

2020 | OCTOBER | NOVEMBER | DECEMBER

# Kilo iā

*Quarterly Membership Publication of the Friends of the Waikīkī Aquarium*

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# WAIKĪKĪ AQUARIUM MESSAGE

Kilo I'a  
**Issue Number 214**  
2020 | OCTOBER |  
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**MANA'O**  
Traditionally, the kilo i'a was an expert of fish and marine life. He studied the behaviors and movements of i'a. The kilo stood at a high point of land overlooking the ocean to watch for an expected school of fish and steered the fishermen in the school's direction. The success of surrounding the school was entirely up to the kilo.

Hawai'i is known for its rich and abundant coral life. Peer underwater and you'll find a diverse array of indigenous and endemic corals, a biodiverse environment that truly highlights the vital role corals play in our marine ecosystems. But what happens when non-native corals infiltrate the reefs?

This is exactly what we've seen in Kāne'ohe Bay, where Hi'ilei Kawelo and father Gabby first observed unusual corals in 2018. After consulting with members of the scientific community and natural resource managers, the Native Hawaiian family of skilled watermen connected with the DLNR Division of Aquatic Resources (DAR) and Waikīkī Aquarium coral biologist Josh Maxwell to move forward with carefully extracting the non-native coral species from patch reefs.

So why not simply leave the non-native coral where they are? The short answer is that they do not belong on Hawai'i's reefs.

The longer answer involves taking a closer look at non-native coral, as well as non-native species in general. The reason why non-native species must be eradicated is because they have the potential to become invasive and negatively impact our native ecosystems and, indirectly, the local economy. The longer it takes to respond to non-native species reports, the more established and widespread they become—and therefore more challenging to manage or remove.

In a natural reef system, corals are always competing for space. The issue with non-native corals is that they often have significantly higher growth rates than our native corals, which makes them like weeds in a garden (they've even been described as "weedy" in an aquarium setting). When given the opportunity, these non-native corals will grow prolifically and outcompete native corals, eventually reducing the amount of space that they have to grow. Our native coral communities are already under a huge amount of pressure and stress due to climate change; it's vital, then, that we do everything we can to help them grow and thrive—which means removing non-native coral whenever possible.

At the Waikīkī Aquarium, we're proud to support this removal work by preserving these non-native corals in bio-secure housing for public display. It's clear from further studies that these corals were planted deliberately several years ago but do not belong on our reefs. We're grateful for the opportunity to work closely with DLNR DAR, the Kawelo 'ohana, and our amazing community partners to provide the non-native corals with the only suitable home in Hawai'i—within glass walls at the Waikīkī Aquarium.

**Dr. Andrew Rossiter**  
*Director, Waikīkī Aquarium*

## WAIKĪKĪ AQUARIUM TO REMAIN CLOSED

Due to the COVID-19 pandemic, the Waikīkī Aquarium will remain closed indefinitely. The Aquarium's small gallery size makes it difficult to ensure the health and safety of the staff, members and visitors. In addition, the capacity restrictions and loss of tourism have significantly impacted revenues and it doesn't make sense financially to reopen at this time.

Due to these financial challenges, we have had to let go of 13 staff members. We are so grateful for their hard work and dedication and all they did to make the Aquarium a truly amazing place to visit.

The Aquarium plans to undertake some much-needed renovations during this down time and as soon as we have more information to share, we will.

FOWA will extend your memberships for the duration of the shutdown. Each individual membership will restart at the time of re-opening with the number of months we're closed added to the length of your current membership.

# EVENTS

## MAUKA TO MAKAI

Mahalo to all who joined the Aquarium and its partners for the 13th Annual Mauka to Makai Environmental Expo on October 24. This year, the event was held virtually, featuring activities from partners who focus on ocean and environmental conservation. If you haven't been able to take part yet, visit [www.waikikiaquarium.org](http://www.waikikiaquarium.org).



## FOWA'S HALLOWEEN MASK & COSTUME CONTEST WINNERS

We received so many creative marine-inspired costumes this year! Congratulations to all of the winners and thank you to everyone who entered. A virtual Halloween parade can be found on our website, showcasing each of the spook-tacular costume submissions we received.

Visit [www.fowaquarium.org/fowas-halloween-mask-and-costume-contest/](http://www.fowaquarium.org/fowas-halloween-mask-and-costume-contest/).

## Mahalo to Our Sponsors



## Mahalo to Our Partners



L to R: Lee Higa Okamoto, Vampire Squid; Eli Okamoto, Viperfish; Ian Okamoto, Anglerfish.

# CORAL SPAWNING: A NIGHT OF MYSTERY AND HOPE

By Teagan Roome //

It is July in the infamous year 2020. Rather than being concerned with what more could go wrong, there is a sense of mystery and hope in the air.

The night is calm, and the ocean is quiet beneath the new moon. The darkness is broken only by the stars and the thin beam of light produced by our boat that guides us to a reef in Kāne'ohe Bay. Our team is here to collect gametes from sexually reproducing corals. The Gates Coral Lab has spent over six years researching the reproduction of Rice Coral (*Montipora capitata*). These spawning events are limited to several periods during the summer months. The infrequency raises the stakes; this is one of the few opportunities we will have all year.

Watching intently over the gunnels of the boat, we wait. While chatting and snacking on Nutter Butters and Oreos, we are on the lookout for tiny dots to appear on the surface from the depths of the reef. My excitement builds in anticipation.

At first the egg and sperm bundles start appearing just a few at a time, drifting past us slowly. Moments later, we are overwhelmed by the strong smell of fish that seeps through our COVID-19 protective masks, and the entire surface of the bay becomes covered in tiny bundles that look a lot like 'Dippin Dots'. The coral bundles move with the flow of the current, turning into spirals and long chains, as they swirl around the boat. There is added commotion as fish come to have their nighttime snack.

We quickly grab our handcrafted 'super duper bundle scoopers' to collect as many coral bundles as we can. Our collection station consists of two buckets of filtered seawater, racks of 150 falcon tubes, and squirt bottles. We work in teams of two; one scooping and one washing the bundles into the bucket. We then use pipettes to transfer bundles from the buckets to falcon tubes. In the falcon tubes, the bundles will break up into eggs and sperm and cross-fertilize with the gametes from other coral colonies.

As we slowly motor back to our lab at Moku o Lo'e, aka Coconut Island, fertilization begins to occur, and the gametes turn into embryos. Millions of embryos are now

ready to enter the larval rearing system, which consists of 34 cone-shaped tanks ('conicals') that hold 2L of seawater and have a spout at the bottom to routinely rinse and refresh the water. We strategically transfer the embryos to the conicals at equal densities, where they will remain for about a week as they mature into larvae.

It is already 11 p.m., and the effort to raise coral babies has only just begun. To rear larvae at the high densities needed for replication in experiments requires constant care. A heavily caffeinated team arrives to take on the first overnight 'babysitting' shift, and I head home after a successful night.

A week later, thousands of larvae have survived and are swimming around, searching for a place to settle. We place them in shallow containers with hundreds of pre-conditioned plugs resting in seawater. The plugs are flipped upside down because coral babies prefer to settle in dark spaces. Once they settle, we flip the plugs right side up and the corals graduate to juvenile status.

Next month we will run stress tests to determine whether we can selectively screen the juveniles for thermal tolerance traits. Previous research in the lab shows that thermal tolerance in corals can be inherited and learned. While the lab is already partnered with federal, state and non-profit groups to selectively outplant thermally tolerant adult corals for restoration purposes, our project is testing whether we can do the same with pre-selected coral babies. These types of interventions are now necessary to save coral reefs, which have been negatively impacted by climate change and bleaching events. Corals with a higher thermal tolerance are more likely to withstand the bleaching events and can continue to enhance the resilience of a reef as they grow and reproduce over time.

As I peer into the tanks with the now one-month old corals that are settled and healthy, I am reminded of the adventure that took place on that calm, mysterious July night. If all goes well, these corals will be returned to the bay to repeat the spawning cycle, giving us hope for many more years of resilient reefs.

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To learn more, visit [GatesCoralLab.com](https://GatesCoralLab.com).

*About the Author: Teagan Roome has been part of the Gates Coral Lab team for almost two years now. As a 3rd year undergraduate student at the University of Hawai'i at Mānoa, she has the ability to directly engage with the scientific community and be an active member of the team. This internship experience has enlightened her as to what type of career she wants to pursue and has given her hope for the future of corals.*





PC: Josh Hancock

UH Mānoa undergraduate student Ninah Munk aboard an HIMB boat with a dedicated coral spawning collection station.



PC: Raphael Ritson-Williams

An adult Rice Coral, *Montipora capitata*, releasing egg and sperm bundles in Kāne'ohe Bay, HI.



PC: Teagan Roome

UH Mānoa undergraduate student Sophia Ranke calculates the total volume of coral bundles collected in falcon tubes from the field.



PC: Teagan Roome

Coral embryos are transferred to a conical on the night of spawning and remain there for about one week as they mature into swimming larvae.



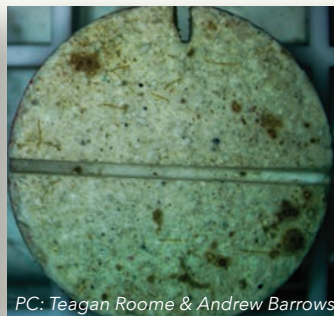
PC: Sarah Woo

The Gates Coral Lab team cleaning the 34 conicals that house millions of coral embryos at the Hawai'i Institute of Marine Biology.



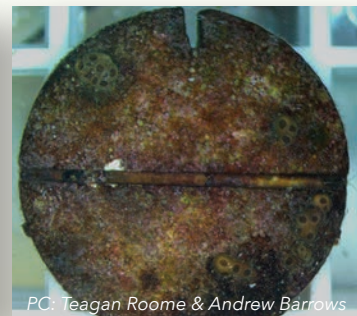
PC: Josh Hancock

UH Mānoa undergraduate student Teagan Roome checks to see which upside-down plugs have successful coral settlement.



PC: Teagan Roome & Andrew Barrows

An example of baby corals (brown dots) 1-month post-settlement following a spawning event in 2019.



PC: Teagan Roome & Andrew Barrows

Baby corals on the same aragonite plug 6 months post-settlement following the 2019 spawning event.

## ARTS UNMASKED, A FUNDRAISER FOR THE WAIKIKĪ AQUARIUM



Hawaiian Dreams an original piece by Sharon Jeffers. The colors of Hawaii with deep golds and blues. 20" x 20" acrylic on canvas.

### Now through November 30, 2020

Support the Waikikī Aquarium by purchasing beautiful artwork donated by local artists. Originally donated for its Arts Unmasked fundraising event, the art pieces will now be available for purchase via The Shop. Visit [waikikiaquarium.org](http://waikikiaquarium.org) for more details.

Mahalo to all of the artists who graciously contributed artwork for the fundraiser including Robin Appasamy, Patrick Ching, Sharon Jeffers, Nancy Taylor, Margo Vitarelli, and Gary Yee.

In addition to the artwork sale, the Aquarium has partnered with CoralWear Clothing to raise funds through mask sales. Masks can be purchased online at [www.coralwearclothing.com](http://www.coralwearclothing.com). They are 1 for \$24.99 or 2 for \$40. Net proceeds will benefit the Aquarium.



# NEW LANDMARK HELPS PROTECT WAIKĪKĪ'S STORIED PAST AND ITS FUTURE

by Cindy Knapman, Communications Leader, *University of Hawai'i Sea Grant College Program*

Nestled among towering high-rises and luxury hotels lies a fairly innocuous manmade structure jutting out into the turquoise waters of Waikīkī Beach. Not many people are aware that this L-shaped rock groin situated along the shoreline directly in front of the historic Royal Hawaiian Hotel plays an essential role in Hawai'i's economy and continued enjoyment of a world-famous beach with centuries of history.

For over 90 years the Royal Hawaiian Groin stabilized the sandy shoreline fronting the Royal Hawaiian Hotel, affectionately known as the "Pink Palace of the Pacific" and only the second hotel to open on Waikīkī Beach. Initially constructed in 1927, the same year the Royal Hawaiian Hotel opened its doors, the 370-foot curved and partially submerged groin has for years helped to mitigate seasonal beach erosion and shelter the beach and buildings that line the shoreline from storm events. However, over time, the groin deteriorated so severely that large cracks and holes appeared, a buttress of rock on the 'Ewa side that was initially used to stabilize the structure eventually fell apart, and only the first 150-feet remained functional; the rest was submerged under water and toppled on its side.

A 2016 economic report written by the University of Hawai'i Sea Grant College Program (Hawai'i Sea Grant) and the University of Hawai'i Economic Research Organization, and funded by the Waikīkī Beach Special Improvement District Association (WBSIDA), shone a spotlight on the ripple effect that the loss of Waikīkī Beach could have on Hawai'i's economy. Using 2016 economic and visitor arrival data, the "Economic Impact Analysis of the Potential Erosion of Waikīkī Beach: A 2016 Update"

concluded that over \$2.2 billion U.S. dollars could be lost annually due to the complete erosion of Waikīkī Beach. This figure represents decreases in visitor dollars spent on hotel rooms, retail, entertainment, food, transportation, and local tax impacts.

Given the critical nature of the project and the urgency to complete the improvements before the groin collapsed, the State of Hawai'i Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL), WBSIDA, and Hawai'i Sea Grant joined forces to come up with a plan. After six years of federal, state, and local regulatory permit reviews, consultation with specialists and ocean engineers, and hundreds of hours of public outreach and legislative testimony, the project plans were finalized and the construction was set to begin in September, 2020. The fall was chosen in an effort to avoid the busy summer season and throngs of people that flock to Waikīkī Beach in the summer months.

In a rare silver lining to an otherwise devastating pandemic that swept through the Hawaiian Islands beginning in early 2020, the project leads took the once-in-a-lifetime opportunity to begin the heavy construction while the beach was virtually empty due to the COVID-19 travel bans and other restrictions.

The \$1,500,000 project began ahead of schedule in May 2020 and the finishing touches were completed by July. It was supported through a public-private partnership with WBSIDA and DLNR splitting the construction costs, and Hawai'i Sea Grant providing community outreach and coordination, technical support, and project monitoring and evaluation.



*Photo Credit: Waikiki Beach Special Improvement District Association*



Dolan Eversole, Hawai'i Sea Grant's Waikīkī Beach management coordinator, coordinated with stakeholders and conducted regular project oversight and environmental monitoring while also providing technical project oversight on behalf of the DLNR.

"This project improves the resilience of this beach and will stabilize an extremely important and valuable natural resource," said Eversole. "Stabilizing the beach system will also reduce the amount of sand migrating offshore which can cause problems for the coral reefs and surf sites if unmanaged."

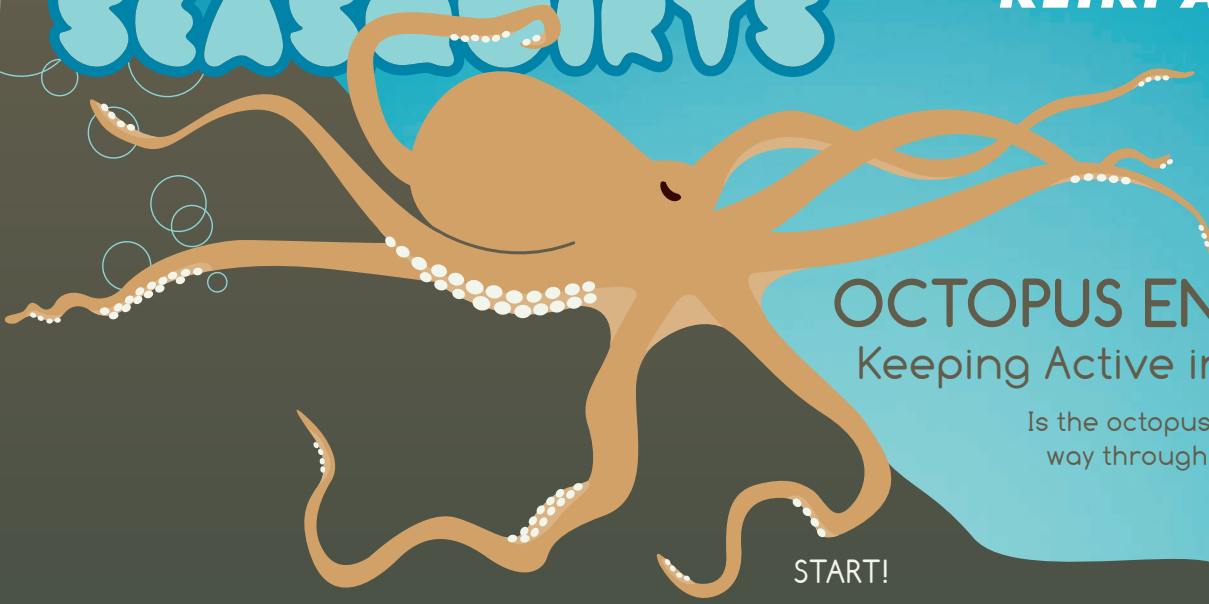
Eversole went on to note "Looking ahead, we are actively working with the Department of Land and Natural Resources on an Environmental Impact Statement and master plan for Waikīkī Beach which includes resilient design features that account for future sea-level rise and the acceleration of beach erosion. This type of planning for future conditions is a crucial part of designing and supporting resilient communities and economies."

While the EIS and master plan have an expected completion date of 2022, three priority areas emerged

from the community visioning process that encouraged the community to outline their priorities and strategies to create a comprehensive plan for Waikīkī's future. The Royal Hawaiian Groin replacement was considered a top priority, and other projects ranging from beach restoration using offshore sand pumped to shore, adding or restoring existing beach stabilizing structures, and relocating sand back to its initial point of origin were identified. Specifically, the Halekulani, Royal Hawaiian, and Kuhio Beach cells were identified for engineering evaluation during the conceptual design and community engagement process for the master plan.

The plan under development is largely based on the community's priority goals and desired vision for each beach cell. The history of Waikīkī Beach is unparalleled, and long before it was the world-renowned visitor destination it is today it was home to Hawaiian royalty and a favorite area for surfing and other recreation. The master plan and comprehensive beach management in Waikīkī are critical to balancing public safety and priorities with the existing recreational uses, future projections for use, beach erosion, and longer-term issues like sea-level rise and planned beach improvements.

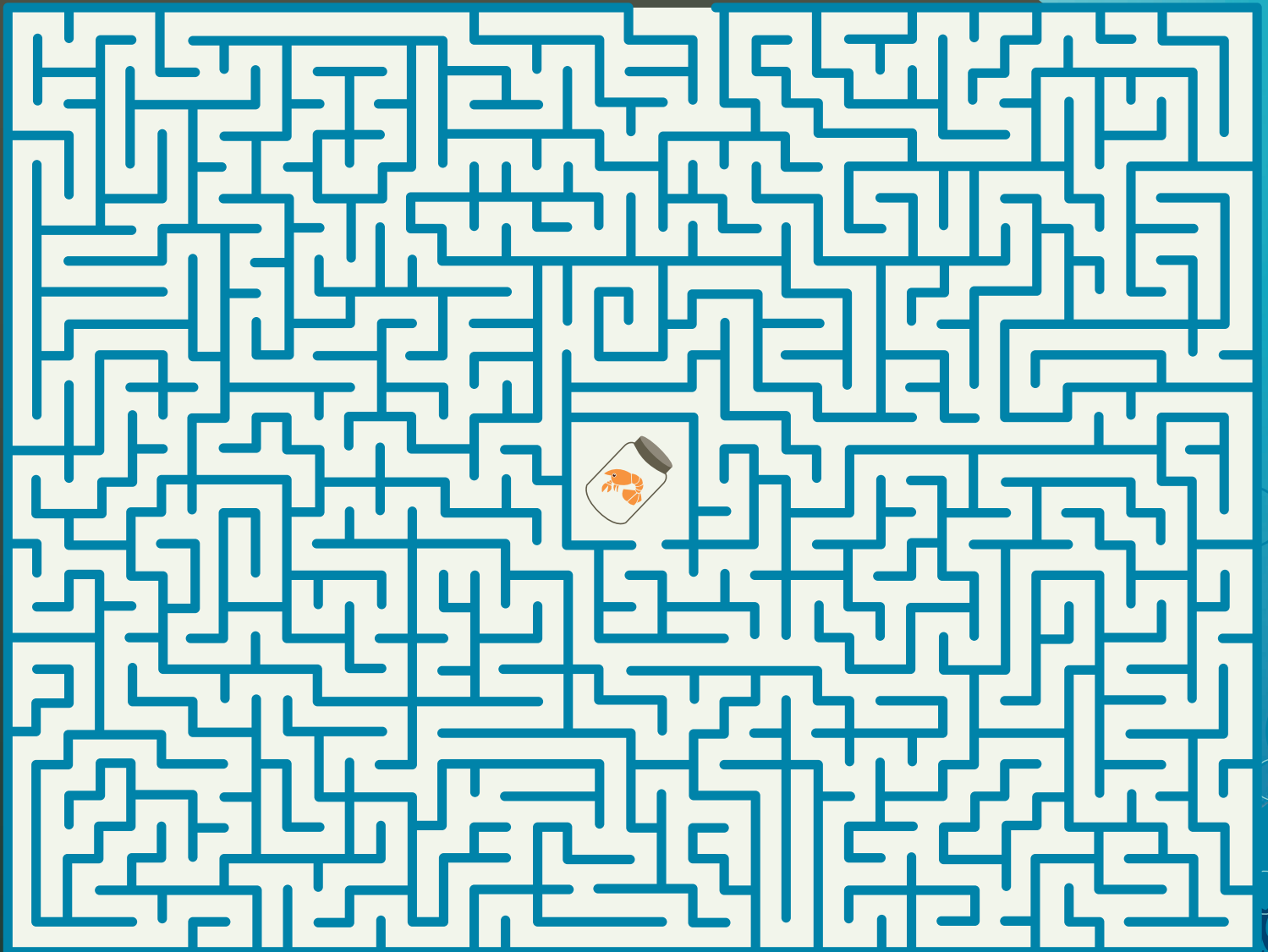




### OCTOPUS ENRICHMENT: Keeping Active in the Aquarium

Is the octopus smart enough to find its way through the maze and to dinner?

START!





# FOWA Annual Meeting & Distinguished Lecture Series on November 19

Join us on Thursday, November 19 for FOWA's virtual annual meeting and upcoming Distinguished Lecture Series featuring Dr. Emmett Duffy and Dr. Mary Hagedorn of the Smithsonian's Marine GEO Project.

The Marine Global Earth Observatory (MarineGEO), directed by the Smithsonian's Tennenbaum Marine Observatories Network (TMON), is a global network of partners focused on understanding how coastal marine ecosystems work—and how to keep them working.

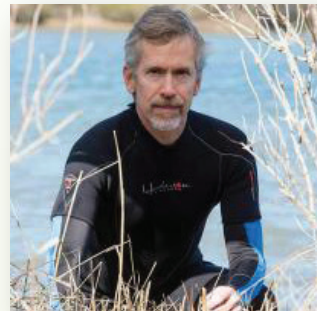
Marine GEO focuses on biodiversity as the heart of healthy, productive ecosystems and coastal regions, where marine life and people are concentrated and interact most. MarineGEO marshals the Smithsonian's leadership in discovery and convening power to advance frontiers in knowledge and provide it to policymakers to support innovative management and protection of our oceans.

In 2017, MarineGEO conducted a study in Kāne'ohe Bay. Drs. Duffy and Hagedorn will share what they found and how it fits with other marine ecosystems around the planet. The program follows:

- 4:00 p.m. FOWA Annual Meeting
- 4:30 p.m. Distinguished Lecture Series Presentation
- 5:15 p.m. Live Q&A with Dr. Duffy and Dr. Hagedorn

DLS is presented in partnership with St. Andrew's Schools. For more information, visit [www.fowaquarium.org](http://www.fowaquarium.org).

Sponsored By:



Dr. Emmett Duffy, Director of Tennenbaum Marine Observatories Network



Dr. Mary Hagedorn, Director of MarineGEO Hawai'i

## CONGRATULATIONS TO CONTEST WINNERS

Congratulations to the winners of the 2020 Ho'okūkū Ki'i Kai Ocean Photo Contest! Winners were selected in four categories including Adult, Professional, Youth and Overall. Mahalo to Huish Outdoors and Pro Camera Hawai'i for their partnership and for providing amazing prizes for our winners.

To view all of the winning photos, visit <https://www.waikikiaquarium.org/interact/special-events/ocean-photo-contest/>

Mahalo to Hawaiian Island Humpback Whale National Marine Sanctuaries for their partnership.



Photo Credit: Kelly Quin



Photo Credit: Jazel Losbog



## NEW & RENEWING MEMBERS

Aaron Akana Shirley & Dennis Alvaro George Aoki Mrs. Judith Baird Sarah Bakewell Maria Barnette Ashley Barrett Ian & Azenith Barrow Jose Bernades Mahea Bernal Lana Beydoun Mariko & Austin Bigelow Kim Binsted Marilyn & Emily Boock Margaret Brevoort Antoinette Brown Abraham Buon-Ya Angela Burke Leilani Calvero Michael Carroll Abby Champagne Matthew Chang Matthew & Gabi Chapman Maureen Chattergy Jeannie Chesser Paul & Jolene Ching Leon & Janeen Chingcuangco Lee-Ann Choy Elizabeth Churchill Andrea Clemens Amy Cleveland Christopher & Angela Cole Annie Cole Peiling Congdon Tony Conjugacion Allison & Brook Conner Elizabeth & John Corbin Rurina Costantini Courtney & Christopher Couch Wendy & Kristin Crabb Marylynn Crawford	Rebecca Cutler Tiffany Davis Seira De Veau Tony DeLellis Chelsea DeMott Bill Devick Christine Dorrepaal Jeff & Tiffany Dudgeon Ms. Carolyn Eaton & Mr. Clifford Kanda Summer Ebaben Scott Edwards Mrs. Stephanie England & Mrs. Brianne Smith Alana Enos Brian & Caryll Fagan Patricia & Robert Faus Bill & Jacqui Fromen Ken Fukuyama & Keiko Okada Adam Garcia Steven Glazier Robert Godbey & Ellen Carson Andrew Gray Del Green Stormi & David Gremminger Ted Grisell Eduard Gschwend Tea Habazin Scott M. Hampson Will Hansen Joe & Mary Hardin Kimberly Harsanyi Fred & Jo Ann Hawley Jennifer & Oliver Hayes Penelope Hazzard Juli & Peter Henning Michael & Jocelyn Herbert Jihan Higa Andrea Hirashima Norma & Alan Hirota James & Elizabeth Hoban	Margaret & Brad Hovas Kira Hughes Joseph & Samantha Hyeon Clyde Ibara Garrett & Susan Iha Walter & Karen Ikehara Cherilyn Inouye Lynn Ishii Karla Izuka & Mark Rodden Spencer Jackson Bryan Jones Sam Kahng Isaac Kalua Malia Kamaau Clifford Kanda Kevin Kaneko Dr. Gary K. Kanemura & Mrs. Liza Kanemura Chad & Jenny Kawakami Brandy & Weston Kawasaki Tracy & Russell Kaya Langdon Kelsch Patrick Kenny Kay & Bill Kibby Mark Kikuchi & Karen Ninomiya Christopher & Elizabeth Kimball Kaiu Kimura Sascha Koki Katherine Kolodzie Lana Kriner Eva Kriz Mr. James Kuss George & Stephanie Lai Kali Larson David & Ann Latham Wilson Lau Wesley & Christina Lau Jeff Lau So-Jin Lee Michelle LeFevre	Maya LeGrande Anastasia Lehman Danielle & Josef Lipp Ronald Livingston Charles & Sandra Loomis Howard & Loudi Lum Joycelyn Lumsdaine Marc Makalii Keli Manley Stephanie & Meluan Mateo Alan & Joyce Matsui Kelsey & Michael Meddles Linden Miller Lisa Miller Sharon Miranda Simone Mitchener Rachelle Moi Mrs. Jana & Mr. Jay Moore Mr. & Mrs. David S. Morimoto Vikram Mruthyunjayanna Mrs. Audrey Mueh & Ms. Nicole Nakamoto Paul Murato Travis I. Nakamura Peter Damian Nash Kevin Nishimoto Cynthia & Jon Nishimura Dr. Walter S. Nobuhara Stephanie & Evan Nomura Toshiyuki Nomura Keith & Dana Lynn Novak Kona Pederson Jessica O'Neill Tyler Parson Thoke Pedersen Georgine & Lee Perez Jonathan Perron	Elissa Pickard Bruce Popkin & Gaile Labelle Ronald Quizon Jeremy Rich Cody Riedeman John Rita, III Jenna & John Robinson David Rosenberg Paulette Rowe Kevin Saiki Francis Sakamoto Monica Salter Joabdel Serrano Ayala Stella Shido Patricia & Dora Shigemura Nelson & Valerie Shigeta Richard Shimizu Mary Silva & Diane Cho Danielle Simoes Kayoko Siu Erin Smith & Jenna Freidman Delsie Smith Joyce Haas Snider Kristie Snoddy Hyoungdoo & Hyun Joo Son Janice Staab Chelsea Stams Joni & Michael Stewart Nick Stronczek Russell Sumitomo Jessica Summersgill Carol & Brendon Sunada Nicole Sung Merry & Christopher Sutton Chiaki Synan Jane & Querubin Tagulao Greg Takeshima Richardson Talavera	Russell & Carolyn Tanaka Mingxin Tang Frances Tannen Nancy & Carroll Taylor Eve Teeter-Balin Mrs. Vera Tom Julie Tomei & Shane Boyle Dr. Eliot N. Tomomitsu Jimmy & Kim Dung Tran Harry Tsai Hiromi Tsuji Gloria & Clinton Uyehara Scott Uyehara Kaleia Valin Brianne Van Treese Brian Wadnal Michael Wakita Ashley Walkner Guirong Wang Gloria Wassman Polly & Keith Webb Joy Wells Anthony Wengler Sandra Wong Kara & Matthew Wong Ramsey Jenna Wonser Stephanie Wyland Tracy Yamoto & Carrie Wedmeyer Sung & Sunah Yoon Kurt Yoshikawa Dirk & Stacy Yoshizawa Julie & Kyle Yuen Steven Yun Audrey Zeldin
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## FOWA BOARD SPOTLIGHT: CHARLIE LOOMIS



This issue we're shining the spotlight on Charlie Loomis. As associate general counsel at Alexander & Baldwin, Inc., Loomis brings valuable professional experience and a long-held passion for the ocean to our non-profit organization's board of directors. We also extend a special mahalo to Charlie's company, Alexander & Baldwin, Inc., for its recent \$2,000 donation to FOWA!

When asked why he joined the FOWA board, Loomis recalled the impact the Waikiki Aquarium had on him during his youth. "I love the ocean and loved the Waikiki Aquarium when I was a kid," he recalls. "Being a part of FOWA has pushed me to connect, get involved, learn about the Aquarium and take a deeper interest in our fish and critters."

Loomis' favorite thing about the Aquarium is its family-friendly environment. "The Waikiki Aquarium is welcoming; it's a beautiful, convenient, fun and educational place for the whole family."

As for his favorite marine animal? "Everyone's favorite sea animal, the Honu!"







# CRITTER CORNER

## PARROTFISH

**Parrotfishes**, called uhu in Hawaiian, inhabit shallow, tropical seas around the world. They are easily recognized by their parrot-like beak of fused teeth, a bluntly-rounded head, large scales, and brilliant colors. Like their relatives, the wrasses, parrotfishes have a single continuous dorsal fin and swim with their pectoral (side) fins making lazy rowing motions. Most range in size from less than 12 inches (30 cm) to nearly three feet (90 cm) in length. Some South Pacific species can reach lengths of over six feet (1.8 m).

Parrotfishes travel alone or in mixed groups close to the reef. They are primarily herbivores, grazing on the fine seaweeds that grow on rock or dead coral surfaces. A few species, like the spectacled parrotfish, may also feed on living coral. The grooves that parrotfishes often leave on rocks or coral indicate that as they scrape the rocks for food, they also remove the underlying rock or coral skeleton as well. A pair of hard, grinding plates in the throat (pharyngeal teeth) crushes the rock into a fine powder, and after it passes through the digestive tract, it is eliminated as sand. As such, parrotfish are important reef-eroders and more important in the production of sand than any other group of animals in tropical seas. It has been estimated that a large parrotfish may produce as much as a ton of sand a year!

Parrotfishes are diurnal, meaning they're active by day. At night, they seek shelter among the rocks and coral of the reef, while smaller individuals hide themselves

by secreting a cocoon of mucus around their body. Some scientists have suggested that the cocoon may provide sensory defense, masking or containing the parrotfish's scent so that night-active predators cannot sense it. Other researchers propose that the cocoon keeps small night-active predators off the fish's body, acting as a mosquito net for marine parasites. At night, parrotfishes are easy to approach as they sleep in their shelters, and can sometimes even be handled before they become alert enough to swim away.

Parrotfishes have been difficult to classify and name because, like the wrasses, they show different color patterns according to their age and sex. The spectacled parrotfish (*Scarus perspicillatus*), for example, is reddish brown as a juvenile, then develops a pale tail spot when it becomes a reproductive female. When it later changes sex to become a male, it develops brilliant blue-green color with pink markings. Males of this species reach two feet (61 cm) in length. The spectacled parrotfish, or uhu-uliuli, has been reported from Hawai'i and Johnston Island (to the south).

In the days of early Hawai'i, uhu were a favorite fish. Not only are there several Hawaiian names for the different sizes and color forms of the parrotfishes, but there are also many Hawaiian legends inspired by this beautiful and remarkable fish!



# VOLUNTEER & STAFF SPOTLIGHT

## WE LOVE OUR VOLUNTEERS!

The Waikīkī Aquarium is blessed to have the most wonderfully passionate volunteers who truly are the heart of the Aquarium! Since our founding, volunteers have played an invaluable role in performing the Aquarium's daily operations and creating a welcoming environment for visitors to learn about the wonders of marine life. Diverse in age, background and life experiences, our volunteers hail from places as far as the East Coast to right here in Waikīkī.

In line with our mission to inspire and promote understanding, appreciation and conservation of Pacific marine life, the Waikīkī Aquarium enlists volunteers who care deeply about Hawai'i's diverse marine landscape and are eager to share their knowledge with kama'aina and visitors from around the world. Our volunteers serve in a wide range of positions, including Aquarium Educators,

Aquarist Assistants, Native Garden Caretakers, Gift Shop Cashiers and many more. We also have a dedicated group of longtime volunteers who return year after year to join us at every special event and beach and algae cleanup the Aquarium hosts.

Although the Aquarium is currently closed, we still want to maintain a connection with our volunteers. Our efforts to keep Aquarium volunteers engaged include our monthly volunteer newsletter, weekly emails and most recently, diving into the world of virtual volunteer enrichments. We miss the daily interactions and talk story sessions with our volunteer family and look forward to working together with them again soon.

Please visit our website [www.waikikiaquarium.org](http://www.waikikiaquarium.org) for the latest Aquarium updates or to check out our live cam virtual experiences.



*Judy Wright, Gift Shop Volunteer*



*Robert Takase, Garden Volunteer*



*Jane Mann and Ricky Bloxson Aquarium Educator Volunteers*

# RESEARCH UPDATES

## NON-NATIVE CORALS IN KANE'OHE BAY *by Josh Maxwell*

I recently had the opportunity to take a boat ride out to Kane'ohe Bay with staff from the Department of Aquatic Resources. We were taking a look at some unusual corals that were found on one of the reefs there. They were large, colorful colonies with some unusual growth forms. At first glance I could tell that these corals weren't native to Hawai'i and, eventually, they would become a problem.

"Why would they be a problem? Coral is coral and the more of it there is the better right?" Unfortunately, this isn't the case. Since the Hawaiian Islands are so isolated, we have many endemic species of animals that live here and nowhere else in the world, making it especially important to protect these species with the utmost effort. These non-native species can grow rapidly, so much so that they can compete with our own native coral species. With this in mind, removal is very important to protect

our native coral reefs and help keep these corals from becoming invasive.

The question of how these corals got here is something on which I can only speculate. Most likely someone illegally had a coral reef aquarium in their home and got tired of taking care of it. Instead of disposing of them properly, the keeper released them into the wild thinking they wouldn't do any harm to the native ecosystem. One should never release non-native species into local ecosystems, as the damage can be massive. Just look at the lionfish plague on the east coast of the mainland U.S. as an example.

Fortunately, the Waikiki Aquarium has an amnesty policy for anyone who brings us aquatic animals that aren't native to the Hawaiian Islands. So, if you find that you can't or don't want to take care of your aquarium anymore and you have animals that aren't from the islands, please bring them to us here at the Aquarium. They will have the best home possible where they can live long happy lives!

## INSIGHTS INTO HANAUMA BAY AMIDST COVID-19 PANDEMIC

While the COVID-19 pandemic has completely upended normal life, its associated travel restrictions and beach closures have had an unexpected impact on our marine life, particularly at Hanauma Bay Nature Preserve.

With the absence of thousands of visitors frequenting Hanauma Bay on a daily basis, the nature preserve has seen a variety of significant improvements. As a result of this absence, the Hawai'i Institute of Marine Biology (HIMB) has conducted a series of surveys during the COVID-19 closures in order to determine the impact of human absence on the site. Below are some preliminary results from the study, which is ongoing:

"The monk seal and water clarity data sets have

comparisons to the carrying capacity study during Year 1. The monk seal data shows an increase in activity during the COVID closure, but it is not statistically significant because of the low sampling numbers.

From preliminary observations during the closure, average water clarity was 2.0 +/- 0.9 meters clearer during the COVID-19 closure when compared to days in 2018 that were closed to the public and 4.9 +/- 1.0 meters clearer during the COVID-closure when compared to days open to the public. On average the Bay is 42% clearer during the COVID-19 closure than on a day open to the public, and 18% clearer during than on Tuesdays when closed to the public. Water clarity within Hanauma Bay is significantly different when comparing open and closed days to the public ( $p < 0.001$ ), open days to the public and the COVID-19 closure ( $p < 0.001$ ), and closed days to the public and the COVID-19 closure ( $p < 0.001$ ) (Independent-Samples Kruskal-Wallis Test)."

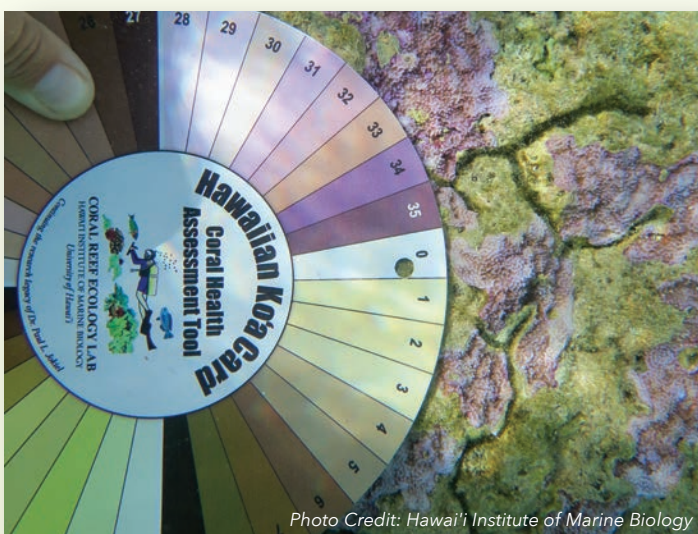


Photo Credit: Hawai'i Institute of Marine Biology



Photo Credit: Hawai'i Institute of Marine Biology PC Anke Roberts



Photo Credit: Hawai'i Institute of Marine Biology PC Anke Roberts



# FOWA UPDATES

## SUPPORT FOWA THROUGH HUKI CAMPAIGN

Although the Waikīkī Aquarium is temporarily closed, the Friends of the Waikīkī Aquarium remain committed to supporting the Aquarium and its mission. And, while our members can't physically visit the animals at this time, there are other opportunities to interact with the Aquarium through virtual activities, webcams and other educational content that can be found on our website. FOWA has also extended all memberships for the same amount of time that the Aquarium is closed.

It's costly to run the Aquarium. Monthly basic operational costs exceed \$250,000, and include utilities, animal feeds, janitorial supplies and freight, services, and salaries (including fringe) for 20+ staff. Many of these costs are still in place even though the Aquarium is currently closed. Without admissions, facility rentals and special events, the Aquarium needs our support more than ever.

We are asking our members and everyone who loves the ocean to huki the Waikīkī Aquarium during this challenging time. In 'ōlelo Hawai'i, huki is translated as, "to pull or tug; to draw, stretch, or reach; to support." Please give to our Huki campaign so that we can pull the Aquarium through this challenging time. With every donation over \$25, you are eligible to receive a FOWA dry bag, great for the beach and other outdoor activities.

Please visit [www.fowaquarium.org/donate/](http://www.fowaquarium.org/donate/) to give online or you can complete our donation form and mail to: PO Box 15518, Honolulu, HI 96830.

## SUBSCRIBE TO OUR E-NEWSLETTER

In an effort to be more eco-friendly and due to the ever-changing situation due to COVID-19, we encourage all members to subscribe to our e-newsletter. Not sure if you're already on our list? Email [membership@fowaquarium.org](mailto:membership@fowaquarium.org).

## WELCOMING SUSAN SCOTT TO THE FRIENDS OF THE WAIKĪKĪ AQUARIUM OHANA

FOWA is excited to collaborate with Susan Scott, locally renowned writer of marine-related organisms and topics. For decades, Susan's Ocean Watch articles were a weekly feature in the Honolulu Advertiser/Star-Bulletin. She now has her own blog and is allowing us to feature her articles on our website. Throughout Scott's blog, readers are whisked away on a marine adventure as she chronicles the life of a nudibranch, the adventure of snorkeling through Hawai'i's pristine waters, and many other underwater experiences. You can enjoy reading Scott's blog via our FOWA e-newsletters and on our FOWA website at [www.fowaquarium.org/ocean-watch-collaboration-with-susan-scott](http://www.fowaquarium.org/ocean-watch-collaboration-with-susan-scott).

Inspired by Susan Scott's Ocean Watch blog, we invited FOWA members and ocean enthusiasts to share their own ocean explorations for a chance to be featured in our new FOWA Sea-Sights blog. Each week, we selected one winner to receive a FOWA dry bag and have their blog post featured on our website, our social media pages, and other publications. Read about their incredible ocean adventures on our blog at [www.fowaquarium.org/sea-sights](http://www.fowaquarium.org/sea-sights).



# //////////////////// SEA WALL OF FAME //////////////////////

## A SPECIAL MAHALO TO THE FOLLOWING DONORS

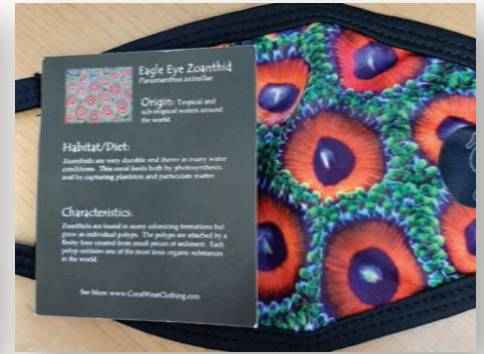
- Dr. Deborah Lee, *President & Founder of Ala Wai Neurology Consulting LLC*
- Marilyn & Steve Katzman
- Linda & Bob Nichols
- Gaylord & Carol Wilcox



Deborah Lee, *Retired M.D. with a passion for marine biology, started volunteering in May 2019 and has dedicated more than 200 hours of service to the Aquarium.*



Greg Boxold recently donated this beautiful black coral to be used for education.



200 masks donated by CoralWear Clothing.

- Mahalo to Jean Carr for her donation made in memory of volunteer Diane Amuro.

## MAHALO TO ALL OF OUR DONORS

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