



Diving that Counts!



**Our World-Underwater Scholarship Society
REEF, Summer 2007 Internship Final Report**

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Texas A&M University at Galveston (TAMUG) has a high number of actively researching staff that encourage undergraduate students to apply for internships. Many professors email opportunities they hear about on to their students, and this is how I heard about the Our World-Underwater Scholarship Society. Our-World Underwater offers a wide variety of sub-aqua summer internship opportunities for undergraduate students, which appealed to me since I was still uncertain about what area of the marine realm I wanted to pursue. I was interested in a few of the opportunities Our-World Underwater was offering. So, I applied.

With my application on its way, there was now the long wait until the successful applicants were notified. As the deadline for announcing interns approached, every phone call I received from an unknown number I answered nervously. One afternoon, I received a call from George Wozencraft from Our World Underwater. He told me that I was one of the final applicants for the internship with REEF, and that someone would call me for a phone interview later. Great! One step closer, I just had a phone interview to get through now. A few days later, Joe Cavanaugh, REEF's Field Operations Director and former Intern Coordinator, called me. We chatted for a little and eventually he told me that they had already offered the internship to another applicant. Discouraged, we ended our conversation, but Joe said there was a small chance for me still; if the other applicant turned down the internship. Shockingly, I received another call the following day from Joe offering me the internship and, of course, I leapt at the opportunity!

The drive from Galveston, Texas, to Key Largo, Florida, takes 22 hours, according to Map Quest. With this information in hand, I chose to split the journey into a

few sections. The first haul took me to North Florida, where I met up with students from TAMUG working on obtaining AAUS diver status through the Scientific Diving class. After diving with them at Ginnie Springs, I continued south to Saint Petersburg where I met up with a friend before completing the final drive to Key Largo. After exiting the main highway onto US1, you're thinking 'I've almost arrived in the Keys!' However, first you must battle your excitement to arrive all the way along a long sparse stretch of road: the '18-mile' stretch; a long, straight, two-lane road, margined by mangroves and water on either side. When I finally arrived in Key Largo on Memorial Day, I met with Kim Sovia-Crandon, REEF's Office Manager and new Intern Coordinator. Kim seemed to embody the Key's lifestyle I had heard so much about: she greeted me with great smiles and hugs, wearing a brightly coloured sun dress and straw sunhat embellished with a bright yellow flower. She directed me to the recently renovated 'intern trailer' where the other REEF intern, Paige, was already waiting.

REEF HQ is based out of a small, quaint, yellow house in the middle of the median in Key Largo. Every room in the office is painted a different bold colour and has bright blue ceilings with wispy clouds. Not your usual stuffy work environment, but this was the Keys! Joe informed me that the office building is actually a historic Conch house constructed in 1936 from Dade County Pine, now commercially extinct, that is termite resistant and hurricane resistant due to its weight. After meeting and greeting all the office staff, we got down to business. How to check and answer emails, enter new members into the database, and package and send orders, were amongst the first tasks we learned. As the days progressed, I began to learn the basics about what REEF is. "What

does REEF do?” is a common question we were asked, and I’ve come to learn that’s there is no simple answer to that question. REEF, founded by Paul Humann and Ned DeLoach, is a grassroots non-profit organization dedicated to educating snorklers and divers in marine fish identification and biodiversity data collection. REEF was created when Paul and Ned, in search of distribution data for their *Reef Fish ID* books, came to find that scientists didn’t really know the distribution of many fish, nor were the scientists experts in identifying fish other than those they were directly studying. So, they decided to recruit recreational divers and snorklers, who were out visiting these reefs everyday of the year, to collect and report fish biodiversity data to REEF. These data have not only been used to help create the *Reef Fish ID* series, but to date, REEF data have contributed to over 30 published scientific papers, providing useful insight on changing fish population abundances and the distributions of migrating fish populations. Since REEF’s creation, it has expanded into many other facets of the marine realm, including exotic species sighting programs.

One key aspect of REEF’s education programs is the Fish Identification Class. Although a class is not required to start surveying fish, REEF staff and volunteers hold classes for those who are interested. This also provides an opportunity for volunteers to take ‘tests’ that rank their data at a greater expertise level than those who don’t. REEF members who obtain an ‘expert’ fish surveyor level, and remain active surveyors, are invited to join the Advanced Assessment Team (AAT). When REEF is asked to conduct monitoring projects, the AAT is called in for data collection. In the REEF database, both expert and novice data is equally important. Due to the quantity of data that is received by REEF’s citizen scientists, the data balances out into an accurate estimation of fish

population densities. One of my first educational trips with REEF was to the West Palm Beach Women's Dive Club. Leda Cunningham, REEF's Executive Director, gave a presentation introducing REEF's mission and goals. Both the dive club and I learned a lot about what REEF does and what their future goals are during this presentation. It was great to see that the club was very interested in what REEF was trying to do, and were eager to start counting fish!

After the introductory week at the office, Paige and I decided it was time to see what draws people to the Keys: the reefs. Many dive boat operators in the Keys, such as Horizon Divers, Amoray Dive Resort, and Crystal Clear Water Sports, support REEF. These generous operators take REEF interns out for no charge, allowing interns to really immerse themselves in what we are trying to protect. Prior to arriving in Key Largo, I had only dove a couple of reefs – all my other dives had been in flooded quarries, on artificial reefs, and in murky near shore waters. The day of my first dive in the Keys was perfect: the sun was shining and the water was calm and warm. The moment I stepped off the boat, I was amazed at the great diversity of life I was sinking in to. All kinds of brightly coloured fish and coral surrounded us. At that time, I had no idea what any of these creatures were, but I wanted to find out!

Island Sun Splash is a weeklong event held in the Keys to promote local tourism businesses. REEF hosted a couple of basic Fish ID classes as part of the event. I attended a class hosted by Paul Humann, one of REEF's founders and world-renowned marine life author and photographer. Prior to the class, I met up with Paul and helped setup before

the students arrived. Families with young children, eager to ask questions and show off what they already knew about fish, and adults who decided they wanted to know what they were looking at when they were out diving and snorkeling, attended. Paul taught them fun memory clues that help people remember common names of many of the fish. REEF teaches fish common names and families to maximize the participation of citizen scientists. One of my favorite memory clues is for the French Angelfish: the yellow on its scales look like the lights of Paris! After Paul's class, many of the participants headed out to the reef to practice what they just learned.

An important learning tool for the REEF Fish ID class is taking students out to a reef or aquarium after the lecture to actually *see* the fish they have been looking at. This activity, combined with onboard discussions after the dives, reinforces the classroom experience. After Leda taught a Fish ID class to a group of teachers from all over the US, I headed out with them, aboard Horizon Divers boat, to dive and snorkel one of the local reefs. Despite the bad weather and rough seas, everyone really to enjoy the trip. They were all excited to take back their new knowledge to their students, and teach them about some of the wonders of the ocean.

Every year REEF sends AAT members out to collect data for a monitoring project at Stetson Bank in conjunction with the Flower Garden Banks National Marine Sanctuary (FGBNMS). This year, REEF still had one space left on the trip and needed a Scientific Diver to fill it. Since I had achieved AAUS status the previous year, Leda offered the remaining place on the boat to me, and I quickly made arrangements to get to Freeport, Texas. Unfortunately, on the morning the boat was due to leave the dock, Emma

Hickerson, FGBNMS Research Coordinator, emailed the group informing us that the trip had to be canceled due to bad weather at sea. So, instead of heading out to Stetson Bank, I went back to Galveston to spend the week with the folks who work at the FGBNMS. I attended a two-day *Corals to Classrooms Workshop* that was being held for schoolteachers. Kelly Drinnen, FGBNMS Education Specialist, lead the workshop. Initially, she taught participants about the Flower Garden Banks: why they are unique and important, and why we should continue to protect them. She also taught participants how to get their students interested and excited about coral reefs through activities such as making edible coral polyps, building 3D topography maps, and constructing Lego coral structures! The second day of the workshop included a REEF Fish ID Class and trip to the local aquarium to test our fish ID knowledge. My high school biology teacher, Dr. Tina Davies, attended the workshop. It was great to catch up with her and show off what I've been learning! On the final day I spent at the FGBNMS office, I meet with Emma Hickerson. After talking with her for bit, she offered me a great opportunity to come back after finishing my internship with REEF and work as her assistant. Despite the cancellation of the monitoring trip, I learnt some fun activities to interest young students in the marine world, and made some great connections that will help further my pursuit of becoming a marine scientist.

Upon returning to Key Largo, Paige and I took part in the Wellwood Restoration Project. This biannual project was established to monitor fish composition changes over time at the site where the Wellwood ran aground in 1984. These data will be applied to aid in the assessment of restoration sites as replacements for natural habitat. Five

members of the REEF AAT and I conducted transects and roving diver surveys at the Wellwood Restoration site, and the North and South Reference sites (control sites for this particular study). During this project, I was able to dive with very experienced surveyors, which turned out to be a great learning experience for me! As we dove, they would motion me over to show me many unique and difficult-to-identify fish they had found.

During the month of July, REEF hosts the Great Annual Fish Count (GAFC). During this event, REEF Field Stations and volunteers collaborate and host large events all over the world to collect fish survey data. Biscayne Bay National Park in Homestead, Florida, hosts a large GAFC event every year under the supervision of Max Tritt. Leda, Paige, and I were able to attend the event. Leda taught the Fish ID class at the Park, and then we all took the students out to snorkel and dive following the lecture. A wide variety of people came to the event, but everyone was interested and eager to learn. Another local GAFC event was hosted at John Pennekamp Coral Reef State Park. This time it was the interns' turn to teach! This was the first time I taught the Fish ID class, but I took the fun memory clues I had learned from watching other people teach the class, and used them during my lecture. In all, over twenty-three events throughout REEF's survey regions were held as part of the GAFC this year! Through these events, REEF was able to collect a large quantity of fish survey data during the month of July.

One of the highlights of my internship with REEF was working with Ken Nedimyer on his Stag-horn Coral (*Acropora cervicornis*) Restoration Project. Ken works as an aquarist, and started culturing live rock for sale at an ocean aquaculture site. After a

few years, he noticed that stag-horn coral was settling and growing on his rock patches. Molasses reef used to have a high coverage of both stag-horn coral and elk-horn coral, but their numbers have been in a steady decline. Ken decided that, instead of selling the stag-horn coral growing on his rock, he would donate it to the reefs of the Florida Keys National Marine Sanctuary (FKNMS). Ken had participated in a similar project three years earlier that transplanted his stag horn coral onto a module on the Wellwood Restoration site. This coral was flourishing, so he decided to continue his project, but move away from a restoration site. During this project, we collected and cleaned the coral from Ken's aquaculture site, transported them to the Restoration site (a site just off the Wellwood grounding site), prepared and cleaned the areas where the corals were to be attached, epoxied the new corals to the reef, and document the newly 'planted' corals. The Sanctuary Friends Foundation generously funded the project, and provided volunteers with a DVD of the days activities! This unique project was the first of its kind, and served as great hands-on experience in a developing scientific area.

While I was in Key Largo, the lobster mini-season began. The locals describe the mini-season as 'mayhem,' and discouraged us from being on the water during those days. The Biscayne National Park Service annually collects data on catch per unit effort during the mini-season, and enlists volunteers to help sex and measure the lobsters that come to the local docks. I volunteered, along with Park staff and other volunteers, for the first day of mini-season. We were given a brief lesson on how to collect the data, such as determining the sex and size of a lobster, and how to approach the boats and ask general questions about their trip. We also learned that, although the National Parks Service does

not have any legal authority over peoples' catches, we could suggest they 'throw back' the extra, short, or egg-carrying lobster they caught, or inform the nearby police staff! For a lobster to be legally caught its carapace must be 76mm or greater, and females must not be carrying eggs. We started the data collection at 10am, and even that early into the mini-season, boats were returning from a night of lobster fishing that started at 12pm. The data collection was successful, and we were able to collect data from almost every boat that came into the dock. A few boats brought in short lobster, but most people were very co-operative and were willing to throw the lobster back in at our suggestions. The police promptly dealt those who didn't! Marine policies are often hard to enforce for many different reasons, and it was wonderful to see so many people complying with the rules, and those who didn't, receiving the fines promised by the law. However, without the huge support from volunteers like those at the National Parks Service, regulations like those on lobster fishing would be very hard to enforce.

Throughout all the activities and events I've been taking part in, I was racking up my number of dives and surveys. Most of my weekends were spent underwater; trying to further my knowledge of the hundreds of fish I was seeing on each dive. Eventually, the time came to prove my newly learnt fish knowledge by taking the level 3 fish surveyor exam at REEF! Although I didn't get them all right, I correctly identified enough species families and common names to call myself a level 3 surveyor! It is a great feeling to actually be able to look at a fish and say to yourself: 'I know what that is!' or answer your buddy's question on 'what was that strange looking fish I saw?'

Another AAT monitoring project conducted by REEF is the annual Upper and Middle Keys monitoring project, a 15-year time series of fish composition data collected for the Florida Keys National Marine Sanctuary (FKNMS). This project requires divers to survey a set of sites, both protected and unrestricted, using the roving diver technique (RDT). The Upper Keys has ten survey sites, and the Middle Keys has nine. We were able to survey all but four of these sites due to bad visibility, missing coral structures, and boat malfunctions! As I have come to learn, planning for mishaps while conducting research is essential to collecting a complete data set! This was another great opportunity for me to dive with experienced fish surveyors – or ‘fish nerds’ as they refer to themselves! Magnifying glasses and survey slates at hand, they introduced me to many of the tiny blennies and gobies found on the reefs in the Keys. It was inspiring spending time with a group of people who were all interested in a common goal: conserving and protecting the reefs, and identifying fish!

On the final day of the Middle Keys monitoring project, Paige and I setup a booth at the Native Plant Fair, hosted by the Nature Conservancy. Every year, the Nature Conservancy in conjunction with other agencies, gives away thousands of native plants to local residents. This project is designed to encourage people to plant native plants, instead of exotics, that are drought tolerant and hurricane resistant. Every individual who attends the event can leave with two free plants of their choice, but while they wait their turn to collect plants, they come and visit informational booths organized by local environmental groups. After seeing the characteristic dive flag on the REEF logo, many people were interested in coming to talk to us. We signed up lots of new members that

afternoon, and it was wonderful to see that so many people who use the reef for sport and recreation were interested in doing what they could to help protect and preserve it.

After a week of out-of-the-office adventure, it was time to spend some catch-up time back at the office. There were lots of orders to fill, new members to enter, and emails to reply to! I was determined to be ranked as an 'expert' fish surveyor before my internship with REEF was over, and time was running out. After the Upper and Middle Keys monitoring projects, and all the hands on learning I was able to do with the survey team, I felt it was time to take REEF's level 4/5 test. When you successfully complete this exam, and complete a required number of surveys, your data become listed as 'expert' in the REEF database and you are added to a special listserv for AAT members and invited to dive on special projects. As I took the test, I was actually quite shocked at how many of the fish I knew! I passed the test section as a level 5 surveyor, I just have to complete a few more surveys to be official!

The time was coming for Paige, the other REEF intern, to head back to school for the fall semester, and a new intern to arrive. Erin, an Environmental Science graduate from Duke University, arrived just in time for some quick training before Paige headed home. REEF relies heavily on its interns, using them not only in the summer, but spring and fall too. REEF interns are responsible for a lot of REEF's day-to-day office duties, such as order filling, new member entry, E-News list serve updates, and member services. When I started interning at REEF, the previous interns had already left, so we had to muddle through our duties until we figured out what exactly we were doing!

Having Erin arrive before I left provided a great opportunity to pass on the ‘intern knowledge’ and current projects we had underway. This will hopefully help at REEF HQ in the transition from the summer to the fall interns.

When I started my internship with REEF, I was excited about getting to know how a non-profit operates, getting some hands on experience with marine education programs, and finally getting to know some of the fish in the Caribbean! With the support from Our World-Underwater and REEF, I have had the opportunity to meet dedicated and inspiring people, learn about hands on marine conservation and education, and participate in some amazing projects. This internship, and all the opportunities it has provided me with, has inspired me to continue my pursuit of a career in marine conservation education and research.



Stag Horn Coral Restoration Part I: Cleaning the coral base in preparation for transport.



Stag Horn Coral Restoration Project Part II: Transporting corals to restoration site.



Stag Horn Coral Restoration Project Part III: Preparation of site to receive coral transplant.



Stag Horn Coral Restoration Project Part IV: Epoxy coral to restoration site.



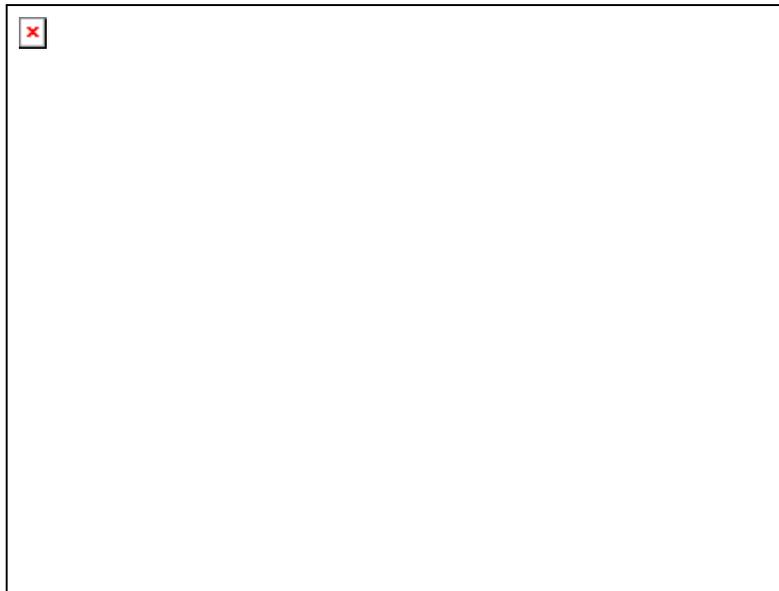
Stag Horn Coral Restoration Part V: Measure and record size data of new coral.



Max Tritt, from Biscayne National Park, measuring and sexing lobster during the lobster mini-season.



REEF AAT members participating in the Upper Keys Monitoring project.



REEF AAT members participating in the Middle Keys Monitoring project.



Joe Cavanaugh, REEF Field Operations Director, conducting a fish survey.



REEF information booth at the Native Plant Fair.