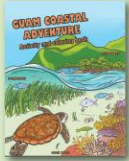


# Man, Land, & Sea

A publication by Guam Coastal Management Program

December 23, 2022



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*"As of August 11, 2022, the Bureau of Statistics and Plans was approved a Grant Award Modification that will provide additional funding to the Drone Training Program to train an additional 67 students for basic and advanced flight drone training sessions and drone pilot training and for FAA Part 107 testing fees."*

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# Exploring Guam's Coastal Habitats at Talofofo Elementary School

Hafa adai from Seba the seagrass, Metgot the mangrove, and Åcho' tåsi the coral! Seba, Metgot, and Åcho' tåsi are all characters from the Guam Coastal Adventure Activity and Coloring Book, which was completed and released online for accessible printing by teachers and parents earlier this year. The book is for elementary audiences and provides fun puzzles, creative challenges, and illustrations of wildlife to teach young students the basics about Guam's seagrasses, mangroves, coral reefs, and watersheds. It also teaches students about our marine preserves and how to be environmental stewards of our island.

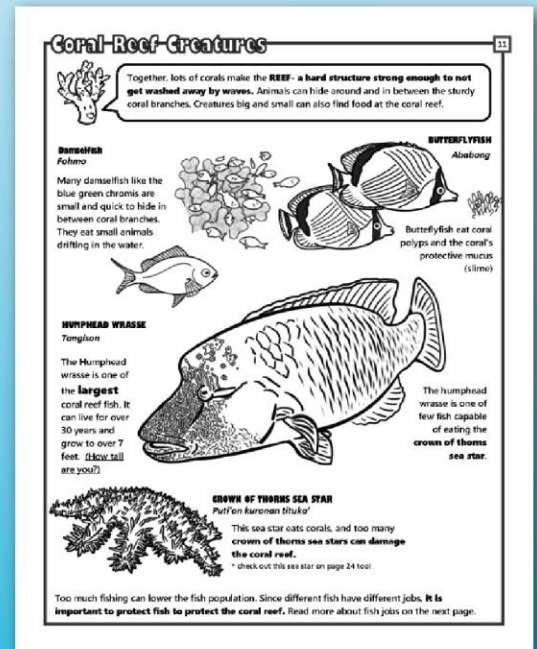
Our recently graduated 2020-2022 coral reef management fellow, Ms. Cara Lin, worked on writing and illustrating the book for nearly a year. The book was also edited with input from other local natural resource managers, including Whitney Hoot, program manager for the Guam Coral Reef Initiative, and Marie Auyong, National Oceanic and Atmospheric Administration affiliate (NOAA). The Chief Hurao Academy also shared their expertise to ensure that the book featured accurate CHamoru language terms and cultural references.

With funding from NOAA, a thousand copies of the activity and coloring books were printed to share with students and families. Ms. Alicia Diego, the librarian at Talofofo Elementary School reached out to our coral reef management fellow at the Southern Water Conservation District's Teacher Symposium and requested books and activities for her students. Then Ms. Lin and Ms. Diego scheduled three visits to the school in the spring of 2022. Ms. Lin presented virtual explorations, games, and stories about Guam's coral reefs, seagrasses, and mangroves to all the classes from kindergarten to fifth grade in the library. Afterwards, the students received the activity and coloring books to take home to continue to learn about the topics.

*A free copy of the Guam Coastal Activity and Coloring Book can be downloaded from the Bureau of Statistics and Plan's website: [bsp.guam.gov](http://bsp.guam.gov), and on NOAA's regional coloring book page.*



*Ms. Alicia Diego (Talofofo Elementary Librarian) and Ms. Cara Lin (Guam Coral Reef Initiative) presenting the Guam Coastal Adventure Activity and Coloring Book.*



*A page of the activity book featuring some of the fish that can be found living in Guam's reefs.*



OFFICE FOR COASTAL MANAGEMENT  
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# GROW Planting

**“What we are trying to do here is restore our badland areas”**



Volunteers from the Bank of Hawaii along with members of the GROW team hosted a mega-planting in honor of the group's 125th anniversary at the UGUM Watershed.

## Successful Tree Planting Events and Arbor Fest Wrap-up Tree Planting Season.

Volunteers and community members alike joined the Guam Restoration of Watersheds (GROW) Initiative for three GROW in Malojloj events to cap off the planting season at the Ugum Watershed in Inalahan.

The watershed provides water for the entire southern region of the island and has seen severe erosion in recent years, which is also proving an issue for coral preservation efforts in nearby reefs.

“What we are trying to do here is restore our badland areas,” explained Austin Shelton, Director of the University of Guam Center for Island Sustainability and Sea Grant. “Poor land use and development practices are causing erosion on our lands up above and degrading and killing our coral reefs down below.”



Volunteers participated in three GROW in Malojloj planting events throughout the season and helped to put thousands of trees into the ground to help stop erosion in the southern watershed.

According to Shelton, planting trees helps to keep dirt and soil in place and prevents it from flowing into rivers and ultimately our oceans. Hundreds of volunteers and supporters took to the hills of the watershed and planted over 5000 trees during the events.

“This was really fun,” said volunteer and high school student ReyVihn Mandapat. “Getting out in the sun and helping with an important cause like this is a great way to spend your extra time.”



Madison Scott plants a native tree in support of the Guam Restoration of Watershed Initiative's out-planting events. The group hosts several events throughout the rainy season in hopes of reforesting badlands to help prevent further erosion.



# Government Drone Training Program



The novel coronavirus, specifically COVID-19, has become one of the fastest and most far-reaching worldwide pandemics in the past couple of decades. Guam, like all other countries in the world, was not prepared for the rapid spread of the coronavirus and the devastating impact on human life, the economy, government operations, health care facilities, medical personnel and services, law enforcement and emergency responders, businesses, schools, churches, social gatherings, and everyday life as we know it.

Because of the rapid spread of the virus worldwide, the Governor of Guam on March 14, 2020, signed into effect Executive Order 2020-04 declaring a State of Emergency for Guam due to the potential dangers posed by the 2019 novel coronavirus (COVID-19). To assist states and territories in preventing, preparing for, and responding to the coronavirus, the U.S. Department of Justice announced the solicitation of the FY 2020 Coronavirus Emergency Supplemental Funding (CESF) Program. This program will help provide critical funding to assist law enforcement and criminal justice communities and medical personnel with protective equipment, supplies (such as gloves, masks, sanitizer), training, addressing the needs of inmates in prisons, jails, and detention centers, and other critical areas in response to the pandemic.



Art Dawley, President, Aviation Concepts, LLC introduces students to the Tech Center Guam Drone Training Program.



To assist in emergency response efforts and to minimize field inspections and surveys by agency personnel so as to reduce the risk of infectious contact, the Bureau was approved for the implementation of a Drone Training Program to allow the Guam Fire Department and the government of Guam permitting and regulatory and natural resource agencies such as the Guam Department of Public Works (DPW) and the Department of Land Management and law enforcement agencies such as the Guam Police Department (GPD) and Department of Agriculture Law Enforcement Section personnel to be trained in the basic and advanced operation of a drone and to be FAA Part 107 Certified.

The first initial class resulted in a total of 15 participants who completed both Basic and Advanced Flight Lessons and passed their FAA Part 107 Remote Pilot Certificate. With the completion of the FAA Part 107 Training Program, the government of Guam has 15 employees trained in the operation of a drone to assist with pandemic and other related emergencies to ensure the welfare and safety of the public.

Further, Aviation Concepts, awarded contractor, has been working with the GFD to develop a Drone Program for the Government of Guam specific to establishing policies and procedures for the Guam Fire Department. The Drone Program will look to 1) develop an organizational flow chart and flight authorization process; 2) establish and document strategic objectives for short- and long-term; and 3) provide the training curriculum for flight and ground school classes.



*Thor Hauerbach demonstrates the Drone Simulator.*

The Policies and Procedures Manual will also establish connective security protocols and hacking mitigation guidelines, provide UAV delivery and implementation timelines, software and hardware requirements, and training expectations to continue to maintain and build Guam's Drone Program. Following the development of a Drone Program for Guam Fire, other law enforcement, natural resource, and permitting and regulatory agencies within the government of Guam can use the Drone Program to develop and establish policies and procedures specific to their agency mission.

As of August 11, 2022, the Bureau of Statistics and Plans was approved a Grant Award Modification that will provide additional funding to the Drone Training Program to train an additional 67 students for basic and advanced flight drone training sessions and drone pilot training and for FAA Part 107 testing fees. We learned as a result of the first cohort of students trained that we actually need a team of 2 to 3 to operate a drone. A total of four additional classes with a full roster has been implemented and is scheduled to be completed on December 21, 2022.

Upon completion of the drone training, GFD and partner agencies will have the capacity and technical expertise to utilize drone services to help with emergency field operations, minimize field inspections and surveys, protect emergency response personnel in hazardous and dangerous situations and reduce the risk of infectious contact. The drone services are in line with Governor Lou Leon Guerrero and Lt. Governor Joshua Tenorio's goal in helping to leverage resources to modernize government operations to improve efficiency and community response efforts. The Drone Services Program with the Guam Fire Department has been in planning for a long time and the fruition of the training program could not have happened at a better time in light of the challenges brought about by COVID-19.



*Government Drone Training Program Class at Tech Center Guam.*



# REEF BRIGADES TRAINING PROGRAM

Photo by Calina Zepeda



*Participants listen to instructor Juan Carlos Hutrón Baca (pictured right) as he gives instructions for in-water skills activities. Participants from left to right: Farron Taijeron (Guam), Liz Terk (Pohnpei), Marie Auyong (Guam), Andrea Hershberger (Guam), Frank Roberto (Guam), and Olivia Bañez (Guam).*

Photo by Juan Carlos Hutrón Baca



*Participants assemble as a team to discuss the plan for restabilizing corals in the water as part of the final skills assessment on the last day of the program.*



*Certified participants and trainers take a group photo to celebrate completion of the course.*

Typhoons and storms present a real threat to coral reefs worldwide and can cause severe damage to these habitats. Intense waves caused by storms can break corals or dislodge entire coral colonies. Loose and destabilized corals that are no longer attached to the reef will usually die, and these unattached corals can cause additional damage by crushing or smothering nearby coral colonies. Sometimes reefs can recover from physical damage on their own, but the process is very slow and is not always possible if there is widespread destruction. However, there is good news: natural resource managers can step in and provide 'coral reef first aid' to kickstart recovery and help even severely damaged reefs return to a healthy state. Coral reef managers from across the Pacific are now better equipped to deliver this reef first aid due to a recent training that was held on Guam.

From November 3rd to 9th, twenty-four coral reef resource managers and partners from Guam, CNMI, Pohnpei, Yap, Kosrae, Palau, and Hawaii gathered on Guam to participate in the Reef Brigades training program. This program, which was developed in Mexico by The Nature Conservancy, follows a comprehensive protocol for safe and efficient delivery of coral reef first aid after a storm or vessel grounding has damaged the reef. The Reef Brigades program has expanded throughout Central America, with 149 individuals trained in the rapid response and restoration protocol. The training held on Guam was the first effort to adapt the program for use in the Pacific Islands region. This 5-day training was coordinated by The Nature Conservancy's Reef Resilience Network with funding from NOAA's Coral Reef Conservation Program, and was executed in partnership with the Guam Coral Reef Initiative.



The course itself consisted of one day of classroom instruction followed by four days of hands-on learning in the ocean at Piti Channel and Outhouse Beach. During the in-water sessions, participants practiced skills such as operating an underwater air-powered drill, conducting snorkel surveys to characterize levels of damage, and reattaching coral fragments to the reef with cement and epoxy. Diona Drake, Research Associate for the Guam Long Term Coral Reef Monitoring Program, noted that, "One of the most valuable skills that was stressed in Reef Brigades was team communication. Responding to a reef that has been damaged requires a lot of personnel and coordination. Going through this training was an eye-opener of how to get scuba divers, surface support, and land-based teams to work together seamlessly and efficiently."

Guam was well-represented at the Reef Brigades training, with eight local participants from the University of Guam Marine Lab, The Nature Conservancy, the Department of Agriculture's Division of Aquatic and Wildlife Resources (DOAG DAWR), NOAA's Coral Reef Conservation Program, and the Bureau of Statistics and Plans' Guam Coral Reef Initiative. These individuals are also members of Guam's Coral Reef Response Team, an interagency effort that was formalized by memorandum of understanding in 2016.

All local and off-island participants successfully completed the training and have acquired new skills to share with other coral reef stakeholders locally and across the Pacific. On Guam, the coral reef management community is now working to incorporate the lessons learned from the Reef Brigades program into development of the Guam Coral Reef Vessel Grounding and Typhoon Response Plan. The training presented a great learning opportunity for all. DOAG DAWR Biologist, Frank Roberto, said, "After the training, not only was I better prepared to respond to physical reef damage, but I was also better informed and made aware of this type of response, which I believe is important for most people living in our region in this field of work."



Photo by Andrea Izaguirre

*Participant Diona Drake practices using an air-powered drill underwater.*

**"After the training, not only was I better prepared to respond to physical reef damage, but I was also better informed and made aware of this type of response, which I believe is important for most people living in our region in this field of work."**

-Frank Roberto



Photo by Juan Carlos Hutrón Baca

*Local participant Andrea Hershberger (second from left) celebrates with Reef Brigades instructors following successful completion of the course. Reef Brigades instructors from left: Joe González, Kaiulani Creamer, Andrea Izaguirre, Juan Carlos Hutrón Baca, and Calina Zepeda.*



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<https://bsp.guam.gov/guam-coastal-management-program/>

# THE BENEFITS OF A RAINWATER CATCHMENT SYSTEM



A rainwater catchment system is a technique that collects, diverts, and stores rainwater in a barrel or cistern for other ways that water can be used. Harvesting rainwater is a resourceful sustainable practice to manage stormwater runoff on your property and water your plants among other things. It provides many benefits to individuals, communities and the environment.

**Reduces Groundwater Contamination.**

Collecting rainwater reduces the amount of runoff that makes its way into our water supplies by rerouting it into designated storage containers. This in turn decreases the amount of these untreated pollutants, and reduces groundwater contamination.

**Lowers the Risk of Flooding and Soil Erosion.**

Capturing rainwater before it reaches the ground reduces flooding in low lying areas and helps control erosion caused by runoff. These results can be significant when utilizing a large cistern or high volume water storage system.

**Keeps Sediment and Pollutants Out of Coral Reefs.**

Coral reefs need sunlight for coral growth and reef building. Sediments can smother coral and impact coral reproduction. Suspended sediments decrease fertilization success and survival of coral larvae and newly settled corals.

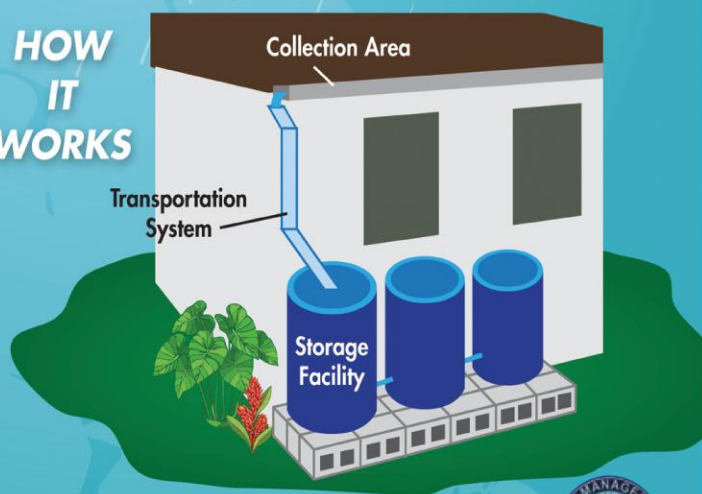
**Can Lower Your Water Bills.**

Every time you water your lawn or wash your car, your water meter spins, slowly clicking away the dollars, as wasted tap water flows into the ground. By using collected water, you can decrease your tap water usage and replace it with a completely free resource.

**There Are Many Ways to Use the Water.**

- Watering your garden, lawn or field
- Flushing toilets or washing clothes
- Washing your vehicle
- Supplementing the water supply in case of fire

**HOW IT WORKS**



**DEPARTMENT OF CORRECTIONS RAINWATER CATCHMENT SYSTEM**

This 1,000-gallon water tank was connected to an existing structure at the Department of Corrections in Mangilao. A piping system connects the water to an area to support irrigation and water needs for the DOC piggery and farm, while a concrete base supports the water tank.



**FOR MORE INFORMATION, PLEASE CONTACT GCMP  
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A MESSAGE BROUGHT TO YOU BY THE GUAM COASTAL MANAGEMENT PROGRAM. PAID FOR FROM GRANT # NA19NOS4190165

**Guam Bureau of Statistics and Plans**

**THE DATA HUB**

WITH TYRONE TAITANO

**Newstalk**



10 am Tuesday