (2-10), M-Many (11-100), and A-Abundant (101+). Once the dive is completed the data is entered in an online database which is freely available to [explore](#) and has been used by students, researchers, and managers for scientific [publications](#).

I think what I enjoy most about these survey dives it that it makes your time in the water a little more interactive by basically being an underwater scavenger hunt and what could be cooler than that!?! Now, one of the personal advantages to becoming an avid surveyor is working up the ladder to different fish ID [experience levels](#). If you can ID one fish you're at level 1 and can work your way up to the expert levels of 4 and 5 (over 35 surveys and passing the advance fish ID quiz). If one is lucky/dedicated enough to reach the advance levels they are invited to join the Advanced Assessment Team (AAT). Members of the AAT are eligible to participate in special regional monitoring projects such as the Vandenberg artificial reef in the Keys and Monterey Bay National Marine Sanctuary off California.

## 1.2 On-line Training Webinars aka Fishinars

As part of their many training tools, one thing REEF hosts is on-line training sessions for various topics in reef fish identification and behavior. These sessions are known as “Fishinars”. Fishinars are a relatively recent REEF venture (only about a year old) but they have been widely received by reef members and fish geeks alike. The Fishinars ranged in topics (Table 1) all of which are very time consuming to set up but a lot of fun to present and interact with the public. I worked closely with Janna Nichols (Outreach Coordinator) to help organize these events, advertise, and support speakers while the session is in progress.

Table 1: Fishinars completed during the internship.

Title	Presenter	Date	Attendance
California Fish ID pt. 1	Janna Nichols	May 15 <sup>th</sup> 2012	48
California Fish ID pt. 2	Janna Nichols	May 17 <sup>th</sup> 2012	36
The Northeast's Dirty Dozen	Janna Nichols	May 18 <sup>th</sup> 2012	30
The Wrasse Class	Jonathan Lavan	June 21 <sup>st</sup> 2012	54
Sculpins Under Scrutiny	Dr. Greg Jenson	July 19 <sup>th</sup> 2012	68
The Blennywatcher	Anna DeLoach	July 31 <sup>st</sup> 2012	69

Once a webinar was scheduled my first task was to establish organizers for the program. The presenter is usually preoccupied with talking and going through the slides during the presentation so organizers help to filter and flag questions from the audience. I was also responsible for communicating with the presenter to see if they needed any questions or polls inserted into the online presentation format. Another priority task for Fishinars was advertisement on social media sites including *Facebook*, *Scubaboard*, REEF's Calendar and other sources. For effective outreach I created banners for each Fishinar (examples below) to be used on various social media sites.



During the presentation I was responsible for communicating with the audience to welcome them to the presentation, congratulate them as they respond to the presenter's questions, answer questions as they filtered in, and flag any question I couldn't answer for either the presenter or another organizer to respond to. Then after the presentation was completed one of my tasks was to collect the data from the attendees list and compile the information in a data sheet. Information included the number of registered versus attended participants as well as generating comment sheets.



*An example of the slides presented in one of these Fishinars. These screenshots are from the latest presentation by REEF Board Member, Anna DeLoach, on the Blenny Family.*

Besides all the pre and post preparation of Fishinars I also worked on a manual outlining everything related to Fishinars. Although they seem simple in concept there is a large amount of man-hours that goes into hosting these. One of the things that Janna, Martha, and I thought would be useful was a sort of training document—something that could be passed along to other interns and staff that would clearly describe all that holding a Fishinar in tales. Throughout the summer I compiled all the information and generated the Fishinar report. Additionally, the

next step in for Fishinars would be to find a funding source to help host them and support the hours that go into their production.

### 1.3 The Great Annual Fish Count

The Great Annual Fish Count (GAFC) is a nation-wide month long event where various dive shops and [Field Stations](#) host fish ID survey dives and snorkel trips. Although you can do a survey any time of the year July is the month for one large push to get the word out and get a huge amount of surveys done anywhere. Although there were individual events all over the US, I'll focus here on those that were in/around Key Largo.

Each fish ID and survey event begins with a Tropical Western Atlantic (TWA) presentation where we go over the basics in identification markers, behavior and in general what to look for while you are in the water. The first event I got to go to was actually up in Miami with The Miami-Dade [Reef Guard](#) Association hosted at the [Tarpoon Dive Center](#). Reef guard has been involved in REEF survey dives for years! Nick, their VP, invited myself and Jessi (another intern) to Miami for a presentation and dive on a site composed of several wrecks and rock piles ([Dive tour](#)). I don't think I expected to meet such a lively group of people who simply loved diving and were just there to have a good time! They were hilarious and a super nice crew to meet and dive with! We arrived at the shop with ample time to set up, ran through the presentation with a very interactive audience (which is always the best), then we get our gear ready for the trip out there. The dive was awesome for a couple of reasons but mainly because it was nice to see a new site with crystal clear water (even at 60+ feet), and I think there was *Miracle-Grow* in the water because I have never seen Yellowhead Wrasse so big before! Any who, lots of fish which made for an excellent count! Thank you Reef Guard for having us up to Miami!



Jessi and I diving with Reef Guard of Miami-Dade County. © Reef Guard.

The second group we worked with was Venture Crew 3,000- a group made up of kids in middle to high school age plus the adults as trip leaders and chaperones. They blew me away at the ID presentation in the REEF Headquarters! Most people, both adults and youngins, know the very common, iconic fish in the TWA area; these guys knew nearly every one already on our powerpoint. Honestly, I almost busted out the Advanced ID presentation because clearly they had been studying. After the presentation, we also administered the Level 2 ID quiz which I'm happy to report they all passed with flying colors. This wrapped up our first event with them, the day after which I joined the crew again who was going out with [Amoray Dive Resort](#) for their first fish ID dives. Once again, these guys did a smashing job! I could tell the kids were really enjoying themselves on these dives (and they knew their fish) but I was more surprised with the long-time diving adults who really took to surveying. Here is what Mike (their leader and organizer of the trip) had to say about REEF:

*“Our trip was great! We really enjoyed all aspects of it, including the REEF session Monday and the survey dives on Thursday. I was really happy to see the youth participating ... every time I saw a youth underwater they had the forms in hand.”*

*Further at least one adult, who previously liked hovering above the reef and cruising along would get bored...when they learned the fish names – thought it was fun to do the surveys and hunt for different fish.”*



Crew 3,000

The rest of the month was filled with other events hosted by dive shops such as [Sail Fish Scuba](#) and [Horizon Divers](#), as well as public fish ID presentations and plenty of TWA Level Test administered.

#### 1.4 AAT Vandenberg Monitoring Project

The [Gen. Hoyt S. Vandenberg](#) was sunk as an artificial reef on May 27<sup>th</sup>, 2009 and has since acted as a site for recreational divers and fishermen alike. The wreck lies at 140ft just off Key West with its decks sitting at about 100ft, providing nearly 45 vertical feet of habitat in an otherwise sandy bottom, open water area. As part of their [monitoring programs](#), REEF was contracted under a grant from the state of Florida to observe and monitor the fish assemblages associated with the wreck. The primary goal of REEF's monitoring efforts are to describe and comparatively quantify fish assemblages found on the Vandenberg as well as neighboring sites (both reef and artificial). Since their first round of monitoring pre and post sinking of the Vandenberg ([2009-2010 Summary Report](#)) REEF has been sending members of the [Advanced Assessment Team](#) (AAT) to document changes in both presence and absence, sighting frequency, and estimate abundance of reef fish over time.



*The Gen. Hoyt S. Vandenberg prior to sinking. More images before and after click [here](#). © Artificial Reefs of The Keys.*

Early July I was assigned the task of organizing the next round of AAT monitoring for this survey project. The first thing to do was contact [Dive Key West](#), the dive company that has hosted past REEF monitoring trips, in order to set up a week of diving! On my first attempt I unknowingly had aimed for the trip to coincide with Lobster Mini-season... that wasn't going to happen! Fortunately the staff at Dive Key West was very helpful and accommodating and eventually we settled on the week of July 30<sup>th</sup>- August 3<sup>rd</sup>. Once the dates and dive sites were set it was relatively smooth sailing from then on. I contacted the group of Tropical Western Atlantic (TWA) Advanced Assessment Team (AAT) divers calling for volunteers and got a great response back over the course of a week or two. In the end, we had AAT members traveling

from all over the US including South Carolina, N. Florida, Key Largo, and even one ventured all the way from San Francisco!

Jana (my dive buddy extraordinaire) and I decided rather than driving from Key Largo to Key West every day for three days we decided to camp and make an adventure out of the survey trip. On Monday, the day of the first dive, we wake up circa 5am and hit the road. We arrive in Key West and at the dive shop at about 7:30 and low and behold there was already a small gathering of divers in front of the shop... we knew instantly that these had to be the first of the AAT members to arrive! While we made the rounds with introductions the rest of the AAT members started trickling in. Once we were all assembled we headed into the shop, checked in, loaded gear, and then headed off to the marina!!

Once we arrived at the Easy Diver we met our captain Steve and first mate Jeremy who were already familiar with REEF, our survey projects, and they were even kind enough to load all our gear! On the first day of diving we headed out to Western Sambos Deep (WSD) and Shallow. West Sambos Deep is a slopping low profile reef starting at about 60+ft in depth. The team and us interns giant stride into the water to kick off the survey trip! Unfortunately on the first dive (WSD) we did not have the best visibility so Jana and I just hung around the anchor line for fear of being those divers who get lost (not cool when you're trying to hang with the big kids!). After a brief surface interval with a passing pod of dolphins we traveled to an adjacent site— Western Sambos Shallow aka the Haystacks. As the name implies this was a shallower dive of only about 15-30ft. This was quite an amazing dive with large coral formations and plenty of fish! On this one we decided to follow Obi-Wan (the master himself), Lad, around because lets face it, he knows his fish! Our plan worked and I think on this dive alone I learned how to spot a handful of new species including the Rough Head and Secretary Blenny and the Red Hind of the Grouper family. All in all not a bad day of diving... and that was only day one! After we wrapped up our dives Jana and I headed to Leo's Camp Ground to make camp and bunker down for the evening!

The following day was an early one again but also the one we were looking forward to the most—The USS Vandenberg (aka the Vandy). Upon entering the water you could feel the ripping current, the kind of current that makes you look like a flag on a flag pole in a hurricane as you hold onto the anchor line! However, the visibility was amazing and we could see the wreck as we descended to its decks sitting around 100ft below the surface. The wreck is huge! Even without a current to swim against I don't think you could see the whole thing on one tank. But before entering the water I had said that the only thing I really needed to see was the communications satellite and guess which mooring buoy we tied on to... Ball #3, sitting right on

top of the satellite. Although we didn't get to see much of the wreck we were able to make it towards the front to the helm, observation deck, and even spotted some of the images from the ["Life Below The Surface"](#) photography show by Andreas Frankes.

The second dive of the day was over at Joe's Tug (a stone's throw from the Vandy). Joe's Tug sat at about 40-65ft and was actually a pretty sweet dive. If I sound surprised it is because I figured once you saw the 3<sup>rd</sup> largest artificial wreck in the world other ships might pale in comparison, but no, that is not the case here. Although a lot smaller and not as intact Joe's Tug was a pretty sweet dive too!

On our third day, and final day, we ventured out to Marker 32 Deep and Shallow. Marker 32 Deep, like Western Sambos Deep, is a low profile sloping reef with a starting depth of about 60ft. Here we got to see some cool things like a large, rather well camouflaged, Black Grouper and a Butter Hamlet which I love to find! After our 30min survey time we surfaced, spent our surface interval jumping off the observation deck of the Easy Diver, then it was back in the water at our final site of the trip, Marker 32 Shallow (locally known as Topino Buoy). This was a spur and grove reef site with a max depth of barely 25ft. I loved this dive! In fact, it may be one of my favorites since I've been in the Keys. There was so much diversity in both fish and coral species. Right off the bat I saw something I've never seen before which turned out to be a Slender Filefish! The rest of the dive was made that much more amazing by spotting about 5 Red-lipped Blennies, Nurse Sharks, juvenile Blue Tangs and Puddingwife Wrasses. In the end of this dive I had identified 54 species— my greatest count to date!



*Photos (L to R): Red Lipped Blenny spotted at Marker 32, Satellite structure of the Vandenberg, and one of the reef walls on Marker 32 shallow.*

## 2. Lionfish Education and Outreach

The invasive Lionfish (*Pterois volitans* and *P. miles*) were introduced in the 1980's via the aquarium trade and have since become the first invasive species to successfully establish in Tropical Western Atlantic (TWA) waters. Their native range is the Indo-West Pacific (IWP) where populations are controlled by predation and parasitism. However, in the TWA Lionfish have no natural predators and are significantly less susceptible to parasites. On densely populated sites Lionfish can reach densities of over 200 adults/acre and cause serious damage to native reef habitats by non-selectively removing recreational, ecological, and commercially important species or reef fish and invertebrates. While there is no natural form of population control in the TWA, humans represent a predator of sorts and are at present the only form of control we have. In areas where removal efforts are sustained Lionfish densities can be significantly reduced and maintained to minimize their impact.



*Progress of Lionfish invasion of Atlantic waters (2012 map as of March). For more information/background on the invasive Lionfish explore REEF's [Lionfish Project](#) and [Quick facts](#) on the problem can be found on this one-page fact sheet from REEF, USGS, NOAA and the Simon Fraser University.*

Through their volunteer survey project REEF started to see more and more increases in citations of Lionfish in their online database. Lionfish being an exotic species this developing trend was quickly recognized and REEF has since been at the forefront for control and handling of the invasive Lionfish. Their efforts include hosting Lionfish workshops, derbies, and dives to educate the public on the proper handling techniques and sustain removal efforts.

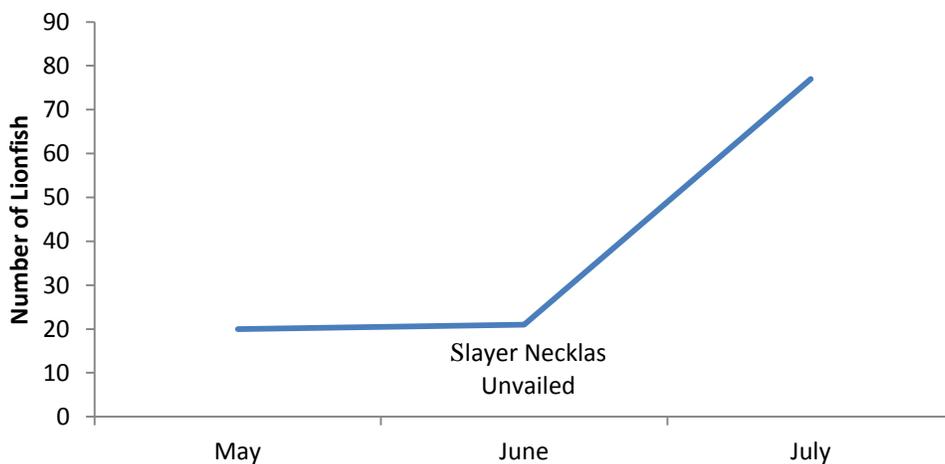
### 2.1 Key Largo Monthly Contest

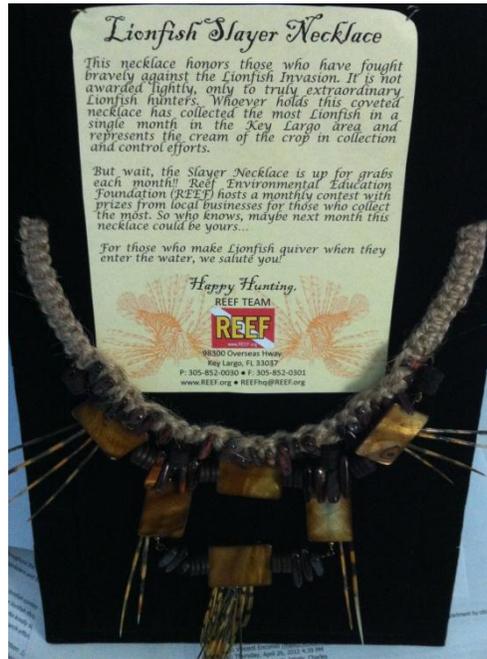
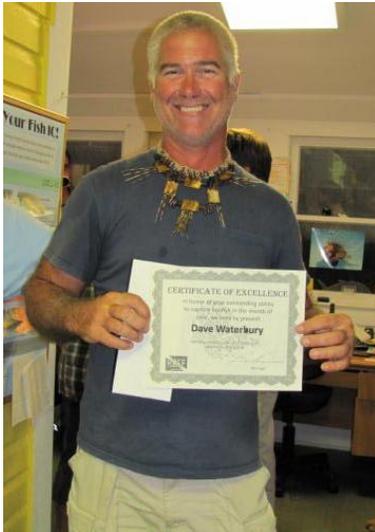
One of the local projects REEF is working on is to generate constant removal efforts in the waters of Key Largo. Fortunately, in many of the well visited dive sites Lionfish are rarely

seen because local dive operations are pretty steady in their removal. However, if you venture in to deeper, less visited locations you are very likely to find some hanging around. In order to promote removal efforts REEF host a monthly Lionfish contest for the individual and group that brings in the most as well as several Lionfish dives to educate visiting divers.

For the monthly contest we receive donations from local restraints as our prizes. The individual with the most captured receives a \$25.00 gift certificate while the dive shop group winners receive \$50.00. Although a great program, it was not receiving the attention it deserved in order to reach its full potential and one of the things we were asked to do was to find a way to generate greater participation in the monthly competition. Well, Jana, who worked a lot with the dive shops over the summer, had a brilliant idea to make a sort of immunity necklace (as seen in *Survivor*) to generate greater interest. Jana had the idea while I had the know-how to execute its construction. Early June I began working on what would eventually become known as the “Slayer Necklace.” The Slayer Necklace was introduced at June’s Fish & Friends and awarded to Horizon Divers. Since its introduction, the resulting turn in of Lionfish has been unprecedented. Needless to say, the necklace would appear to be doing its job.

## Results of the Monthly Lionfish Contest





*Photos (L to R): Dave, our ongoing winner in the individual category, the Slayer Necklace display, and Horizon Divers Captain fashionably sporting his prize.*

## 2.2 Lionfish Collection Dives

Another ongoing program in Key Largo is organized Lionfish removal dives with local dive shops. Although there were many throughout the summer the one that I got to participate in was on Sunday July 5<sup>th</sup> with Amoray Dive Resort. Lad, Jessi and myself joined the Amoray crew along with a fully booked charter of about 30 divers. On the boat ride out Lad educated everyone on their invasion history, proper capturing techniques, and what all we were going to be doing on this dive.

The weather was rather choppy so it worked out well that we were visiting fairly deep sites. Our first dive site was a ledge on French Reef. The ledge set at about 65ft at the bottom and at least 15ft in height. We jumped in with all our Lionfish collection gear including armored gloves, vinyl collection bag, and mesh nets. It took us basically the length of the entire dive before we spotted our first Lionfish. Because this would be the first that either myself or Jessi would have attempted to capture we set back and watch Lad and his perfected technique. The technique to net a Lionfish is to use two nets, with one net block their obvious escape path while placing the other in front of them and slowly move your nets together. Lionfish are fairly bold and won't move much as long as you move slowly. Lad bagged his Lionfish then we booked it back to the boat. Once on the boat with our catch people got so excited- most had not ever

seen a Lionfish in person. So it was great to be able to talk with everyone and educate them while they studied our catch.

The second dive took place on a ledge adjacent to the Benwood Wreck. Personally, I love the Benwood, but never knew that such a ledge exist so close to it. Lad and I entered the water, and swam out from the stern of the Benwood across a sandy grove until we got to the sharp drop of the ledge. Within only a few minutes of dropping down the ledge (~60ft) Lad once again spotted our target. Although a much smaller Lionfish then our previous catch, it was up to me now to catch it. Following Lad's technique of moving nets together, I got the Lionfish out of its little overhang into open water where it was much easier to maneuver the mesh nets and quickly bagged it! With the Lionfish between the two nets we swam up the ledge a little till we found a patch of reef devoid of anything and laid the vinyl net bag on the bottom. I placed one net on the bottom in order to get the Lionfish to swim up into the second net then slowly and very carefully began collapsing the net around him until there was very little room for the fish to swim. Next I dawned on my armored gloves, grabbed the Lionfish across the head, inverted the net (fish in hand), and deposited the Lionfish into our collection bag.

### *2.3 Lionfish Derbies*

Unfortunately, the invasive Lionfish in the TWA is beyond eradication and solutions have moved into control and management of the problem. REEF is one of the organizations at the forefront of this movement and among many of their Lionfish Programs is their Derby Series. The first Lionfish Derby took place in 2009 in the Bahamas where in a single day they removed 1,408 Lionfish! These Derbies are designed to promote mass removal efforts and to date have removed 1,408 Lionfish in 2009, 2,587 in 2010, and 3,542 in 2011.

#### *2.3-1 Broward County Lionfish Derby (Saturday June 30<sup>th</sup>)*

The first Lionfish Derby I attended was the weekend of Friday June 29<sup>th</sup>- Saturday June 30<sup>th</sup>. This weekend marked the 2<sup>nd</sup> installment of REEF's Summer Lionfish Derby Series which took place in Ft. Lauderdale, FL. The derby was hosted at [15<sup>th</sup> St. Fisheries](#) and sponsored by REEF, [Divers Direct](#), and [Sea Grant](#). There were 12 teams registered for the event that brought in a total of 419 Lionfish! Cash prizes were awarded to the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> place teams in three categories: Most Caught, Largest Lionfish, and Smallest Lionfish. Among the highlights of the day was seeing over 225 individual Lionfish come in from a single team and the largest Lionfish caught which measured in at a monstrous 411mm (16.2")!



*Photos (L to R): Contender for the Smallest LF, Lionfish Filled Cooler, One of my MANY Lionfish Filets in Progress.*

The first team in was Brownies Team arriving around 3pm to the 15<sup>th</sup> St. Fisheries dock. When teams arrive, their first stop is the check-in table where their time-in is recorded, they turn in their site map, and then head over to the scoring table where the counting begins! Now it is just not simple enough to have one table with one scorer, no, that would just be too easy. At each table there is a scorer, a recorder, fish cleaner, and several NSU students collecting samples. Take all that times it by 2 tables, handling 12 teams, and processing a total of 419 fish and things get a little messy (pun intended)!! I manned one of the scoring stations and in what little down time there was I jumped in to help with the cleaning process. In fact, this was my first time ever filleting a fish. One filet quickly turned into 40+ and it dawned on me that choosing a Lionfish as my first fish to filet was probably not the brightest idea but I'm happy to report no puncher wounds were sustained!

This was my first Lionfish derby and to be honest I didn't quite know what to expect but it was a blast! Overall I think I was so surprised by how many different uses there were for the Lionfish—we had the Chef of 15<sup>th</sup> St. Fisheries cooking Ceviche, students collecting tissue samples, stomach content, and carcasses for parasite studies, and we even had one of the team's members after the tails of the Lionfish for her [Jewelry](#). So in the end there was very little evidence left of the invasive critters except for all the smiling faces of the crowd.

### *2.3-2 Teeples Memorial Lionfish Derby (August 8<sup>th</sup>)*

At the Ft. Lauderdale Derby we met Kelly Teeples, a derby participant and REEF member. Kelly unfortunately lost her husband Billy in a diving accident last year. She came to REEF to host a memorial derby in honor of her husband. On August 7<sup>th</sup> and 8<sup>th</sup> Lad, Joel, and myself once again journeyed up to Ft. Lauderdale to 15<sup>th</sup> Street Fisheries to offer our support and helping hand. We held a brief Captain's meeting on Friday then returned Saturday for the scoring and silent auction.

There were four teams registered for this event: Brownies Team I, Brownies Team II, the Dusky, and Quad Threat. Although not a huge catch for the day, there were a total of 27 Lionfish removed with the largest measuring 340mm and the smallest at 123mm. After all the teams returned to the dock and the scoring completed derby participants and spectators gathered for the silent auction. There were about three large tables filled with items being auctioned off. Items ranged from nice beach-themed frames, boating equipment, to a sail boat charters with Fantasea Sail.

The chef of 15<sup>th</sup> Street again made his famous ceviche with the filets from the days catch which was delicious again! Because of the nature of this derby, there were no cash prizes given to the winners- only bragging rights. Proceeds generated from the derby and the silent auction was donated to REEF in Billy's name.



*Images from the Teeples Memorial Lionfish Derby. Kelly presenting the award for largest Lionfish caught to Brownies Team II (Left) and the whole crowd on the 15<sup>th</sup> St. Fisheries Dock (Right).*

### **3. Volunteer Work**

One of the many perks to the internship with REEF is the opportunities to volunteer with other non-profit groups in the area. Not only is it a great chance to meet like-minded marine conservations but it is also an incredible experience to get a taste of all the work going on in the area. The volunteer aspect of the internship is purely up to the intern to make it into what they want to do. I loved volunteering with the many groups in the area but there were some that stood out above the rest and those were the Coral Restoration Foundation (CRF), Florida Keys National Marine Sanctuary (FKNMS), and the Florida Department of Environment (FDEP) Coral Reef Conservation Program (CRCP).

### 3.1 Coral Restoration Foundation

I contacted the Coral Restoration Foundation a while ago (even before I was in Key Largo) asking if I could be a volunteer. Turns out their Science and Education Director is none other than former REEF intern and OWUSS scholar recipient, Stephanie Roach! Stephanie has been a tremendous help for me with not only getting settled and navigating OWUSS and REEF but with also organizing volunteer days with CRF.

On my first day with CRF, not having done anything like this before, I had no idea what to expect. Jana and I met up with the CRF crew behind a warehouse early in the morning where we were introduced to the legend himself, Ken Nedimyer (Founder of CRF), Kevin (manager), Stephanie, and Ben (a long-time volunteer and now the most recent member of the CRF staff). The day began early in the morning with loading tanks and gear on to the Dusky and once the boat was all geared up we piled in to Ken's pick up and headed for the water! After a short ride out, Ken ties up to a small black mooring ball seemingly in the middle of nowhere. However, it was a whole other story when you entered the water. Sitting on the sandy bottom at about 30ft were rows and rows of coral "trees" stacked with hanging Staghorn coral.



*Coral Trees with hanging Acropora cervicornis (c) CRF*

First thing in the water was a tour of the nursery which is home to about 25,000 coral fragments. Once the tour was over, it was back to business... Steph or Ken would select a tree and cut corals that were growing on wires attached to PVC pipes. The corals would rain down on Jana and myself as we scurried around the bottom collecting them. The first task is to clear off the algae growing on the wires and attach a numbered tag representing their genotype to each coral. So, one might think that in a sandy bottom with nothing but some PVC Pipe trees

and wires with Coral there might not be a lot of wildlife, however, this couldn't be further from the truth. While pulling off the algae swarms of fish appeared and loved the free snack we were providing them! We collected 10 coral fragments from 10 trees (IE 10 genotypes) for a total of 100 individual corals. All of the tree's segments were mixed so that one bundle would have ten coral segments, one from each genotype. These were then bundled together in preparation for their transplantation into the wild!

Once we had completed our work we surfaced, not-so-gracefully got back into the Dusky (corals in hand), and headed out towards the Wellwood Restoration site on Molasses Reef, where we dropped in and got to work! Stephanie once again took us under her wing and showed us the proper techniques for literally [planting corals!!!](#)

The 5 simple steps to planting coral

1. Site Selection
2. Lay out an oval of 10 corals (1 fragment from each genotype)
3. Clear the benthic till we hit bare rock (aka hammer away)
4. Attach coral with epoxy mixture
5. Nail in ID marker

Not too hard right? Well let's not forget to maintain perfect buoyancy hovering only inches from the reef/live coral and the fact that you're working with actual tools under the water. Oh, and remember to avoid the labyrinth of Fire coral! We repeated these steps for a total of 10 ovals, planting 100 corals over all!!! It's all in a day's work. Who says Maine Biologist don't work 9-5 jobs? We do, we just spend 4 of those hours under the water!!!

Since our first dives, Jana and I have been fortunate to go out on quite a few trips with CRF and as the summer went on we were even asked to volunteer as Team Leaders for their larger trips to the nursery. One of the more noted ones was rather a last minute adventure- It was a quiet morning at the office when out of nowhere we get a call from Ben to be team leaders (We felt so special!). They had a rather large group show up which REEF had actually worked with earlier on some fish survey dives but CRF needed an extra couple of hands on deck to basically act as crowd control. Our next time as team leaders, rather than be crowd control, we were actually in charge of a group of divers. As team leaders we are responsible for showing our group members their task then watching them and assisting when necessary.

The work alone has been an unbelievable experience with highlights such as seeing a Goliath grouper swim through the coral trees and having a personal best dive time of 95mins on a

single tank!! I also now officially hold a PADI Specialty certification in coral restoration! It is truly amazing work the CRF team is doing and I am so thankful to have the opportunity to witness it firsthand.



*Photos (L to R): Stephanie Roach showing us the ropes our first day with CRF, Hogfish visiting us, a growing patch of Staghorn corals hanging, and Jana and I enjoying our time in the nursery.*

### 3.2 FDEP CRCP Coral Reef Clean-up

One of the things I have to say I have enjoyed the most is the networking that has occurred through working with REEF. One of the connections I made was with Karen Bohnsack the NOAA Regional Management Coordinator for South Florida. I worked with Karen to set up a volunteer day working as top-side support for the Florida Department of Environmental Protection (FDEP) Coral Reef Conservation Program (CRCP) Reef Clean-up event.

On July 21<sup>st</sup> I journeyed up to West Palm Beach for the event where I met up with more NOAA and FDEP staff on the Narcosis dive charter. There were a total of 14 divers participating, who collectively spent just under 16 hours underwater, covering approximately 12 linear miles of reef. While I wasn't diving, it was still a great experience and a lot of fun top-side. When divers would return to the boat we would be responsible for sorting what they had collected, classifying it, and recording the weight of items removed. Overall the divers removed 46 pieces of debris weighting at approximately 15 gallons and 30lbs of trash removed in a single afternoon.

This was a single dive charter in one location but was actually part of a long standing effort to clean up our reefs. Karen provided the following table to illustrate overall the amount of debris removed from south Florida reefs in their reef clean-up series.

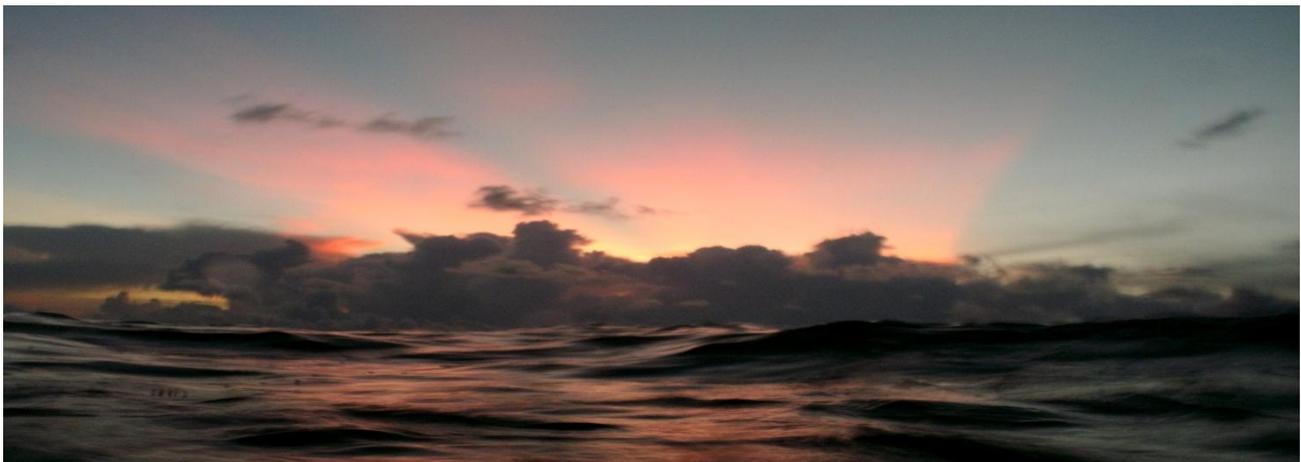
County	# of Participants	# of Dives	Pieces of Debris Removed	Volume of Debris Removed (Gallons)	Weight of Debris Removed (pounds)	Total Distance Covered (linear miles)	Total Time Spent Cleaning (hours)
Miami-Dade	23	45	166	59.5	136	4.5	33.1
Broward	16	28	157	55	129	4.4	25.6
Palm Beach	37	50	161	51	91.5	27.5	34.9
<b>TOTAL</b>	<b>76</b>	<b>123</b>	<b>484</b>	<b>165.5</b>	<b>356.5</b>	<b>36.4</b>	<b>93.6</b>

### *3.3 FLKNMS Coral Assessment and Monitoring*

Another one of my many connections made was to Lauri McLaughlin. She has been with the Florida Keys National Marine Sanctuary (FKNMS) for over 20 years—the majority of which have been focused on coral reef monitoring and assessment. I spent several days as a volunteer with Lauri doing various FKNMS work including environmental assessment impact surveys and coral spawning dives.

For the environmental assessment we would join Laurie on her rounds through the Keys as she visited different private and public locations. Parties wanting to build a dock, add a boat lift etcetera have to go through a rather extensive permitting process where they submit their project blueprints. One of Laurie's responsibilities is site visits to a) conduct benthic surveys, b) make recommendations, and c) observe the progress of the construction. In areas heavily covered in coral often times she removes the coral fragments and relocates them to her coral nursery in Key West. On our volunteer days we went along on site visits and learned how to read construction blueprints, perform benthic assessments, and identify different coral species.

For a different adventure with Laurie, I joined her on a coral spawning dive on August 4th. The goal of these spawning dives are to look for cues for a spawning event such as fish behavior, setting of coral gametes, and other invertebrate behavior (e.g. brittlestars and squid). We entered the water and first laid a long transect line around Horseshoe Reef as a guide then proceeded to swim around the reef looking for these cues. Unfortunately, the corals were not ready to spawn and we did not get to witness a spawning event. Never the less, it was still a very enjoyable dive and I was happy to have even gotten the opportunity to join in on a coral spawning dive.



*Sunset from a divers eye view as we embark on our coral spawning dive.*