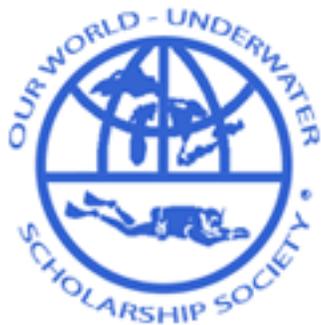


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Our World-Underwater Scholarship Society
REEF Internship Summary Report
2011



As any college student knows, the search for internships and summer jobs can be quite daunting. Hours of web searches, phone calls, resume writing, and possibly tears can all pay off, I'm proof of that. I must admit that I got a bit of a late start looking for summer opportunities, my first semester of graduate school at Indiana University (IU) had been, well, excruciating. I hadn't had much time to even see the light at the end of the tunnel that is summer, let alone be looking for great internships. As spring semester started, I finally got around to beginning my search. I knew of the Our World-Underwater Scholarship Society (OWUSS) because the 2010 North American Rolex Scholar was an IU alumnus. I checked out the opportunities through OWUSS and seeing the REEF internship, I knew I had to apply! Because of the late start in my internship search, the deadline was dangerously close. It was a mad scramble to get my application materials in on time but I did it! Then, as with most applications, I just had to sit back and wait.

A couple months later, just when I thought all hope was lost, I got an email from Alecia Adamson, the REEF Internship Coordinator, wanting to set up an interview. Ultimately, I heard the good news from Alecia and George Wozencraft that I had been selected for the OWUSS REEF internship. It had turned out that in a matter of days I had been offered another great internship, but I knew that OWUSS and REEF were both great organizations and that I couldn't go wrong with them. I happily accepted the internship and started immediately daydreaming of Key Largo!

The 20 hour drive from Indiana was not something I was looking forward to but luckily my boyfriend, Josh, found great opportunities working on his master's project at John Pennekamp Coral Reef State Park and interning with the Coral Restoration Foundation so he was going to be able to make the trip with me. We set out as soon as

finals were over and in three days we were in sunny, southern Florida. However, this was not the start of my internship yet! Thankfully, both OWUSS and REEF were very accommodating when I explained that I had a fieldwork course in the Dominican Republic (DR) for two weeks in early May. Josh and I drove down to Miami and flew to the DR for two weeks of scientific diving with the Indiana University Underwater Science Department. In the Dominican Republic, I was able to learn first hand about buoy creation and maintenance, park development and management, site mapping, lionfish, and help develop three shipwreck sites including the actual shipwreck of Captain William Kidd's *Cara Merchant*! It was a great two weeks, but unlike most people packing up to leave, I had something just as wonderful to look forward to!

Getting Started at REEF

After arriving back in Miami, we finally made the hour drive to the Florida Keys! It was so amazing driving over the bridges for the first time and experiencing the laid back Keys lifestyle. We had our first American meal in two weeks then got settled in. The next day I was off to REEF! I was very lucky on my first day to be able to sit with Jamie and Catherine, the spring REEF interns and learn 'the ropes' from them! Their input, suggestions, and welcoming words were so helpful! On just my third day I was already in the water surveying fish with another past intern and my first dives in the Keys did not disappoint. Spotted eagle rays, several large grouper, sea turtles, and more fish than I had ever seen all on my first dive! I knew this was going to be an amazing summer! The next week the other summer intern, Julianna, arrived and we quickly began learning the in's and out's of the office and how to do the miscellaneous office tasks like answer phones, sell items from the store, work with visitors, etc. We jumped right in and felt at home in the

REEF office in no time. Learning fish also started immediately and after my first week I took the first fish ID quiz and became a REEF Level two surveyor.



Preparing to do a fish survey



Doing a REEF fish survey

As I got started at REEF, I noticed that the 'Intern Survival Kit' could use some updating. REEF relies heavily on interns, who switch out three times a year. I personally hate to bother people with miscellaneous questions I know they have been asked before so I decided to create an intern guide of all the things I had to ask about. I hope this resource

can help REEF interns and staff get off to a productive start. I included in it detailed descriptions of all we do at REEF, including step-by-step instructions to update the website.

Updating the website was always an interesting experience. As I am no pro at HTML coding, this was at times challenging, but very rewarding when things actually turned out! This summer I was also responsible for keeping the REEF online events calendar updated. This included keeping all upcoming REEF, lionfish, and Great Annual Fish Count events up to date. To better publicize these events, I posted regularly on the REEF and REEF Lionfish Invasion Facebook pages and publicized the pages to get more 'likes' and followers. On the website I also was responsible for adding articles to the "REEF and Lionfish in the Media" page. This page is a comprehensive list of news articles and stories that feature REEF and the lionfish invasion. Doing this really taught me how much the media and everyday people look to REEF for information on lionfish. This gave me the idea to develop a media kit for the REEF website so that journalists could quickly get the information they need about what REEF does in regard to the lionfish invasion as well as other projects. I created this page on the REEF website and added information on REEF staff including biographies and contact information. Similarly, I created a Media Contact Spreadsheet so REEF could quickly and efficiently disseminate their press releases. I organized this sheet into geographic areas so that, in the future, REEF staff could select the appropriate tab for the media contacts of the area where the event is being held (Ex. Lower Keys only) or for larger geographic regions (Ex. All Southern Florida).

Special Projects

In addition to publicity and website maintenance, some special events occurred during my internship at REEF that I was able to experience and be a part of. REEF Fish and

Friends is a monthly open house at REEF Headquarters in Key Largo that features speakers and all things fish for local fish lovers and marine enthusiasts. In June, I was able to see an amazing underwater photograph presentation. Despite having been to only one Fish and Friends previously, Julianna and I set up the July Fish and Friends as all-star REEF volunteer Nancy Perez, who normally runs Fish and Friends, was participating in the first ever REEF survey trip to Fiji. REEF's own Alecia Adamson gave this presentation and focused on The Great Annual Fish Count, an annual month long event that occurs every July. This event is an annual push to collect fish abundance and species data in addition to REEF's year round volunteer survey project. Started in 1992 and loosely based on the Audubon Society's Christmas Bird Count, REEF leads the effort to collect extra fish data every July to enhance the REEF fish database. This event is also important because the consistent increase in data every July helps researchers to better monitor annual fish population fluctuations.

The Great Annual Fish Count (GAFC) was a big part of my summer as I organized events and did outreach. I was able to set up fish ID classes at several local dive shops that also serve as REEF field stations. After writing a press release and creating a poster to publicize these free events, I taught fish ID courses to recreational divers then led them on fish survey dives in the afternoon. As I was used to working with the public from my last two summers in the National Park Service, it was great to interact with the public and teach them something I loved. Fish surveying is an oddly gratifying experience and teaching others how to identify fish and add another enjoyable aspect to their dive is very exciting. I also took to the REEF social media sites to publicize these events and reached out to

organizations like the Florida Keys and Key West Tourism Council to publicize these events on their Facebook account that has over 35,000 followers.

As part of the GAFC, I also represented REEF and taught a fish ID course in Miami for the Miami-Dade Reef Guard Association. This group focuses on protecting the reefs around Miami and does annual monitoring of the wreck trek sites off of Miami Beach. I taught their volunteer surveyors basic fish ID's and joined them on their survey dives. This group was very excited to learn fish and put their skills to use and diving in Miami was great! GAFC events kept me busy in July but I was able to meet many great people and encourage them to survey and submit data to REEF's database.



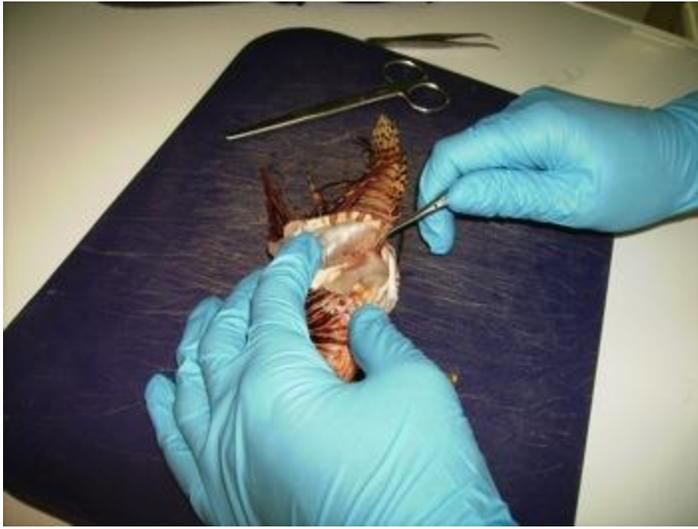
Teaching a fish ID course to the Miami-Dade Reef Guard Association

Lionfish

Another large part of the outreach and work in my summer was in relation to the lionfish invasion in the Western Atlantic. In my first week I was dissecting lionfish looking at their stomach contents. After measuring their length and weight we would extract the stomach and attempt to identify the fish, if any, in their stomach. We also took a gill snip to be sent off to a researcher in North Carolina for genetic testing. A trickier part of the dissection was extracting the otoliths, or ear bones, of the fish. To get the otoliths, you must cut through the skull at the precise place and look for the small, and I do mean small, clear oval shaped bones hidden in the muck of the lionfish cranium. Because it is sometimes so challenging to get both otoliths we would often celebrate our triumphs or streaks of however many fish with both otoliths removed. These too were sent to North Carolina where they are cut and further dissected by researchers. Because fish lay down a layer of cells on the otolith every day, researchers can count the number of layers, much like counting tree rings, and tell how old each individual fish is.



Lionfish dissections



Determining the sex of the
lionfish

Removing the otoliths



Removing the otoliths

Aside from dissections, I was able to assist in the planning of several lionfish derbies, where participants form teams to see how many fish can be captured from the reef in one day for prizes and award money. Soliciting sponsorship and raffle gifts, ordering t-shirts and plaques, and registering participants were all regular tasks. After derbies, I was responsible for creating a spreadsheet that listed each lionfish size by team and creating graphs to show the lionfish size distribution. My other lionfish obligations included taking lionfish sighting reports by phone and compiling a monthly report of all the sightings that come in to REEF through various means. These reports are important to monitor the invasion and also to help us understand what kind of habitats lionfish prefer, and combined with the dissection data, how much and what they are eating.

Outreach

Despite the effort to remove lionfish, I've learned in my time at REEF that one of the most powerful weapons against these invasive fish is knowledge. At REEF, I spent a large amount of my time doing outreach relating to lionfish. I was able to assist in a REEF lionfish workshop, where people can come to learn about the biology of lionfish, the history of the invasion, and how to safely and most effectively remove the fish without being stung by their venomous spines. At the end of the workshop, after passing a quiz, participants (myself included) received a permit issued by the Florida Keys National Marine Sanctuary (FKNMS) to remove lionfish from the special protected areas within the FKNMS.



At a lionfish workshop with our sample lionfish

Lionfish outreach also occurred in less structured ways. I volunteered at a mini lobster season information kiosk sponsored by the Florida Fish and Wildlife Conservation Commission (FWC) where I provided information on lionfish. Thousands of novice lobster catchers swarm the Keys for this two day lobster season before the commercial season opens. Many stop at the REEF kiosk to get information on new regulations of the mini season. I was able to share information about lionfish, which they were likely to encounter in their quest for lobster, and encourage them to remove lionfish after their lobster quota was met. During this time, I was also able to talk with FWC officer Bobby Dube about his job and the challenges facing the FWC in the Keys. He shared stories of some of the 'busts' they have made of people illegally harvesting lobster and other fish. These stories were both frustrating and good to hear. I am frustrated when people abuse our resources, but

proud and happy to know that our law enforcement officials are working hard to enforce the rules and regulations that protect our marine resources.

Quite often, while out on dive boats doing survey dives, I would end up giving mini lionfish lectures. Visitors to the Keys were often very interested in these creatures they knew very little about. These divers and snorkelers would be very interested if one of the fellow divers was able to remove a lionfish off the reef. It is my hope that many of these people will share their experiences seeing and learning about lionfish with their friends and dive buddies at home and spread awareness.

Volunteering

Another amazing part of the REEF internship was the weekly volunteering. REEF encourages interns to spend a half-day or full day in the field each week volunteering with various conservation organizations. I was able to combine lionfish outreach and volunteering by working with John Pennekamp Coral Reef State Park in Key Largo. The park is one of the most heavily used Florida State Parks and houses a small yet impressive aquarium in its visitor's center. In my first visit to the park I noticed that they had tank housing a few lionfish with a small sign offering some bullet points of information on the lionfish. I offered to redo the signs for the tank with information on what lionfish are, how they got here, why they are bad, and what can be done to limit the damage of their invasion. I believe that this is a wonderful opportunity to share correct information with children and adults from all over the world about lionfish, while live specimens could be viewed at the same time!

Early in the summer I worked with the Marine Mammal Conservancy (MMC). On May 5th, 24 Pilot Whales stranded in Cudjoe Key, Florida. Several of these whales were

immediately released, several died, and several were brought to the MMC facilities for rehabilitation. These whales were not in very good shape and required around the clock assistance to stay afloat. This meant that volunteers physically supported the whales in the water to keep their blowholes above the water line. These whales were over ten feet long and weighed several tons. At least four volunteers were needed for each whale 24 hours a day. I volunteered at the MMC to hold whales several times. This involved wearing wetsuits and standing in chest deep water in several 'positions' to support the whale. It was a once in a lifetime experience to get in the water and actually support a pilot whale. It was so amazing to be standing between two whales using different grunts and whistles to communicate with each other and testing out their sonar. By mid summer, two whales had been euthanized due to deteriorating health, two released, and one transported to Sea World because it was deemed unable to be released.

I was also able to spend a day volunteering on the water with marine biology technicians from Biscayne National Park. These technicians were completing a project checking that their Geographic Information System (GIS) bottom substrate data was correct. They had over two hundred pre-selected points to visit and physically check that the bottom substrate matched that given on maps. The day I volunteered they had only eleven points to go. To check each point, we would navigate to the point using GPS and drop a weight with a small buoy attached to mark the specific point to be checked. The technicians snorkeled shallow spots and donned diving gear for deeper areas. After one hundred and eighty-nine spots they were very efficient and quickly in and out of the water. After completing these spots, we were able to visit several locations to snorkel, observe fish, and capture lionfish. This day was so much fun, not only because I met many fun

people and learned about their work, but the visibility and calmness of the water was simply amazing. The water was crystal clear and looking off in the horizon you could not even tell where the ocean stopped and the sky started. It was also an interesting day because, after spending the previous two summers doing interpretation work with the National Park Service, it was great to see what other divisions of the NPS do and visit a park that was created to preserve amazing marine resources.



One of our snorkel spots while volunteering with Biscayne National Park



Biscayne NP Biological Science Technicians and other volunteers

Although these experiences were great, I think my favorite volunteering days were the ones I spent with the Coral Restoration Foundation. This organization is a non-profit based in Tavernier, Florida that works to restore the *Acropora cervicornis*, or staghorn coral, population in the Keys. This coral is endangered and threatened by the many challenges facing our reefs today including global warming, ocean acidification, and irresponsible anchoring (among other things!). CRF maintains a coral nursery with over

ten thousand coral specimens. They also develop different strategies to find which growing method supports the healthiest, most robust coral. I was able to learn about how their methods have progressed through the years and about the different genetic specimens of coral they use. I was able to volunteer in the office making tags that are attached to each piece of coral to identify their genotype. I was also able to dive with CRF on several occasions in their Tavernier nursery (they also have a nursery in Key West).

The coral nursery is, in simplest terms, impressive! As you descend to the seafloor the nursery stretches as far as the eye can see. The nursery started growing corals on small posts but over time they have found that coral on trees and line nurseries grow much better. During my dives with CRF, I was able to attach coral to large fiberglass pipe 'trees' where they can grow from small to large. I was also able to take freshly cut pieces of coral and attach them to a line nursery, which basically looks like a clothesline suspended with buoys from the ocean floor with multiple lines. I also spent time cleaning algae off the tags and wire holding the coral to the lines and trees. This is necessary for the coral to thrive. Eventually these corals are transplanted to local reefs. This is done using epoxy. CRF has been so successful in some of their early transplants that they have been able to expand their projects to new reefs.

Another time diving with CRF, Josh and I had the task of cleaning out some of the debris. This involved moving large cement blocks, rebar, and other debris to the underwater debris pile. While this wasn't the most glamorous task, I've never enjoyed hauling trash around so much! We eventually worked out a system of using the rebar to walk multiple cement blocks at once to the pile. Despite fighting fire coral and other small critters that were upset with us for moving their cement block homes, this task was fun.

Walking on the seafloor is a unique feeling and being able to just jump up and float in the water is able as close to flying or walking on the moon one gets here on Earth.



The CRF nursery

Of course, I can't leave out one of the greatest parts of volunteering with CRF, getting to work with Stephanie Roach the 2008 Our World-Underwater Scholarship Society REEF intern. Steph now works full time with CRF and served as my point of contact with OWUSS for the summer. It was so great to have her to talk with and answer my questions about the Keys, CRF, REEF, and OWUSS. As we have very similar interests, it was also nice to learn about her experiences and get tips and ideas for the future. I was so lucky to have her as a coordinator and friend during my internship.

Conclusion

As September approaches, another school year creeps in, which of course means the end of my internship. I can't even express how quickly this summer has gone but as they say, time flies when you're having fun! I have learned more than I ever could have

imagined about fish, coral, and marine life and conservation. I've met amazing people, made valuable contacts, and grown personally and professionally. I've learned to ID over 100 fish, completed over 30 fish surveys and 40 dives, and met amazing people like Paul Human, founding chairman of the board of REEF and author and photographer of the amazing REEF Fish ID books.

As I leave the Keys I have many people to thank. First and foremost, I'm so thankful for the Our World Underwater Scholarship Society for giving me this wonderful opportunity. George Wozencraft and Martha Sanders have been more than helpful and truly a pleasure to work with. My entire experience with them and OWUSS has been simply amazing and I feel so lucky to have had the honor of receiving an OWUSS internship.

I also thank Alecia Adamson, REEF Internship Coordinator, and Lad Akins, Director of Special Projects at REEF, they have been amazing to work with and I have learned so much from them. Thanks go to Julianna, my fellow intern, as well as Debbie, Jane, Nancy, Janna, Christy, Sasha and everyone else at REEF for answering questions and helping me with my projects during my internship. REEF is truly a special organization and I am so thankful for being given the opportunity to work with them. I would also like to thank Key Dives and Rainbow Reef for sponsoring the REEF internship by letting me dive this summer to do survey dives. A big thanks also goes to the great people at Horizon Divers in Key Largo for allowing me to dive with them and for hauling me out to the reef on most weekends to survey!

I would also like to thank the organizations I volunteered with, Pennekamp State Park, the Marine Mammal Conservancy, Biscayne National Park, and the Coral Restoration Foundation. A huge thank you goes to Stephanie Roach for serving as my internship

coordinator for OWUSS. Your assistance throughout my internship made the entire experience that much better!

I head back to Indiana with a heavy heart because let's face it, who ever wants to leave the Keys!?! However, I go back for my last year of graduate school knowing that my time and hard work our worth it and that I am headed down the right path. More than anything I am thankful for this internship for confirming, once again, that marine conservation is a worthy path and the right one for me. My experiences this summer will never be forgotten and have made me a better student, scientist, and person. I look forward to using my experiences at REEF to educate others and make a difference in the field of marine conservation, and I owe so much of that to OWUSS for giving me the opportunity.

