

# **Our World-Underwater Scholarship Society®**

## **Dr. Jamie L King Reef Environmental Education Foundation (REEF) Marine Conservation Internship**



**Ben Farmer**  
**2019**



# Our World-Underwater Scholarship Society®

## 2019 REEF Marine Conservation Internship

### Final Report



May 26<sup>th</sup>, 2019 – this was the day that I would finally be making the departure from Lexington, Kentucky to REEF in Key Largo. I had heard so much about REEF, a marine environmental conservation nonprofit, over the past couple of years that when I was offered an internship through Our World-Underwater Scholarship Society (OWUSS), it felt surreal. As I ate a farewell breakfast with my parents in Lexington, it really started to sink in that I would be making a return to the coral reef ecosystem I had fallen in love with a couple years prior. In Bonaire, the Dutch Caribbean island where I had studied abroad in 2017, I gained an unforgettable introduction to the realms of marine science, scientific diving, and coral reef ecology. REEF would provide a chance for me to become an improved communicator about all these things I had come to cherish in the underwater world. Founded in 1990, REEF’s mission is to protect the marine world by engaging the public through citizen science, education, and collaboration with the scientific community. All four of its main projects, the Volunteer Fish Survey Project, Education Program, Invasive Lionfish Program, and Grouper Moon Project, would appeal perfectly to my scientific interests. That is a lot to pack into one summer!

But first, I had to make the actual drive. It was a combined 17 hours down to Key Largo, which I split among a couple days, staying with a friend in Orlando. Nothing quite compares to the unmistakable scent of salty air as you inch closer to the coast – I had experienced it plenty of times growing up, on trips to the beaches of New Hampshire and South Carolina. But being able to finally do so en route to the Keys was just a little different. Kitschy business advertisements and gaudy neon signs welcomed me as I rolled into Key Largo late at night, my mind racing,

**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



excited for the summer of diving and outreach that awaited. The following day, May 28<sup>th</sup>, would be the first of many early rises for work at REEF.

From my first tour of the REEF headquarters that day and an introduction to all the staff, I knew I had found what I was looking for. The model of a conservation nonprofit is well exemplified at REEF HQ – smartly designed placards are placed throughout the property detailing the ecology of the Florida Keys; one is greeted at the front entrance by an array of marine life identification books; staff are located behind cozy desks peppered throughout the small building. Over the course of the first few weeks, the other three Marine Conservation Interns (Matt, Kate, and Stacey) and I would quickly realize that our jobs would be fairly all-encompassing. Whatever was needed around the office, from updating outreach materials, to cleaning up the garden, to sending out postcards to REEF volunteers who went on fish survey trips in the tropical Pacific, often came on a need-to-do basis.



*2019 REEF Interns, left to right: Matt, myself, Stacey, Kate. This was taken right before our first fish survey dives, with Rainbow Reef Dive Center*

**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



Generally, my tasks were split between three major programs at REEF. The first, the Volunteer Fish Survey Project (VFSP), is what immediately caught my interest. The VFSP was created in 1990 in collaboration with The Nature Conservancy, in an effort to document the presence and abundance of fish species around the world. Divers are encouraged to contribute as citizen scientists to this expansive project, which has come to define REEF's mission to conserve marine habitats. The vast amount of data collected by volunteers contributes to research that informs policymakers and resource managers about how best to provide for local habitats. While studying abroad in Bonaire in 2017, I gained a wealth of knowledge on marine species identification in the Tropical Atlantic as part of my coursework. That was a crucial part of what got me hooked on the underwater world. Since then, I have been looking for ways to help make that same gateway more accessible to my peers. Through a project I developed as part of the VFSP, I was able to fulfill that goal. With the advice of David Ehlert, the Education Lead Intern, I developed Quizlet online flashcards for more than 250 fish species. These flashcards would then be integrated into the REEF website with the generous help of two senior staff at REEF, Janna Nichols and Christy Semmens (the Citizen Science Program Manager and Director of Science, respectively). That could have been the culmination of the project and I would have been happy, but since I have left it has continued to expand. Since I departed in mid-August, several other interns, as well as REEF volunteers put together Quizlet sets for three other regions: the Pacific Northwest, Hawaii, and California. The VFSP is run by REEF volunteer divers who submit surveys detailing the species abundance of fish in regions all over the world, so integration of these Quizlet training materials was both an exciting and global endeavor.



**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



*The REEF Volunteer Fish Survey Project is truly global. Volunteer divers submit surveys of species presence and abundance from 11 survey regions*



The second major program at REEF that I became involved in was the Education Program. My fellow interns and I were tasked with learning each of REEF's outreach programs and then presenting them to young crowds in the following weeks. My favorite was the Florida Keys Ecology lecture, which wraps together many of the things I had learned about in Bonaire: the importance of mangroves as protectors against surge in major storms, ecologically vital species found in seagrasses, and the different types of coral reef systems. More challenging, though, were the fish identification and invasive species lectures. Gaining experience in front of student and youth groups showed me how well I had to know the material myself, in order to properly relay the information and get crowds engaged. I enjoyed the challenge and improved my communication skills in the process.



*Not all of my time in the Interpretive Center was spent giving lectures – sometimes an average day meant helping a little dude identify a Nassau grouper!*

**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



My favorite portion of the Education Program, however, was helping put on REEF's Ocean Explorers Summer Camp at John Pennekamp Coral Reef State Park. As I touched on in my third and fourth blog posts, I fell in love working with the kids during those two weeks alongside David and REEF's Education Program Specialist, Brittany Parker. Kids in the 8-12 range can be a challenge, but with time I embraced the process of getting to know each kid and their experience with the underwater world. Summer camp activities ranged from going out on kayaks in the mangroves, to viewing fish through a glassbottom boat, to simply creating some tie-dye shirts. I never knew how much work washing and preparing tie-dyes for a group of 15 kids was until this, summer, that's for sure. The great thing about camp, however, was the more work you put in, there was almost always a tangible reward because of how excited the kids got about even the smallest things. One of the kids was so endeared by the sunglasses and buff that I wore to work that she made a habit of trying to grab them when I wasn't looking. Initially this was a bit annoying of course, but when I saw how proud she was marching around with her oversized shades, I couldn't stay upset. At the end of the week, with Brittany's encouragement, she ended up buying her very own set of sunglasses and a buff from the Pennekamp Gift Shop. It doesn't get cuter than that.



*Kayaking the mangroves with the kids. My fearless leader in the front liked to take the charge with paddling!*

**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



There was also something therapeutic about taking a break from the office for a week to focus entirely on exploring the outdoors with kids who may have never seen these things before. We were there to help kids build their love of not only the ocean, but the Keys as a whole. This was not too hard really, especially when campers were enthralled with things like tracking down unique surgeonfish species, as part of a scavenger hunt in the small indoor aquarium. Each new discovery for them felt like a huge win for me; the kids often were quite good at remembering the information we handed them. The most rewarding part was seeing them bring their existing knowledge about the fish and coral of the area (which was often surprisingly extensive), and continue to develop that curiosity. It often reminded me of a summer camp that I participated in back home in Kentucky as a kid, out on a large farm called Pepperhill. There, I became great friends with kids from all over central Kentucky and where we learned everything from horseback-riding to archery. Much as this integrated us into the outdoor world of Kentucky, Ocean Explorers Camp helped kids in Key Largo get in touch with the beautiful mangrove, seagrass, and coral reef environments around them.



*Left: Campers take in the sights aboard the glassbottom boat*

*Above: Brittany, Amy, and Matt help the kids make slime! All kinds of marine species produce "slime," from eels which use it to fit in crevices, to parrotfish which use it for protection from predators*



**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



I enjoyed the camp experience so much in the first week that I ended spending my last week at REEF in early August helping out with a second week of Ocean Explorers Camp. While I know that such experiences are so fleeting from the perspective of kids, hopefully the other interns and I made some small impact on their views of conservation and the natural world.



The third major program at REEF was the Invasive Lionfish Program. This program was the most interactive with the local communities. I realized through working with Dr. Alli Candelmo and Madelyn Mussey (Invasive Species Program Manager and Invasive Species Program Lead Intern, respectively), how invested both the Keys and the entire Florida fishing/diving community is in removing the threat of lionfish. Lionfish invaded from the Indo-Pacific, potentially via aquaria release. Unlike many exotic marine fish species, lionfish became established, spread rapidly, and began to wreak havoc on fish populations, mainly in the Tropical Western Atlantic region. Humans are the only true predators of lionfish outside of their native tropical Pacific range, so it is up to us to control their devastating impacts on the food chain. To facilitate this endeavor, REEF has put on derbies since 2009, in locations spanning the entire



**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



coastline of Florida. Derbies are open for groups to assemble for single day competitions, where they remove as many lionfish as possible in that time period. This can be done with pole spears or hand nets, via scuba diving or snorkeling. Participants range from those casually participating as part of the fun, to seasoned fishers with a keen knowledge of the best locations to spear. Awards are provided for the groups hauling in the biggest and smallest lionfish, as well as the largest amount of fish.



*Me spearing my second lionfish off the coast of Ft Lauderdale. Notice how my hand is not actually around the spear – the lionfish could have swum off with the spear in it (I was learning!)*

*Photo by Tom Sparke*

Because of the threat of a tropical storm over Sarasota in July, our intern group only ended up doing one lionfish derby over the summer. The interns all drove up to Ft. Lauderdale Friday, June 28<sup>th</sup>, talked briefly at our Airbnb, and promptly crashed after the long drive. Saturday consisted of attending a workshop run by Alli, which covered the biology of lionfish, how they invaded the Caribbean (thought to be through the aquarium trade, ballast water, or some mix of the two), and how to safely collect them. After that, things got really fun – though it was raining hard outside around noon, we waited it out and eventually were cleared to go out for

**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



our very first lionfish hunts! These dives ended up being some of my favorite I have ever done. The captain took us out south of the shores of Ft. Lauderdale, and by the time we splashed in, the skyline of Miami was well in view. Plunging to 80 feet of depth, I began my first ever drift dive! Following Alli, we sought out lionfish to spear. I speared two on that dive, both pointed out to me by more experienced hunters. The rush was exhilarating. Each and every dive is an exercise in exploration, but this one in particular was quite memorable for me.

On Sunday, teams brought in their fish to be counted and measured. My job was mainly to haul the hundreds of lionfish that groups brought in via coolers onto tables, and then help write down their measurements, provided by Madalyn. These data are used to identify the sizes of lionfish over the years, in locations around Florida and the greater Gulf area. Lionfish sizes are trending downward overall, which is likely a sign that REEF's derbies are making a positive impact – lionfish in general appear to not be surviving to an age where they are capable of eating huge amounts (and thus becoming as large as before). Nevertheless, awards were handed out for biggest catch (1.3 feet in this derby!), smallest catch, as well as most fish brought in. The groups were all very happy to contribute to the event and learn more about invasive species. As the marine ecosystems of the Florida Reef Tract and Gulf of Mexico continue to contend with invasive species, nutrient runoff, pollution, and climate change, endeavors such as lionfish derbies which engage the public in environmental initiatives are going to be crucial.

**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



*Me and Madalyn handling lionfish at the Derby, with team members looking on.*

*Photo by Tom Sparke*

Outside of the three main programs put on by REEF are a bevy of collaborative and volunteer opportunities. As part of the intern experience, REEF allows interns to spend time volunteering with other organizations and agencies to expose them to career opportunities. One opportunity early on in the summer came through Coralpalooza, an event put on by Coral Restoration Foundation (CRF) in Key Largo, where families were invited to visit environmental organizations throughout the Keys. REEF had a mock fish survey game set up in our Interpretative Center, and we were lucky to have many young children stop by. Stacey and I also later volunteered with CRF via four scientific dives. CRF is a nonprofit in Key Largo, dedicated to the conservation and restoration of corals in Key Largo and Islamorada. We assisted with their initiative of propagating, growing, and outplanting *Acropora palmata* and *Acropora cervicornis* (Elkhorn and staghorn coral, respectively), as well as other coral species.

**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



*Elkhorn coral (Acropora palmata) stored in seawater after being we harvested it that day at the Tavernier nursery. The following Monday, these fragments would be outplanted on the reef!*

On our first CRF dives in June, we helped clean coral “trees” that were rigged up with growing coral fragments, using chisels and brushes. On the second dives in July, we harvested the more mature corals from these trees and prepared them for outplanting. I had been looking forward to volunteering with CRF for a long time; this was a very satisfying experience. Even handling coral up close and personal is a radical departure from the conventional wisdom of never touching corals (generally a good move). Later in the summer REEF also had its own big fundraising event in Key Largo, called Rockin’ the Dock. Held at Sharkey’s Pub and Galley under Rainbow Reef Dive Center, there were all kinds of sponsors who set up tents with refreshments: Florida Keys Brewing Company and Captain Morgan were a couple. My role at the REEF tent was to greet visitors and get them signed up as REEF members, as well as offer T-shirts, silicone pint cups, and even plushies. Everyone had a good time there!



**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



*A glimpse of the reefs I saw almost every day out on the boat toward the end of the summer, either during Ocean Explorers Camp or diving with Key Dives*

REEF interns have the excellent opportunity to dive anywhere in Key Largo or Islamorada, with the understanding that they perform fish surveys and educate the charter customers about REEF's missions. In doing so, I often found myself in conversations with people from around the world, wondering about the fish they were seeing underwater and how they could contribute to what REEF was doing. Being able to get these people excited was a very rewarding part of the internship. Most of my diving throughout the summer was done with Key Dives, in Islamorada, however, and my time with Key Dives was a bit of a departure from this model. Instead of survey diving, I achieved a professional certification with them. I had the fantastic opportunity to achieve Divemaster (DM) certification, and I could not have asked for a better shop or group of instructors to do it with. They pushed me to be the best version of myself

**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



both in the water and out on the boat, in what would become one of the hardest things I have ever done. This meant becoming a better and more focused diver, assuming the responsibility of divers who in many cases were tourists with barely any experience in the water before.



*Introducing new divers to reef-scapes like this never got old.*

I walked away in mid-August with my DM training complete, ready to move into the underwater world as a professional dive leader. Mike, Cortney, and all the other instructors at Key Dives went out of their way to make sure I was fully prepared for what being a DM entails, and I am forever grateful for their commitment and patience.

That leads me to my final point – the next step for me is back into the world of education abroad. Bonaire is what kicked things off for me as a marine scientist back in 2017, and now I have returned to the Caribbean to help make such experiences possible for my younger peers. I am currently a Waterfront Assistant with the School for Field Studies in South Caicos, one of the

**Our World-Underwater Scholarship Society®**  
**2019 REEF Marine Conservation Internship**  
**Final Report**



six inhabited islands of the Turks & Caicos. Everything I gained in terms of teaching and dive-leading experience as a REEF intern will be integral to my work here. I cannot thank everyone at REEF enough for this. Contributions and opportunities taken by REEF interns can have a lasting impact long after each intern has departed; I am so excited to see what future interns pursue, and to meet them in the future. I know that with the tools provided by REEF and OWUSS, they will go on to achieve excellent things in the underwater world!

**Acknowledgements**

I would like to acknowledge everyone involved with REEF and OWUSS, who helped me immensely along the way:

Brittany, Education Program Specialist (REEF)

Martha Klitzkie, Director of Operations (REEF)

Janna Nichols, Citizen Science Program Manager (REEF)

Christy Pattengill-Semmens, Ph.D., Director of Science (REEF)

Mike Ryan, Courtney Benson, Caterina Natale, Jason Adams,  
Sara Abbott, Justin Hannel; Dive Instructors (Key Dives)

Mike Goldberg, Owner (Key Dives)

John Pennekamp Coral Reef State Park

Coral Restoration Foundation

Jenna Walker, VP Internships (OWUSS)

Ellie Splain, Lead Intern Coordinator (OWUSS)

Martha Sanders, Treasurer (OWUSS)

