

FROM RIDGE TO REEF

SALT, SUN AND SAND

BRITNEY ESPINOSA
2020 Summer Intern
DCRM Shoreline
Monitoring Program



I am definitely a beach girl. During childhood, I'd spend my weekends at the beach enjoying the salt water in my hair, the sun kissing my skin, and the sand between my toes – nothing could get any better than that! As the years went by, I noticed our beaches were changing. I've always been curious about the key factors that contribute to shoreline changes, besides climate change, and what I could do to help.

This summer, I was given a great opportunity to intern at the Division of Coastal Resources Management (DCRM), under the Shoreline Monitoring Program alongside two other interns. The Shoreline Monitoring Program plays an important role in protecting our island's beaches. The program gathers data about the characteristics of a beach, such as its water line, wrack line, vegetation, berm, and moat.

All the collected data is used to create a beach profile, and with that, coastal managers are able to take action and make efficient and manageable plans.

My partners and I are tasked to monitor western beaches. We use a Berger level, tape measure, and a rod to help complete our survey. We look at the characteristics and see how much has changed overtime. We must know the anatomy of a beach when noting down the characteristics. It's exciting to look for these features and interesting to see how much has changed. With the data collected, we are able to see if a beach is eroding (losing sand), accreting (gaining sand), or stable (no changes).

According to a global shoreline study by Luijendijk et al. (2018), 24% of the world's sandy beaches are eroding at rates exceeding 0.5 meters per year, while 28% are accreting (gaining sand) and 48% are stable.

I was also tasked to update DCRM's Story Map. With all the new data collected, I am able to update the beach profile and see the changes over time. I've worked with the ArcGIS software to create this story map. It was challenging at first because I was not familiar with the software, but the more I used it, the easier it was to navigate. This story map will be available for the public on the DCRM website, under the Shoreline Monitoring page.

This internship was an amazing experience. I've learned several things such as the different ongoing conservation efforts/ programs. It's convenient as I'm a freshman college student majoring in Natural Resource Management.

THE IMPORTANCE OF INFORMATION

My name is Eloise Rose Lopez and I was given an amazing opportunity to participate in the Division of Coastal Resources Management's Summer Internship, under the Division of Environmental Quality (DEQ) Environmental Surveillance Laboratory. This summer I have been learning how to collect and analyze marine and drinking waters, how the process works and why it is so important to follow each procedure when providing information for the public. When we collect samples, we have to make sure the steps on the SOP, or "Standard Operating Procedures", are exactly followed. For example, when we receive the samples, we make sure we identify the samples by using laboratory ID's designated for Microbiology or Chemistry. We have to be very efficient and accurate in our process, because of the importance of our service to the community.

In my time with the lab, I've found that when it comes to marine water, Enterococcus Bacteria is our main concern when it comes to the Microbiology, because being exposed to contaminated beaches can make you seriously ill with sore infections, diarrhea, etc. Where drinking water is concerned, it is defined as any type of water that is used to drink, shower, or wash. Our main concern for drinking water is Total Coliform and E. coli. Total Coliform can be caused through natural interferences, such as leaves and dust that fall into water tanks. E. coli, on the other hand, is commonly caused by fecal matter coming into contact with drinking water. It is very important for people to know the safety conditions of our waters, because if people are repeatedly exposed to contaminated water in our beaches and public water systems, the possibility of contracting serious illnesses increases.

Through my mentors, Ms. Charito Bautista, Mr. Melvin Piteg, Mr. Jamie Reyes, and Mr. Michael Flores, I was able to understand how properly testing our waters has a significance impact on our community.

The Journal of Environmental Quality states that, "A staggering number of people in the world are becoming ill and dying every year due to the microbial contamination of waters used for drinking, recreation, irrigation, and aquaculture" (Cabral, 2010; Pandey et al., 2014).

These two short months of my internship with the DEQ Laboratory taught me that water is a blessing to be careful with. As an aspiring teacher, I am hopeful that my learning here will help me teach my future students why clean water is important. I also hope to someday write and apply for grants so that I can help others around the world who are suffering with no access to clean and drinkable water.



ELOISE LOPEZ
2020 Summer Intern
DEQ Environmental
Surveillance Laboratory

FROM RIDGE TO REEF

DANIEL JACK
2020 Summer Intern
DEQ Pesticides

BE SAFE, BE PESTICIDE AWARE

Pesticides are simply defined as any substance(s) intended for killing or controlling pests.



Only pesticides that are actively registered with the US Environmental Protection Agency (EPA) are allowable for use, sale, and import in the CNMI. EPA registration is a regulatory scheme, in which public health and environmental impacts are assessed. The result is that, if a pesticide is used according to the product label, the application would not cause an adverse effect to human health or the environment. The improper use or over-exposure of pesticides can result in health hazards such as eye and skin rash or irritation. In some cases, pesticide misuse can lead to excess run-off of chemicals that can adversely affect air and water quality, which in turn affects the health of marine ecosystems.

This summer, I had the opportunity to become the first intern under the Division of Environmental Quality's (DEQ) Pesticide Program, as part of the Division of Coastal Resources Management's Summer Internship Program. I have learned a lot regarding pesticide regulation and enforcement. The commercial use of pesticides is one of the major activities that the program regulates. Pesticide Applicators must be certified by DEQ for the commercial use of pesticides. This certification ensures that the applicator is competent and knowledgeable to properly use pesticides in a way that will not adversely affect human health and the environment. The sale of misbranded, or illegal, pesticide is an ongoing problem in the CNMI and is being strictly monitored. Misbranded pesticides are products that are not registered by US EPA and have not gone through the proper laboratory screening, or testing, and are improperly labeled according to US EPA requirements.

My project throughout this internship was to create an outreach video to help our community understand how to properly read and apply pesticides in the CNMI. I also created a logo for DEQ's Pesticide Program to aid in raising pesticide awareness in the community. During this internship I had the opportunity to cross-train with other programs within DEQ such as the Storage Tanks program, Site Assessment and Remediation, and Toxic Waste Management. Moreover, I was able to learn about the different projects within DEQ such as the Brownfields program, Formerly Used Defense Sites (FUDS), Leaking Underground Storage Tanks, as well as numerous Solid Waste programs (i.e. Litter Control, Used Oil, and Recycling). Working with such a passionate and dedicated team has reaffirmed my decision to further my education and eventually start a career in environmental conservation. I will value the time and skills I have learned this summer and will continue to be a steward of the environment.

LOGAN MISTER
2020 Summer Intern
DCRM Watersheds

SAIPAN'S WATERSHEDS: HOW IT ALL CONNECTS

In order for the marine environment to prosper, the land that it connects to must also prosper.



My fellow intern, Wileen Mongami, and I had the opportunity to work alongside Zachary Williams (Watershed Coordinator) and Ilan Bubb (National Coral Fellow) from the Division of Coastal Resources Management (DCRM). We were able to survey the wetlands and burn sites throughout Saipan.

To assess the wetlands, we were trained to conduct a Rapid Assessment Methodology (RAM), from RAM we would score Wetland functions: hydrology, water quality, and habitat also looking at native and non-native plants. We conducted RAM surveys at about 50 wetlands on Saipan. From this data we are able to decipher which areas are healthy, and which areas need management. This information is important for permitting and monitoring change over time. People are not allowed to build or fill in wetlands. Wetlands serve as crucial habitat for many animals, and help with filtering polluted water that could end up in the ocean. A study in Taiwan found that wetlands can remove about 52.6% of nitrogen in the water, which will stop algae blooms that can harm coral. Wetlands are also ideal for small countries since they are a cheaper alternative to a water treatment plant (Yeh & Wu 2009).

For fire surveys we learned how to collect data using a transect line. We studied the regrowth of vegetation by inputting photos taken from the transects into a program that calculated the amount of green (representing living vegetation) in each photo. Throughout each week we were pleased to see that the percent of green continually increased. Understanding how fast these burn sites recover is important due to erosion, having loose sediment during the rainy season will cause large amounts of sediment to end up in our oceans. "Runoff constitutes one of the biggest potential sources of reef degradation" (Rodgers & Caroline 1990).

Overall, I was able to fully understand the importance of "ridge-to-reef" and their interconnections. A coral reef does not just thrive on its own, there are many factors that influence and are interdependent upon each other. By surveying the wetlands and fire sites, I was able to learn about these connections. The community can utilize our data to take steps towards protecting our islands and maintaining its beauty. I enjoyed walking through mud and ash and happy to have found a new appreciation for bird and plant species. I am grateful to partake in this experience and hope others will look into this opportunity.



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FROM RIDGE TO REEF

"I've heard many rumors over time that Saipan is sinking..."



MARVIN SABLAN
2020 Summer Intern
DCRM Micronesia Challenge

SAIPAN IS SINKING ...or is it?

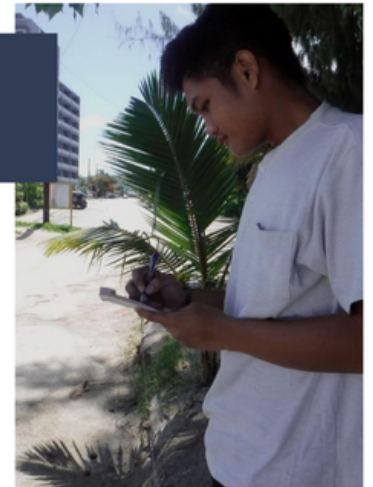
Is it possible that this prediction could be true or false? Shoreline profile monitoring is a way of observing and measuring the changes of a beach, overtime, to determine if that beach is eroding (losing sand) or accreting (gaining sand). This summer I had the opportunity to work under the Shoreline Monitoring Program, led by DCRM's Coastal Planner, Mary Urena.

I, along with two other interns, have been important in gathering shoreline data at various beaches in Saipan. One person uses the tripod and a Berger level to which they place on a flat surface to take sight of the level rod. The other person who holds the rod places a transect line along the beach profile before holding the level rod. The third person does the note taking as the person who is sighting reads the measurement from the level rod and informs the note taker as to what measurement he reads. Measurements from the transect line are measured every 10 ft, depending whether there are features to capture such as berms, roads, vegetation, wrack lines or water lines and these are captured every ft.

The data we gather is to inform the public about the changes of the shorelines every year. I've been living on this island for 22 years and I never knew which beaches were losing sand or gaining sand until entering the shoreline monitoring team. "In some parts of the world, shoreline hardening as a response to erosion reflects a coastal management model of action-reaction, compounded by the challenge of teasing out the natural causes of erosion." (Luis Martinez, 2018.) DCRM considers this statement and prefers living shorelines to address erosion. On top of shoreline monitoring, I have been working on the public shoreline access guide. This project was created in 2015 and it must be updated every 5 years. This guide aims to provide the public information regarding the recreational opportunities available at the various beaches. During my observation for each of the beaches on the island, I've noticed that due to damage from super typhoons, Soudelor and Yutu, changes have been made to some of our beaches. For example, new palapalas have been built and new trash receptacles placed. Overall, this has been a great learning experience for me and most of all it is fun!

JEFF SAGUM
2020 Summer Intern
DCRM Enforcement

"While out on the field, you never know what you will encounter"



TO PROTECT AND PRESERVE

Being an intern under the Division of Coastal Resources Management (DCRM) Enforcement section is a completely different experience compared to interns from other sections. While out on the field, you never know what you will encounter - whether it's having to justify your work duties to an upset fisherman or nearly losing a UAS drone's wing, the list could go on. Nevertheless, being an intern under the Enforcement section was an unforgettable experience.

While working under the Enforcement section, I was tasked with two main projects. My first project was to create a reference map of the dive sites within the CNMI. The purpose of this project was to provide DCRM with a quick reference to these dive sites. In identifying the coordinates of the dive sites, I researched and converted the coordinates provided. Some of the dive sites coordinates were based on the installations of mooring buoys. Once coordinates were identified, I then plotted them on Google Earth to produce a reference map. With this map, Enforcement has an easier and quicker access (either digitally or hard copy) in identifying the different dive sites within the CNMI.

My second project was to create outreach material for the Marine Sports Operators (MSO) permitted under DCRM. Outreach materials should reflect MSO permit conditions to ensure compliance with the agency's regulations. The first step was to research all standard and mandatory permit conditions. I then decided on two types of outreach materials: a durable magnet and a water-resistant poster that will be distributed to the various companies permitted or applying for permits under DCRM. My goal in creating these specific materials was to develop a quick and easy reference guide for MSO operators to ensure they're always in regulatory compliance. In regards to what an intern does under the Enforcement section regularly, much of it includes conducting routine inspections of projects and activities located within an Area of Particular Concern, Major Siting Projects, and MSO compliance. If any of the projects or activities are in violation of their permit conditions or DCRM's regulations, a Notice of Violation is issued with corrective measures to be adhered to. In cases of recurring violations, a Notice of Violation can lead to a Notice of Enforcement, wherein monetary fines are issued. It is Enforcement's responsibility to ensure projects and companies are in compliance with DCRM's rules and regulations.

The role Enforcement plays in any community is important. According to research done in Komodo, "seamless monitoring and enforcement" helped to lessen fishing pressure on an Indonesian marine protected area, which helped to restore an important, but threatened, species of fish. In the end, rules, regulations, and effective enforcement, are there to help protect our environment, our resources, and the people of the CNMI.



FROM RIDGE TO REEF

MARIA TERLAJE
2020 Summer Intern
DCRM Micronesia Challenge

PRESERVING CULTURE THROUGH ENVIRONMENTAL OUTREACH



"This is a sentiment I consistently voiced, embedding knowledge and passion throughout this internship. This summer, I had the opportunity to work as an intern for the Micronesia Challenge (MC) at the CNMI Division of Coastal Resources Management (DCRM). Under the leadership of DCRM Director, Janice Castro, and in collaboration with Pheona David, the MC Young Champion, I was assigned to create education and outreach materials that would inspire our community to come together to achieve the MC goal - to effectively conserve 30% of near-shore marine resources and 20% of terrestrial resources by 2020.

As residents of the Marianas, we each have an obligation to conserve our land and sea for the prosperity of future generations and preservation of our culture. In Conservation Education and Outreach, Susan Jacobson defines outreach as an opportunity to celebrate the importance of environmental value through education (Jacobson et al., 117). In the CNMI, education and outreach are critical for youth and local community involvement. This is validated by DCRM and the overall success of their internship program. In addition, outreach initiatives targeted to tourists and visitors are important if we want them to continue to enjoy our beautiful land and sea.

This summer, I was fortunate to be able to exercise my passion to inspire through education and outreach. I helped to identify target audiences and develop and create outreach materials that highlight the goals of the MC and CNMI's progress towards that goal. I had the opportunity to design a new logo - half-tree, half-coral - symbolizing the connection between our land and sea. I also developed a fact sheet that detailed CNMI's strategies to conserve the Marianas' natural resources, while identifying next steps moving towards 2030 and the Micronesia Challenge Plus. The projects were work but were also exciting. I gained a wealth of knowledge on the importance of the Mariana's natural resources and I am even more inspired to continue to learn, advocate and work towards the betterment of our environment.

RICHELLE RAMON
2020 Summer Intern
DCRM Marine Monitoring Team



*"Over time,
our ocean has
undergone
many
changes..."*

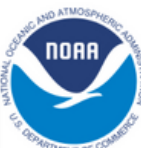
FISHING FOR MARINE LIFE OR NO LIFE?

We love our fish straight from the ocean. And where do our fish reside? Our reefs. Overtime, our ocean has undergone many changes especially from the effects of human activities, climate change, and natural disasters. Our reefs are essential as they play an important role in providing shelter to marine life, food and protection from storm surge and wave energy.

As a summer intern under the Division of Coastal Resources Management's Marine Monitoring Team, I have gained hands-on experience through monitoring our lagoon and reef flats'. The necessary tools needed to accomplish lagoon surveys include a GPS device, five transect lines that measure up to 50 meters, data sheets to quantify benthic substrate and invertebrates, quadrats, cameras, and snorkeling gear. Regarding a benthic survey, each transect line is laid out 50m, a quadrat (counting 6 points) is placed at each meter along the transect, to observe what is present at each point in terms of coral species, seagrass, and algae. Regarding an invertebrate survey, the number of invertebrate species is counted along the transect lines. These actions are taken to inform on the well-being of our ocean and its quality as it affects our reefs, or marine life, in general.

During my time in this internship, I have observed the vulnerability of our dying reefs and seagrass beds, as well as the declining population of fish species in our lagoon. Some key contributors include 1) illegal littering, which eventually finds its way into our oceans and become marine debris, 2) the occurrence of typhoons and heavy rains, which can cause sediment runoff to smother and break our coral reefs, and 3) climate change, which causes coral bleaching and sea level rise. As many people on island rely heavily on our ocean as a food source, our community must work together to help our oceans such as cleaning up after themselves and disposing trash properly in order to prevent it from washing into our ocean.

The opportunity to work as a Marine Monitoring intern has given me the knowledge and skills needed to approach the needs of our ocean and has reaffirmed my decision to pursue a degree and career in Marine Biology. I am extremely grateful to be a part of this year's cohort as I've learned many new things, met new people, and went on great adventures throughout the summer. I look forward to returning next summer as a second-year intern.



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FROM RIDGE TO REEF



SEARCHING THROUGH AN OCEAN OF PEOPLE

ESTHER HUH

2020 Summer Intern
DCRM Coral Reef Initiative
Communications

How do you determine that an individual might pursue a certain education, career, and even lifestyle? According to Heather Joshi of University College London, UK, she states that “information on the past helps anticipate the future”. As an Education and Outreach intern, I was given the opportunity to reach out through different communication methods. Throughout the internship, I worked with the CZ Communications intern and the Geographic Information Systems intern on the “Intern Longitudinal Study”. A longitudinal study is a type of research that looks to gather data on long-term effects of a selected group. We used this method to “track” the interns who go on to pursue degrees and/or employment in environmental science related fields. The data from their before-and-after experience will help to determine whether the internship program is successful at building local capacity for resource management in the CNMI.

First, we searched through and collected the data of every intern from 2002 - 2019 from their respective files and compiled them into a single spreadsheet. Based on the information available to us we were able to decide which methods we would use to contact them - email, phone, and social media. After compiling the data, we worked together to design three surveys (pre-internship, demographics, and post-internship) that would help us gather specific information on their educational and professional backgrounds. The pre-survey is given to new interns to take prior to starting their internships. Demographics is a survey of overall characteristics of a population such as race, ethnicity, education, occupation, etc. Finally, the post-survey is given to those finishing up and seeks to gather information on the path each intern intends to take after their internship ends. After creating the surveys, we searched for the whereabouts of past interns. We had two ways of connecting with those individuals: send out emails or call to complete the demographics survey. We got in touch with some through searching online - through Facebook and Instagram - although email was most effective.

It was not easy reaching out to 20 years of past interns, however, we still managed to get about 40 survey responses, which is about 26% of the total list. Thank you DCRM for having me as an intern for two years. I will cherish our memorable experiences together.

THOMAS BENAVENTE
2020 Summer Intern
DCRM Marine Monitoring Team

WHAT LIES BENEATH THE TIDES

The marine resources of the CNMI are a treasure.



They provide so much for coastal communities from recreational activities to food and medicine. In order to preserve this treasure it is important that we observe and document the changes that have occurred in our reef ecosystems and explore ways in which we can better protect them.

The Division of Coastal Resources Management's (DCRM) Marine Monitoring Team (MMT) works to document changes to coral reefs and seagrass beds in the CNMI. As an MMT intern under the DCRM Summer Internship, I was able to take part in a project that gave me a better understanding of what lies beneath the tides around us. Our project focuses on conducting surveys that quantify the amount and types of marine life in the Saipan lagoon. Common metrics that we survey for include: benthic cover, coral and algal diversity, and invertebrate and reef-fish densities. These surveys are conducted bi-annually and provide an assessment of reef health. Additionally, the data can be used to evaluate how the reef has changed over time.

We use a variety of tools to conduct the surveys including water-resistant paper, underwater cameras, transect lines, and a GPS, among others. After the team collects the data from a monitoring site, my fellow intern and I would assist each other with inputting the data into a database. Lastly, we compare the data from the newly completed survey to data from surveys done in past years, which helps us identify differences or changes in that environment. One study on coral disease determined that “current information regarding the effects of coral diseases on Indo-Pacific reefs lags behind that of the Caribbean.” (Myers and Raymundo, 2009) Over the years, more blue-green algae and turf algae are taking over the seagrass and corals in the Saipan lagoon. This is harmful and is usually a result of land-based pollution, like dirt and chemicals, which are washed into the water from land - a concept of Ridge to Reef. The data must continue to be assessed to ensure our marine environment is protected from human activities.

This summer, I have helped conduct surveys to monitor the lagoon, used benthic datasheets to note the seafloor at the designated sites, and I can now compare what I found this summer to what was found in surveys from the past. I have received new knowledge about what is out there, including the different examples of sea cucumbers and sea urchins lying around. I have also been made aware of the different diseases affecting the coral colonies. This all helps to be wary of the water quality and hopeful for more careful planning and development. I plan to use this experience to work in the local community after the internship. It was an appreciable adventure to be part of the 2020 DCRM Internship cohort.

FROM RIDGE TO REEF



NATALIE MONTANO
2020 Summer Intern
DCRM Geographic
Information Systems

GIS GALORE

This summer, I worked on two geographic information system (GIS) related projects for managing coastal resources. Through my internship, I learned much about current environmental management programs happening in the CNMI.

The first project I worked on, User Capacity Assessment of Prime Tourist Sites (UCAPTS), was a continuation of a project started in 2019 by the previous GIS intern, Dianne Pablo. UCAPTS is a long-term coastal resource management project and a component of UCAPTS is to work with the Permitting Section to collect yearly marine sports operator data. The data collected aids the DCRM Planning section with area prioritization and resource management goals based on user-density and revenue generated by area. I was tasked with quantifying the economic value of Saipan's coastal resources in 2020 with this data in order to identify capacity limits in areas of operation. ArcGIS Pro was used to create maps that show the annual average value of operation and operator density for a given area. The sum of the annual values of all operators in 2020 decreased from last year. Although, in context with the ongoing pandemic, these 2020 MSO figures are not wholly representative of MSO revenue due to the major reduction in tourist numbers. However, these projected figures are still important for the long-term as they represent how valuable these ecosystems are and indicate the economic significance of managing them sustainably.

Second, I assisted with a pilot program for updating the current map definitions of Saipan's shoreline areas of particular concern (APC). Shoreline APCs are defined as the area between the high tide line and 150 feet inland. Currently, these APCs are measured from the mean higher high water mark, but the update aims to measure from the high tide mark. In this program, we used a Trimble Geo7x (GPS) with an attached Tempest antenna and walked along the shoreline of Forbidden beach. We then used GPS Pathfinder Office to do post-processing corrections to obtain higher accuracy positions as well as created a buffer of 150 feet in accordance with the definitions of shoreline APCs. The major APC updates will take place later in the year due to higher wave conditions that occur between October to March (Sea Engineering, Inc. 2018). This update in shoreline APCs is crucial to regulating areas of environmental sensitivity or frequent use in order to protect land and coastal resources.



LANCE TUDELA
2020 Summer Intern
DCRM Shoreline
Monitoring Program

THROUGH A COASTAL PLANNER'S EYE

We all know that Saipan has its fair share of eroding beaches. But what particular areas? How fast are these beaches eroding? This is where we come in. This summer, I had the opportunity to be a second-year intern at the Division of Coastal Resources Management (DCRM), under the Shoreline Monitoring Program. I, along with two other interns, Marvin and Britney, conducted shoreline monitoring at various beaches along the western coastline of Saipan.

We measured the slope of the shoreline at different head stakes and compared it to past data to see how much a shore has changed over time. Measuring the shore allows us to determine whether it's eroding (losing sand), accreting (gaining sand) or stable (no change). Through this internship I was able to visit more beaches than I was accustomed to, and I enjoyed every bit of it. This data is crucial for coastal planning and shoreline development, whether it's building a small playground or a huge hotel.

In order to strengthen the Shoreline Monitoring Program, I was in charge of updating the 2020 Shoreline Monitoring Map. I was able to familiarize myself with Microsoft Excel by entering data and using formulas to create beach profiles, which show the contour of the shoreline as it slopes. I also got to use ArcGIS for the first time, which is a software used to create the map. The updated Shoreline Monitoring Map is available for public access on the DCRM website: www.dcrm.gov.mp.

Through this internship I was able to look at the shoreline from a coastal planner's eye. Some people may look at the beach and only see the horizon and beautiful water. But after my experiences this summer, when I look at the shore, I see the features and characteristics of the shoreline, from the eroding berms near Hyatt to the lush shoreline vegetation at Wing Beach.

FROM RIDGE TO REEF



WILEEN MONGAMI
2020 Summer Intern
DCRM Watersheds

COLE CHAMBERS
2020 Summer Intern
Division of Fish & Wildlife

SO MANY PLANTS SO LITTLE TIME

One tree, two trees, green tree, mango tree! Observing and identifying vegetation can yield insight into the surrounding ecosystem.



Just as a person may scan the forests looking for tall trees in hopes of finding a fruiting mango tree, biologists rely on identifying vegetation to grasp the nuances of the surrounding area. Within the CNMI, there are a plethora of different types of plants.

Even the most veteran and skilled botanist would struggle to know every single plant and its characteristics. Knowing the types of plants in a given area can help resource managers determine where conservation efforts should be targeted. I was tasked with creating a herbarium to assist ornithologists at the Division of Fish and Wildlife with vegetation identification.

A herbarium is a preserved collection of plants, mainly leaves, that have been pre-identified. Biologists can use a herbarium to familiarize themselves with particular plant species or bring back an unknown sample of a plant and then try to match it with one in the herbarium. Another tool biologists use to identify plants are field guides that contain images and descriptions of plants such as Trees and Shrubs of the Northern Mariana Islands (Raulerson & Rinehart, 2018). However, the photos in these books sometimes do not provide the level of detail needed to accurately identify plants; it is in these situations that a herbarium is most helpful. One item that I included on each page in the herbarium is whether or not the species is native, naturalized, or invasive. This distinction is important because invasive plants can push out and endanger native plants.

Unfortunately, creating a herbarium that holds all of the plant species found in the Marianas is unrealistic within the eight week time period. First, I had to learn how to create a herbarium. The tools I needed to accomplish this were a plant press (to preserve the plants), newspaper and cardboard (to separate the plants in the press), and mounting paper and glue (to put it all together). Each plant took a different amount of time to finish pressing, depending on the leaf's thickness, with most taking over a week to finish. This did not leave much room for error. Although I could not gather all plants in the Marianas, I was able to gather around 30 of the more common trees, ferns, and a couple of endangered plants. This will help biologists in the CNMI with the identification of plants in the future.



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A NOVEL EXPERIENCE IN SAIPAN'S WETLANDS

We're always collecting new knowledge and experiences - even in a pandemic. As an intern with the Division of Coastal Resources Management (DCRM), I spent the summer conducting wetland assessments and learning about watershed management in the CNMI. My main duty was to collect data on the health and function of Saipan's wetlands. The project itself is important because it can help determine if a wetland is healthy and functional, and if not, why? The key is to look for the natives - a healthy wetland habitat consists of many different native plant and animal species.

As an intern, I got the chance to create a herbarium - a collection of dried plants used for identification - under the guidance of my mentor's Zak Williams, DCRM Watershed Coordinator, and Ilan Bubb, National Coral Management Fellow. To make a herbarium you first flatten a collected specimen in order to preserve the plant. A plant sample is taken either by the roots or by clipping it from the stem up, the leaves should be included as well. The sample should be pressed on the same day it was collected to preserve its shape and color. After a couple of days in the plant press, the specimen is removed, glued to a sheet of paper, labeled, and placed in the herbarium which can then be used as a reference guide to help identify the different types of plants that grow in and around a wetland. These plants are important because they help prevent soil erosion, provide habitats for animals, and act as a filter for ocean pollution.

As part of the internship, we also took part in different experiential learning activities such as sea grass monitoring with the CNMI Marine Monitoring Team, stream hikes with DEQ's Water Quality section, invasive plant removal with MINA, and many others. From this experience I was able to meet new and interesting people through our cohort of interns and learn from experts in the fields of conservation and natural resource management.

FROM RIDGE TO REEF



SHELLA MAE RUIZ

2020 Summer Intern
DCRM Coastal Zone
Communications

THE PAST RAN SO THE FUTURE COULD WALK

Summer 2020 is coming to an end, but I will never forget the experience and knowledge that I have gained throughout it. I was fortunate enough to be a part of the Division of Coastal Resources Management (DCRM) Summer Internship Program, under the Coastal Zone (CZ) Communications section. The main project I focused on was called the Intern Longitudinal Study (ILS). Within two decades, about 150 people have participated in this internship, many of whom have moved on to pursue a college degree in environmental science or related fields and/or gain full-time employment at local resource agencies and organizations. We wanted to create an accessible online platform so individuals can view the success and growth of the internship since its inception in 2002.

I have worked with the Coral Reef Initiative (CRI) Communications intern and the Geographic Information System (GIS) intern to make this project come to life. Our collaboration has led us to create and design effective surveys that target information of past and current interns that would allow us to evaluate the efficacy of the program. We created three surveys for this project: demographics, pre-internship, and post-internship. We used the website Survey123 to collect

data and display the information on ArcGIS Dashboard, which is made available for the public.

Though our work does parallel to one another, both the CZ and CRI interns' main job is to initiate the "discovery phase" of the ILS project. We were in charge of reviewing past interns' interagency records, reaching out for their participation, and compiling and evaluating the data into a single database.

One of the biggest challenges we faced was reaching out to the older cohort(s). Some of their contact information was either invalid or inaccessible, but we were able to use other methods of communication such as social media.

The ILS project is important because it not only measures the success of the internship but shows the growth of the previous interns. "Internships enhance general abilities and key qualifications, such as communication skills, report writing, organization of work, information acquisition, and the ability to operate independently" (Scholz, R., Steiner, R., & Hansmann, R., 2003). The best part of this project was watching the dataset slowly increase as we progressed more throughout the weeks. I hope to see other interns who we weren't able to contact take part in this project. Overall, my time in the Communications section was exciting! I was able to sharpen my communications skills and techniques and got to express my creativity through some outreach materials. I hope to reflect on my experiences in my future work as an individual and student.



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