

# Our World-Underwater Scholarship

## Society National Park Service Internship

Sarah Von Hoene

2021



Kalaupapa National Historical Park



# Acknowledgements

Few words can adequately describe the immense gratitude I have for everyone who played a role in making this dream a reality. It's incredible what can happen when someone has a supportive and encouraging network of mentors behind them, and I felt like I had the best of the best throughout my internship. First and foremost is Dave Conlin, who not only welcomed me to the NPS Submerged Resources Center (SRC) team with open arms but also went out of his way to provide me with work opportunities when Covid-19 delayed my internship. He, Brett Seymour, Jim Nimz, and the entire SRC team were pivotal in making this such an unforgettable experience – for it was their unwavering support and encouragement that helped me approach my internship with greater self-confidence and gumption.

I am especially thankful to those who helped me discover a newfound passion for underwater imaging during the course of my internship: Jerrod Popham, who lent me his camera rig and gave me an underwater photography crash course prior to starting my travels; Susanna Pershern, for patiently teaching me valuable camera skills and vouching for my photographic abilities; and Brett Seymour, who entrusted me with an SRC camera rig and consistently provided indelible knowledge, insight, and technical support. I feel incredibly lucky to have been able to spend time with and learn from such kind and talented people.

Speaking of kind and talented people -- OWUSS made me feel like family from the start. Steve Barnett, Martha Sanders, and Shaun Wolfe were particularly generous with their time and support over the course of my internship. I'd also like to thank the former interns who stayed in touch throughout the summer and shared their useful advice with me.

The success of this internship is dependent on the support of the many NPS programs and individuals who agree to host the OWUSS/NPS intern each year. I'd like to express my utmost gratitude to those programs and individuals: Mike Feeley, Jeff Miller, and the entire South Florida/Caribbean Inventory and Monitoring Network (SFCN); the University of the Virgin Islands CMES crew; the Natural Resources team at Biscayne National Park; the Wounded American Veterans Experience Scuba (WAVES) organization; the Natural Resources team and the entire NPS crew at Dry Tortugas National Park; Devon Tyson and Thomas Kelley at Virgin Islands National Park; Kelly Moore and Glauco Puig-Santana in Kalaupapa National Historical Park; and Dan Brown and Scott Pawlowski at Pearl Harbor. I cannot thank you enough for your generosity, patience, enthusiasm, and warm welcomes.

I would also like to extend a special thank you to everyone who followed along on my journey by reading my blogs. The kind comments and remarks I read/heard throughout my internship helped me write through the moments of inevitable jet-lag and exhaustion. I am so honored to have been able to share my experiences with such an engaged and receptive audience.

Lastly, I want to thank the friends, family, and professional mentors who have supported me over the years and made it possible for me to embark on this adventure of a lifetime. Without them, I would not be here today.



# How It Began

**I remember the moment I found out I'd been selected for the NPS/OWUSS internship. A casual evening of dinner and a movie turned into a night of ecstatic celebration after I glanced at my email inbox and saw, "Congratulations on your selection as the 2020 NPS/OWUSS Intern!"**

Life changed that day, but in more ways than one.

On the same day, the World Health Organization officially announced that COVID-19, the virus that had started sweeping across the globe, could be characterized as a pandemic. I was blissfully ignorant of such news when I received the congratulatory email, and I celebrated accordingly. I danced around my living room, hugged my partner, and began processing the fact that one of my biggest dreams had just come true.

I am an explorer at heart, but I am also a conservationist and a scientist. Innate curiosity drives me, though I am steered by a sense of responsibility to do my part in protecting and understanding the natural world -- the ocean, in particular. The OWUSS/NPS internship is a once-in-a-lifetime opportunity to explore the diverse underwater resources within the U.S. national parks while also contributing to ongoing research, conservation, and outreach efforts -- truly a dream internship for a young marine scientist like me.

However, the impacts of the pandemic quickly set in after that night of joyous celebration. Within a few weeks, OWUSS made the wise decision to pause internships for the year. Albeit a disappointment, the silver lining of waiting until 2021 meant that I had even more time to prepare for the internship experience I'd dreamed of having for years.



# Joining Community

“

*It only took a few phone conversations and emails with the OWUSS and SRC teams to realize that I was entering into a close-knit, highly-esteemed group of scientists, divers, and explorers.*

Despite the complications that COVID-19 presented, OWUSS and the SRC quickly made me feel like a part of their communities. OWUSS held virtual meet and greet events, previous interns reached out to express their excitement and offer any help I might need, and SRC Chief Dave Conlin found a way to involve me in ongoing NPS research projects, even hiring me to co-produce a podcast series on marine soundscapes while I was waiting to get the go-ahead on my internship.

I had been searching for this sort of community for years. Coming from college in Boulder, CO, I wasn't privy to the same community that students coming from a renowned marine science

or oceanography university were. I had been quite lucky in finding a small group of marine researchers at the University of Colorado Boulder (and I wouldn't be writing this today if not for them), but I yearned to immerse myself in the greater community of underwater scientists and explorers.

The moment I stepped foot in the SRC headquarters in May 2021, I realized that this internship was giving me the chance to do just that. Primarily a team of archeologists and photographers, the SRC divers have explored lakes, oceans, and shipwrecks all over the country. They're experts in their fields, and they have work-related stories that would make for some crazy movie plots.

The SRC welcomed me and treated me like one of their own from the start. They kitted me out with everything I needed for a summer of diving and worked with me to create a travel itinerary that aligned with my professional interests and took me to some of the most epic underwater national parks the U.S. has to offer.





# Life on the Road



Out of the five internships that OWUSS organizes, the NPS internship is known for being the most travel-heavy. In the span of four months, I took 14 flights across the U.S., worked in six national parks, and spent time on seven different islands -- and that was the “pandemic-lite” version!

I began my internship travels close to home, in Denver, CO. After completing the NPS Blue Card dive exams and getting kitted out by the SRC, I packed my bags and headed to St. Croix, one of the U.S. Virgin Islands. I spent two weeks on St. Croix, working on a

collaborative coral reef monitoring project between NOAA, NPS, University of the Virgin Islands, and The Nature Conservancy. The two weeks on the Caribbean island flew by, but it was the perfect amount of time to figure out what belongings I really needed to lug around for the next few months.

The next leg of my trip was in Florida’s Biscayne National Park, where I worked on two projects -- one with the SRC and the Wounded American Veterans Experience Scuba (WAVES) program, and the other with the park’s Natural Resources team. At that point, I was getting used to

living out of a few bags and moving around every week or so. The travel lifestyle wasn’t glamorous, but bouncing around so much meant that I was seeing a handful of places that I had never been to. On top of that, I got really good at packing my bags.

The third leg of my travels took me to one of the most unique places I’ve ever been - Dry Tortugas National Park (DRTN). The 100 square mile park, located 70 miles west off Key West, FL, is primarily underwater -- seven small islands are scattered throughout the park, collectively adding up to only 143 acres (less

# “Packing light” -- easier said than done when you work in the underwater sciences.



than a quarter of a square mile). The other 99.75 square miles are open ocean and vibrant coral reefs. The park's remoteness alone is confining, nevermind the diminutive acreage of land one can roam. The most challenging part of staying there for 10 days? Having to pack all of my food for the entire trip (there are no grocery stores or restaurants in the park).

It wasn't initially part of the plan, but I ended up flying back to the Virgin Islands after my time in DRTO. This time, I stayed on St. John (and got to spend time on St. Thomas, too). St. John's white-sand beaches and warm blue waters caught the public eye

in the 1930s, causing the tourist industry to take off on the sleepy paradisiacal island. By the 1960s, Virgin Islands National Park had been established, encompassing 60% of St. John and nine square miles of offshore waters. Virgin Islands Coral Reef National Monument protects an additional 20 square miles of open water and coral reefs around the island. I had already seen St. Croix, one of the U.S. Virgin Islands, and seeing St. John and St. Thomas was making me wonder how I could find a way to return to the small collection of islands after my internship. I enjoyed another two weeks in the USVI doing more National Coral Reef Monitoring Program (NCRMP) surveys with the SFCN crew and

the Natural Resources team at Virgin Islands National Park.

After my stint on the East coast, a long series of flights took me to Kalaupapa National Historical Park on the Hawaiian island of Molokai. The Kalaupapa Peninsula sits at the base of a 2,000 ft. sea cliff wall ("pali" in Hawaiian), separating it from the rest of the island. "Top-side" Molokai is only accessible from Kalaupapa via boat, aircraft, or a steep 2.5 mile hike or mule ride up the sea cliffs. Much like



Dry Tortugas, it was an extremely remote and isolated park. These destinations were a bit harder to plan for since you had to stock up on everything before going there, but I noticed in KALA that everyone in the settlement did a great job pooling their resources together when someone needed something

**M**y internship ended on a special, reflective note. Pearl Harbor National Memorial is unlike most of the other parks I visited for my internship. Rather than being full of natural resources, the park is known for its

cultural resources, particularly the USS Arizona and USS Utah wrecks from the December 7th, 1941 attacks on Pearl Harbor. The park is also home to the USS Arizona Memorial, along with a number of other memorials made for the other ships that were damaged during the attacks. While I was there, I was lucky enough to dive the USS Arizona wreck and get a tour of the other park memorials and the museum collections building.

**L**ife on the road had its fair share of ups and downs, but despite the occasional jet

lag and exhaustion, I always felt like I had nailed down a pretty amazing itinerary for my internship. Due to some pandemic-related issues, there were some schedule changes, but as someone told me during my travels, the best way to succeed in this profession is to “maintain a rigid state of flexibility.” Once I took that to heart, the schedule changes and impromptu flight modifications didn’t phase me much.

**T**he number of constantly moving parts of this internship is a lot to handle, but it’s one of the elements of the experience that makes it so unique. I may have been working 10+ hour days on the water, but I also had to handle a frequently changing travel itinerary and all the logistics that went along with it. Working in remote areas like Dry Tortugas National Park and Kalaupapa National Historical Park made that process even more complex. By the end of the internship, I felt like I had made equally huge strides in my traveling ability as I had in my diving ability.





How to travel well?  
“Maintain a rigid state  
of flexibility.”





# Learning Behind the Lens

“

*One of the biggest challenges of working in marine science is effectively communicating and conveying ecological change, and visual communication is an essential part of doing just that.*

One of the main goals of OWUSS is to “foster the development of future leaders of the marine environment”. By exposing interns such as myself to a broad array of activities in the underwater community while connecting them to influential leaders in aquatic disciplines, the society helps interns gain valuable skills and experience that may otherwise be inaccessible. Similarly, my NPS SRC supervisors were focused on giving me every chance to take advantage of the

resources and knowledge they had at their fingertips.

The opportunity that the SRC provides in terms of developing skills as an underwater photographer is unparalleled. I’ve probably used the term “once in a lifetime opportunity” way too many times already, but those were the words that echoed in my mind practically every day of my internship.

I didn’t come into the internship with much photography experience. I’ve always loved taking photos, but had never found the time or money to make photography a more serious hobby, much less a professional skillset. When I learned that I’d been selected to be the next NPS dive intern, I knew that it was my chance -- an opportunity to learn from the best and focus on developing my own underwater photography skills.





After giving me a crash course about cameras and taking photos underwater in general, my partner at the time -- an underwater photographer/videographer -- let me borrow his camera kit at the beginning of my internship. My first project in St. Croix kept me way too busy to even use the camera, but after that I headed to Biscayne National Park for a marine debris removal project with SRC and the Wounded American Veterans Experience Scuba (WAVES) program. SRC

photographer Susann Pershern was there to document the project, and being her dive buddy for the week meant that I could focus solely on practicing my shooting.

Susanna was an incredible mentor. The first day we were in the water together, I struggled to figure out what to do with the camera. The strobes baffled me, I wasn't getting close enough to my subjects, and I spent more time deleting photos underwater than I did taking

them. She patiently guided me both above and below water, helping me understand camera settings better and encouraging me to experiment more for each dive. As the week progressed, I began to love the challenge of capturing the light effectively, getting sharp focus on my subjects, and thinking of creative ways to frame a shot.

After the WAVES project, we rejoined the rest of the SRC team for more work in

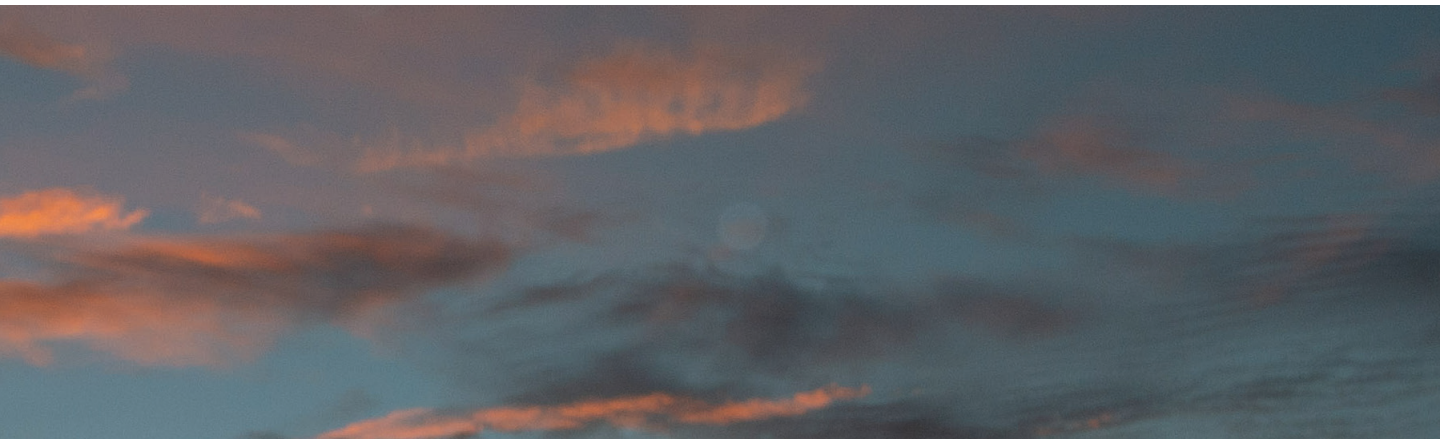




“

*As the week progressed, I began to love the challenge of capturing the light effectively, getting sharp focus on my subjects, and thinking of creative ways to frame a shot.*

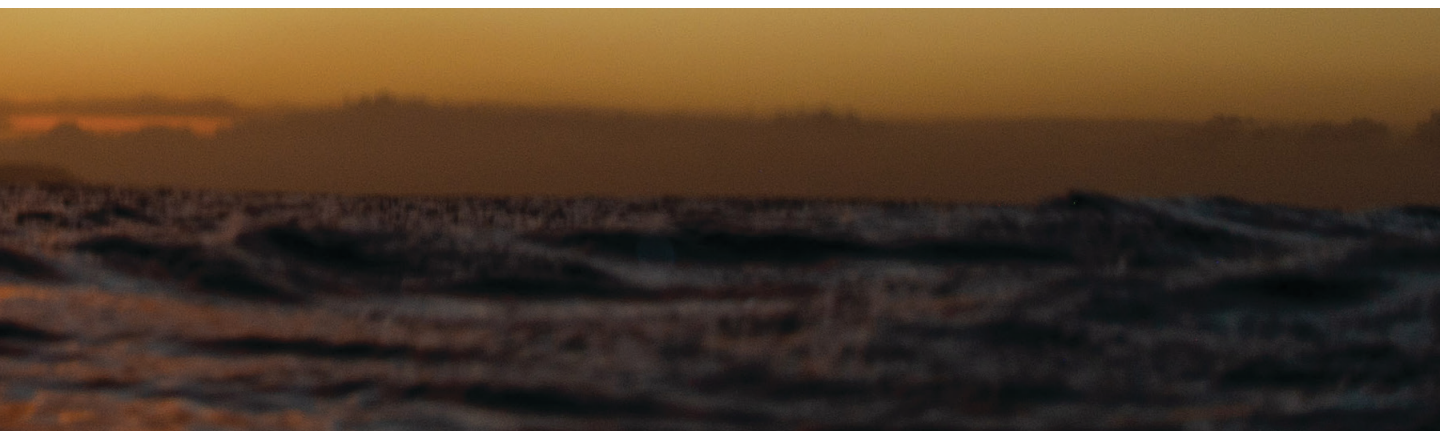




Biscayne National Park. Susanna went out of her way to vouch for my abilities to Brett, who then agreed to have one of the SRC camera kits shipped out for me to use for the remainder of my internship. I remember sitting in the Airbnb, looking over my photos from the WAVES project with Brett and Susanna. To have such accomplished photographers not only compliment my work, but take the time to share their suggestions and insights with me was one of the best moments of my internship.

I was honored to have been entrusted with a top-of-the-line SRC camera kit, and I found a

deep sense of purpose in developing my photography skills for the remainder of the summer. The camera taught me determination, patience, and focus. I made mistakes -- putting the wrong lens in the underwater camera housing (see next page), forgetting to charge batteries every now and then, etc. -- but with each mistake, there was also a valuable learning experience.





**MANY PEOPLE STRUGGLE TO UNDERSTAND WHAT'S HAPPENING TO UNDERWATER ENVIRONMENTS AROUND THE GLOBE. THAT REALITY IS LARGELY A RESULT OF BARRIERS — BARRIERS IN COMMUNICATION AND BARRIERS IN KNOWLEDGE AND UNDERSTANDING.**

One of my primary goals when I began this internship was to share what I learned along the way in a thought-provoking, engaging manner — I wanted to help close the communication gap between those with their boots on the ground and people who weren't directly exposed to the ongoing issues and efforts in the national parks. In my experience, people who aren't in an underwater science field often struggle to understand what's happening to underwater environments around the globe. That reality is largely a result of barriers -- barriers in communication and barriers in knowledge and understanding.

The opportunity to develop my visual communication and photography skills with top-of-the-line gear, mentorship, and technical support helped me achieve that

goal. It was undoubtedly one of the most valuable aspects of my internship experience.

# Science & Stewardship

“

Being able to effectively preserve something requires understanding. It requires scientific research, investigation, and in some cases, experimentation.

In the course of four months, I worked with 10 unique NPS teams and conducted a diverse array of scientific research and fieldwork. Research efforts ran the gamut -- one week I was diving to conduct rugosity surveys on coral reefs, the next week I was plunging into freshwater streams in the backcountry to survey pea-sized snails.

Many people aren't aware of how much science is conducted within national park boundaries. Science wasn't the reason national parks were established -- rather, the NPS mission emphasizes conservation and preservation of natural spaces for future generations. However, being able to effectively preserve something requires understanding. It requires scientific research, investigation, and in some cases, experimentation.

Throughout the course of my internship, I was able to work directly on many biological research efforts in the parks. Firstly, there was the National Coral Reef Monitoring Program (NCRMP) -- a large-scale monitoring effort that aims to assess ecological reef conditions such as fish species/composition/size, benthic cover (i.e. which substrates and organisms are present on the seafloor), and coral density/size/condition. Ultimately, the information gathered from NCRMP provides geographic and ecological context to inform and supplement local reef monitoring efforts and aids general studies of tropical reef ecosystems.

My first introduction to NCRMP was in St. Croix, USVI. Buck Island Reef National Monument, the first

designated Marine Protected Area (MPA) within the NPS, wraps around two-thirds of St. Croix and is surveyed biannually. Sadly, the reef has faced a number of challenges in recent decades. Invasive lionfish, hurricanes, disease, and coral bleaching events have all taken their toll. Currently, the biggest threat is Stony Coral Tissue Loss Disease (SCTLD), a lethal coral disease that has been spreading rampantly throughout Caribbean reefs since 2014.

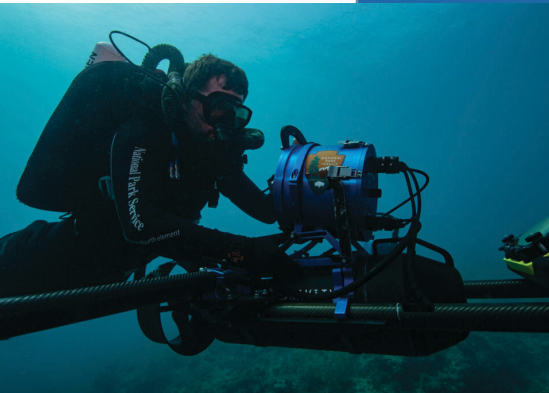
Since I spent a large portion of my internship in the Caribbean, I did a lot of work that was related to addressing the SCTLD crisis. A disease so fast-acting and so devastating to coral reefs requires attention in a number of different forms. The first step is monitoring. NCRMP surveys and long-term monitoring projects help give the





**“The National Park Service preserves unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations.**

**The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.”**



parks, collaborators, and other stakeholders an idea of how the reefs are changing over time. In some parks, like KALA and DRT0, NPS divers have been conducting marine benthic surveys and photo transect surveys for decades, resulting in a massive amount of qualitative and visual data about the parks' reefs.

While working with the SRC in DRT0, I also got to experience another surveying method: the Sea Array. The high-resolution underwater camera system consists of three cameras, a propulsion system, a sub-sea GPS navigation system, and a control panel. Essentially, the Sea Array uses photogrammetry technology to merge tens of thousands of digital images into a 3D visualization of underwater resources, like shipwrecks or coral reefs. The technologically advanced device opens the door for an entirely new method of surveying underwater resources.

Based on the information gathered from monitoring and surveying efforts, NPS teams respond accordingly to ensure that park resources are being preserved and protected as best as possible. In the Caribbean, many parks are conducting SCTLD disease treatment efforts. I worked with a small unit of divers in DRT0 who focus on treating infected corals in the park with antibiotic paste in the hopes of slowing

disease spread. Albeit a somber task, I valued being able to work directly on disease management and other natural resources management projects, like marine debris removal in Biscayne.

In addition to diving-related projects, I got involved in a number of terrestrial and aquatic projects as well. In KALA, weather conditions made it difficult to dive for a good chunk of the season, but the Natural Resources team handled a lot of other tasks aside from marine surveys. Monk seal monitoring and freshwater stream surveys were highlights of my time in the park. The freshwater streams in the Kalaupapa backcountry are home to an endemic species of snail that cannot be found anywhere else in the world. Similarly, Hawaiian monk seals are an endangered species that are only found in the Hawaiian archipelago. The park collaborates with other organizations to monitor both of these species.

The last destination for my internship was Pearl Harbor National Memorial. Rather than being a haven of natural resources like most national parks, Pearl Harbor is known for its cultural resources -- particularly the USS Arizona Memorial. While my visit there was brief, I had the once-in-a-lifetime opportunity to dive on the USS Arizona and see firsthand the historic resources that the park is tasked with preserving.

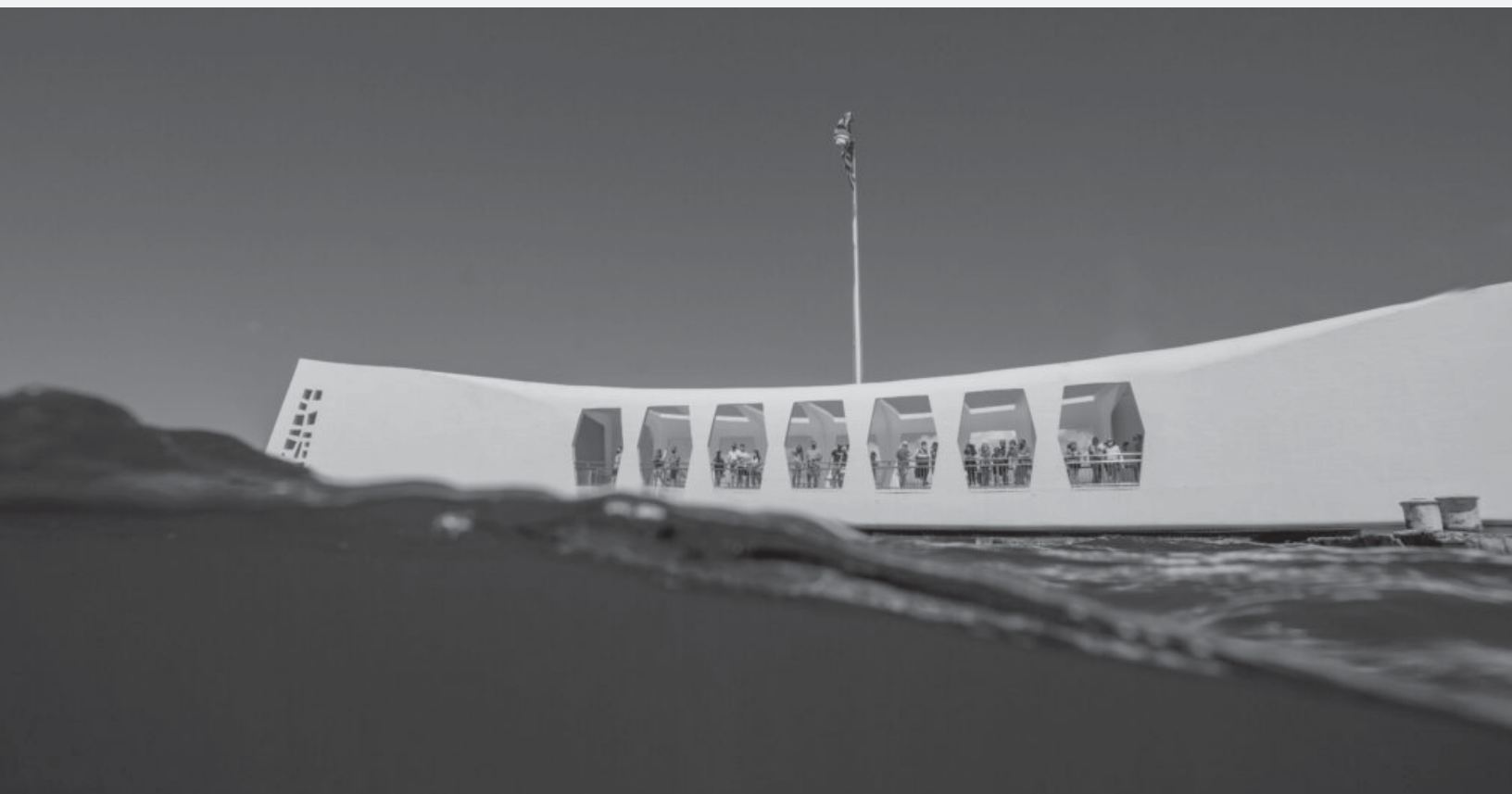
In the same way that the NPS protects the hot springs and geysers in Yellowstone and the petrified wood in Petrified Forest National Park, the NPS closely monitors and protects the USS Arizona and the artifacts that remain on the wreck. It's no easy feat -- they are tasked with preserving, protecting, and interpreting a monumental collection of historical and cultural resources and leaving it unimpaired for future generations (seeing the museum collections gave me insight into just how many artifacts the park maintains). The more time I spent in the park, the more I was impressed by how well the NPS has done just this. By preserving the USS Arizona and its associated artifacts, they have kept the story of Pearl Harbor alive.

The more time I spent working with NPS employees and departments, the more I respected their tireless efforts, their dedication, and their commitment to the overarching mission of the NPS. Through diseases, natural disasters, and climate change, the people I worked with continued on as stewards of the places they worked and the resources they were entrusted to protect and preserve. Their efforts in scientific research and resource preservation help make the national parks what they are today, and I was incredibly thankful to have been a part of their many research and response efforts.



*Clockwise from above: NPS and WAVES divers collect marine debris in Biscayne National Park; NPS diver Dan Brown observes the gun turrets of the USS Arizona in Pearl Harbor National Memorial; antibiotic paste separates the last living section of a coral infected with SCTLD from the dead white skeleton; The USS Arizona Memorial from the water.*

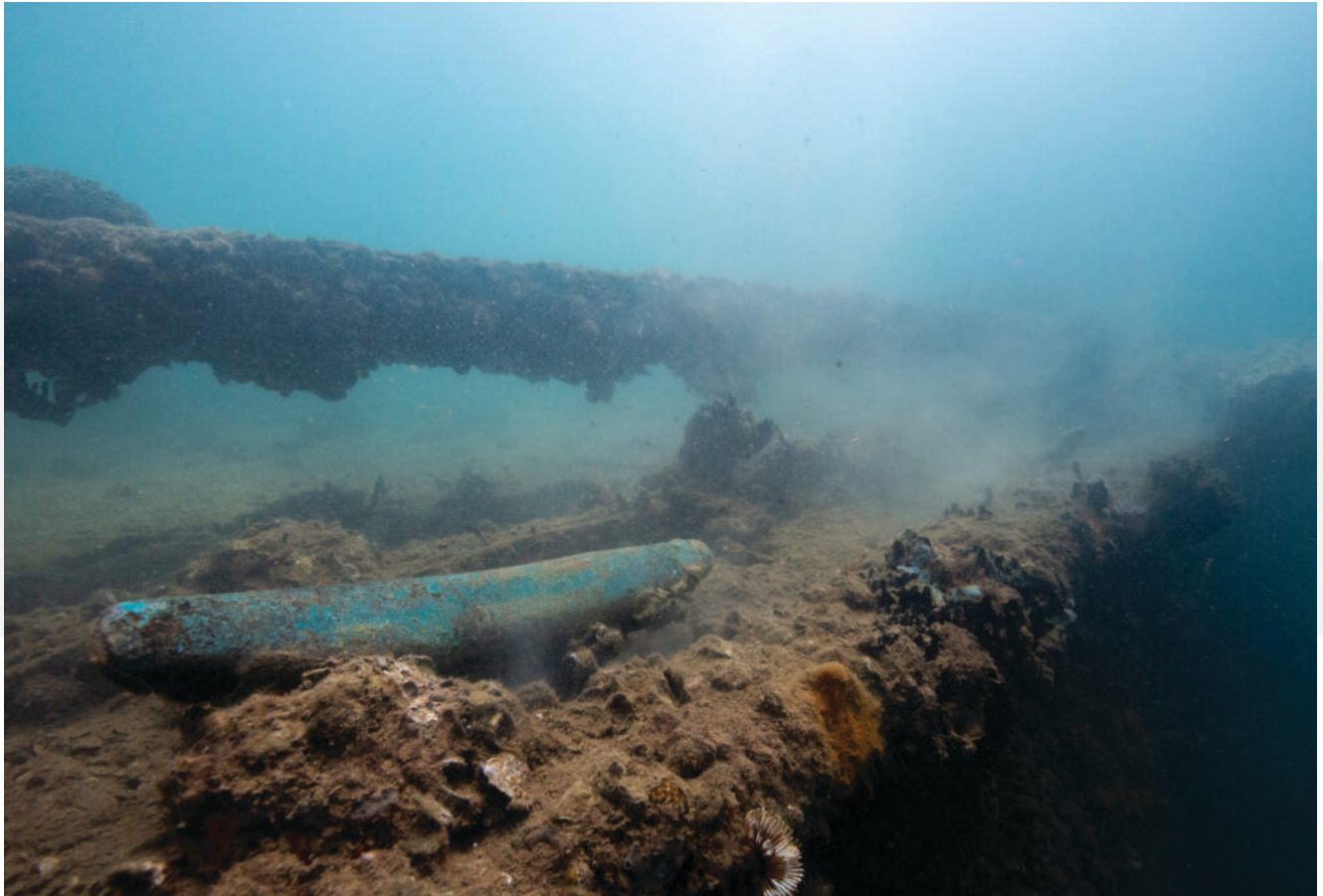








*The National Park Service as a collective is tasked with stewardship of some of America's greatest treasures -- above water and below.*









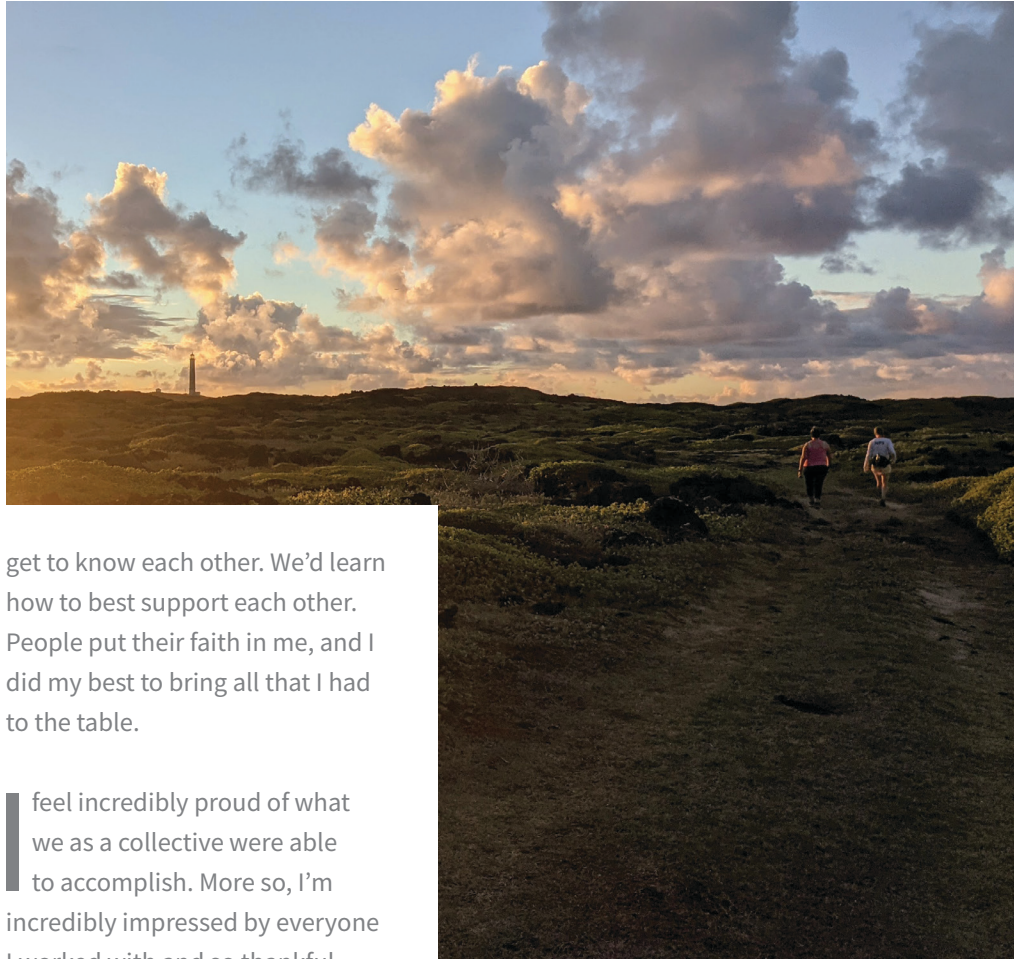
# It Takes a Village

Looking back on my internship, I am in awe of all that came out of the experience. One of the most amazing parts of it was the social network that I developed. I've never had so many people in my corner, rooting for me and going out of their way to help me and provide me with career-building opportunities. And I didn't just make professional connections – I made friends.

I spent the entire summer jumping into field teams as the outsider, never initially knowing how I could best support the group. Eventually we would find our rhythm, working together to accomplish the task at hand. We'd

get to know each other. We'd learn how to best support each other. People put their faith in me, and I did my best to bring all that I had to the table.

I feel incredibly proud of what we as a collective were able to accomplish. More so, I'm incredibly impressed by everyone I worked with and so thankful to have been able to form connections with such dedicated, talented, and inspiring people. Science is a hugely collaborative effort -- it takes a village. Thanks to this fantastic opportunity, I feel as though I'm part of that village now and ready to take on the next challenge -- together.





# What Comes Next?

I am thrilled to say that I was able to secure a position with the University of the Virgin Island's Center for Marine and Environmental Studies shortly after completing my internship. I will be working as a coral disease treatment specialist in Virgin Islands National Park, focusing primarily on SCTLD disease treatment. Being selected for this position is just one example of how life-altering the OWUSS/NPS internship has already been for me – for it was the work that I did during my internship and the connections I

made along the way that I believe helped me land the job.

This experience has given me invaluable experiences, life lessons, and most of all, confidence in myself. From the beginning, people who I have the utmost respect for expressed their belief in me when I didn't necessarily believe in myself. The impact that has had on me is impossible to adequately express. Now, I feel more capable and prepared than ever to continue pursuing my passion for marine research and

science communication. I began this internship expecting writing to be my primary form of communicating underwater science, but thanks to the opportunities this internship provided, I feel like I have the chance to move forward with a greater focus on photography and compelling visual storytelling. The possibilities seem limitless and it's thanks to everyone who supported me and helped make this grand adventure happen. To each one of you – I am forever grateful.



---

**What a powerful thing it is to believe  
and to be believed in. To everyone  
who helped make this adventure  
happen and supported me along the  
way -- thank you.**

---

