

# Kilo iʻa

2016 | JULY | AUGUST | SEPTEMBER

## EDUCATION & CONSERVATION



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TO SURVIVE  
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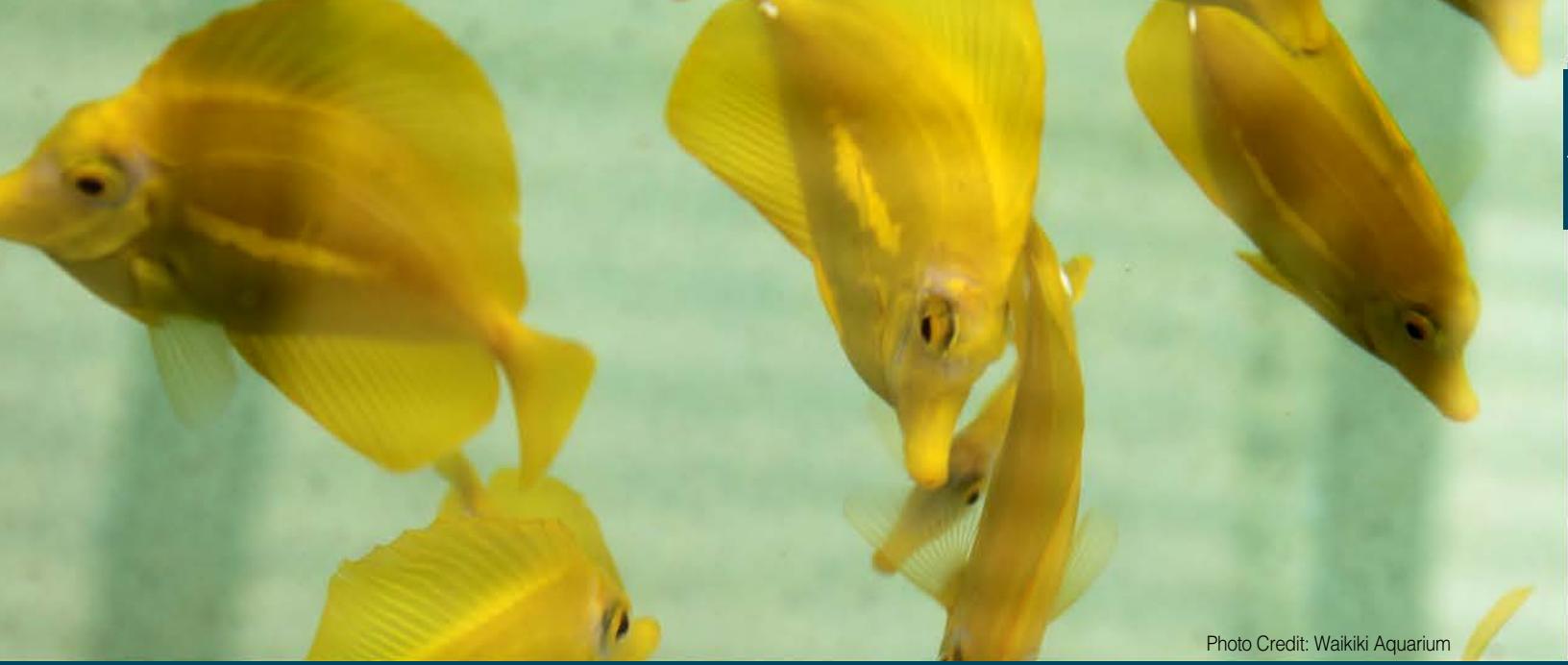


Photo Credit: Waikiki Aquarium

## DIRECTOR'S MESSAGE

**A**s we slip into June, preparations are in full swing for the Ke Kani O Ke Kai concert series, which has become a must-go event on the Honolulu summer activities list. Each of the five concerts features two or three top local entertainers, with food catered by a signature local restaurant, and beers, wine and refreshments also available. Run by FOWA, this is their main fundraising activity, and tickets are available at discounted prices to members. So why not check elsewhere in this issue for concert dates and entertainers and plan on spending an evening under the stars on the Aquarium lawn? See you there!

Of course, those of you with small children, and those who are still children at heart, will know that the sequel to Disney-Pixar® **Finding Nemo** comes to the silver screen on June 17. Titled **Finding Dory**, this film focuses on Dory, the blue surgeon fish of the first film. An article on surgeonfish can be found in this issue, and a new "Nemo" exhibit, featuring the clownfish and anemones symbiosis, will be unveiled this month in Gallery 1 at the Aquarium. The popularity of "Nemo" led to a huge demand for clownfish by the pet trade, which were collected from the wild. Demand was so high that Thailand and other countries banned the collection and export of clownfish due to the depletion of their natural clownfish populations. Interestingly, all the clownfish in our new exhibit were bred in captivity by our friends at Oceanic Institute, and point the way towards a more-sustainable marine ornamental fish industry. The yellow tangs pictured above are also especially noteworthy: they are the first yellow tangs ever bred in captivity, also by Oceanic Institute, and will be going on display in various exhibits throughout the Aquarium. Some have also been released onto the reef at the back of the

Aquarium, along with captive-bred mullet and moi, to help repopulate the depleted fish populations found there.

Captive bred fish point the way towards restoring Hawaii's reefs to their former state, but critical in this perspective is the need to restore or preserve the reef habitat as well. Hawaii's coral reefs have been affected by physical damage, pollution, global climate change, invasive species, bacterial infections and coral bleaching, and it is essential to restore the reefs themselves before undertaking any major fish restocking programs. At the back of the Aquarium, a partnership between ourselves and University of Hawaii Department of Botany has, since 2002, been removing alien algae in a community wide program. This is the longest alien algae removal project in Hawaii, and one of the most successful, since it measures what species of algae have been removed and how much. All algae removed is weighed, giving a scientific underpinning to the project. Elsewhere in this issue, Dr. Ruth Gates educates us about coral conservation and the ground-breaking approach she and her team at Hawaii Institute of Marine Biology over on Coconut Island, are doing. The multi-pronged approach to these problems, which are being addressed by a group of expert scientists who collaborate well, and which also involves active participation of the local community, offers strong hope that Hawaii's reefs can be conserved and, perhaps, one day restored to their former glory.

Enjoy your summer!

Dr. Andrew Rossiter  
Director, Waikiki Aquarium

# Kilo ia

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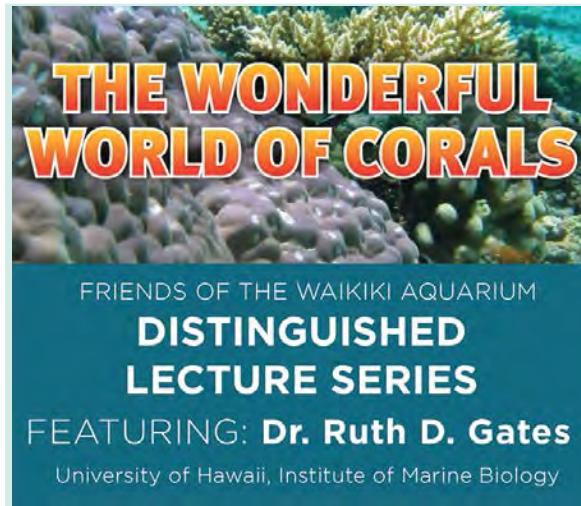
### MANA'OE

Traditionally, the kilo ia was an expert of fish and marine life. He studied the behaviors and movements of ia. 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.

# RECENT EVENTS

## DISTINGUISHED LECTURE SERIES

It was standing room only on April 7, when Dr. Ruth D. Gates of the University of Hawai'i's Hawai'i Institute of Marine Biology spoke about "The Wonderful World of Corals" as part of the Aquarium's Distinguished Lecture Series. Dr. Gates highlighted the threatening conditions facing coral reefs in Hawai'i and around the globe, the importance of coral reef conservation, and how the knowledge of coral reefs could improve the ecosystem. Held at Thurston Memorial Chapel, the lecture was supported in part by Professional Programs, Punahoa School.



## MAUKA TO MAKAI

In celebration of Earth Day, on April 23, the Waikiki Aquarium hosted the 9th Annual Mauka to Makai Environmental Expo presented by the Department of Health-Clean Water Branch and City and County of Honolulu Environmental Services with support in part by Kamehameha Publishing. The Aquarium was among 15 other organizations that highlighted the impact we all make on water sources from Mauka to Makai through special keiki and family activities. Thanks to all who came out in support of this important topic!



Keiki and their families learned how they can positively impact ocean health by visiting booths at Mauka to Makai.

## WORLD OCEANS MONTH

We celebrated World Oceans Month throughout June with a number of special events highlighting just how critical ocean health is to climate, sustenance and recreation. Among the events were beach clean-ups, special Afternoons at the Aquarium, an Outrigger Resorts OZONE Day, a Painting in Paradise event with artist Patrick Ching, and special presentation on key conservation issues from NOAA, Pacific Islands Ocean Observing System, and other partners.



Volunteers helped clean up trash and debris from beach and park areas surrounding.



Left to right:  
Gordon Walker,  
PacIOOS; Lisa  
Golden, Waikiki  
Aquarium; Don  
Young, Volunteer

## SEA GRANT LECTURE SERIES

In May, the Waikiki Aquarium hosted members of the University of Hawaii Sea Grant College Program for a series of classroom presentations that were free and open to the public. A number of ocean-related issues were discussed, including the Ala Wai Watershed, Waikiki Beach management and maintenance, and King Tides, a citizen science project documenting high tide events.



Matt Gonser, extension agent for the University of Hawaii Sea Grant Program, spoke to attendees about the Ala Wai Watershed Partnership.

## Finding Dory

On June 12th, we celebrated the long awaited release of the new Disney-Pixar® film, Finding Dory. Keiki and their families joined us for special activities, received Finding Dory bags, posters and sunglasses and had the opportunity to win advanced screening passes to see the movie on June 13th.



Waikiki Aquarium staff sporting fin-tastic Finding Dory gear.

# UPCOMING EVENTS

## KE KANI O KE KAI SUMMER CONCERTS

Our popular summer concert series, Ke Kani O Ke Kai presented by Outrigger Resorts, continues through August 4, with live entertainment from some of Hawaii's top performers and delicious food under the stars. A major fundraiser for the Friends of Waikiki Aquarium, Ke Kani O Ke Kai is one of the best and most unique ways to experience the Aquarium.

- July 7 Kupaoa; Mark Yamanaka; and Amy Hanaiali'i
- July 21 Lehua Kalima; Maunalua; and Raiatea Helm
- August 4 Jeff Peterson; Melveen Leed; and Natalie Ai Kamauu

A different restaurant is paired with each concert. Doors open at 5:30 p.m. The concerts begin at 7 p.m. and conclude at approximately 9:30 p.m.

Tickets are priced at \$50 for adults, \$20 for children (ages 5-12) and free for children 4 and under. Tickets for Friends of Waikiki Aquarium "FOWA" members are priced at \$30 for adults, \$15 for children. Food, beer, wine and other beverages will be sold separately. For tickets or information, visit [www.waikikiaquarium.org/kkokk](http://www.waikikiaquarium.org/kkokk).

Photos: featured performers (to come)  
Include sponsor logos (to come)



## FAMILY NIGHT: MARINE MYSTERIES

### FAMILY NIGHT: MARINE MYSTERIES

Mark your calendars now for the Aquarium's annual Family Night - taking place on Friday, August 26, from 6:00 to 8:30 p.m.

This year's theme is Marine Mysteries and super sleuths are invited to learn about the most mysterious habitat on earth—the ocean. Participants will solve Reef Riddles to be granted the title of Ocean Detective. Scientists will reveal new discoveries, and tell of still unsolved mysteries. Amazing, cryptic animals will be specially displayed for the night. This is family fun for all ages – bring a picnic and enjoy the warm summer night.

Admission is \$12 per person and \$10 for members. All paid children's admission tickets will receive a free marine mysteries kit. Children 2 and under are free.

Register online at [www.waikikiaquarium.org/interact/activities-classes/](http://www.waikikiaquarium.org/interact/activities-classes/)

# JELLY KARMA

By Kelley Lam, Aquarist



About 10 years ago, not long after the Waikiki Aquarium's Ocean Drifters Gallery opened, I became the aquarist in charge of the Jelly Exhibit and culture room. Back then I believed that through my successes of breeding and exhibiting jellies, and my frustrations working with these high maintenance and unpredictable creatures, I had attained a certain level of Jelly Karma. Since then Jellyfish husbandry has come far with advanced techniques discovered and practiced by leading institutions, such as Monterey Bay Aquarium.

Earlier this year, the Monterey Bay Aquarium hosted its 2nd Jelly school for which only 10 applicants from the aquarium industry around the world were selected. Designed for advanced aquarists with previous knowledge and experience of jellyfish husbandry, I jumped at the opportunity to apply not only to learn the secrets of Monterey Bay's jelly keeping but also to learn and gain contacts from the other candidates as well. In early March, I received the news that I had been accepted along with nine other jelly aquarists from around the world.

On April 5, 2016, the 10 of us Jelly schoolers met outside the Monterey Bay Aquarium eager to start. We were warmly welcomed by several of the MBA jelly staff and led to a classroom with desks outfitted with a notebook, dissecting scopes, and materials for our course. The organization, presentation and professionalism of the aquarium could have been intimidating but the friendliness of the hosts, the small class size and the common interests of jellies made everything inviting. Among all of the technical topics to which we were

introduced, one of the key concepts brought up was "Jelly Karma" and will be one of the most valued concept I would bring back to the Waikiki Aquarium.

The first day our class went over Jelly taxonomy, maintenance, food and feeding, acquisitions, pathogens, tank design, water quality, life support. The second day we followed with some hands on maintenance, culture demonstrations, culture care and techniques. We also had an opportunity to do some hands on work with identifying jelly polyps and ephyrae. The third day we wrapped it up with population management and troubleshooting.

One of my favorite activities was the behind-the-scenes tour of the jelly facility. Every course subject went well into discussion with invaluable information among the nine participating students. In the end it was surprising how close our group became in just three days. We all promised to keep in touch, help each other, and most important, send jellies when we have them. In our final course wrap up, "Jelly Karma" was once again mentioned. Working with each other, sharing information, sending surplus jellies to institutions is all a part of obtaining "Jelly Karma," one of the most important concepts brought up in Jelly School.

A sincere thank you to all the jelly school experts from the Monterey Bay Aquarium, and to the Waikiki Aquarium for allowing me to attend Jelly School.



Photo Credit: Monterey Bay Aquarium



Jelly School instructors and attendees.

# VOLUNTEER SPOTLIGHT

*Looking for a new challenge or to gain new training?  
Want to inspire the next generation of marine life enthusiasts?  
Interested in joining a rewarding and meaningful community program?*

## *How about becoming a Waikiki Aquarium School Support Program Docent?*

Docents function as teachers, interpreters, and guides for the School Support Program. They interact with kindergarten through sixth grade students, using Education Department curricula, teaching aids, and methods to deliver interactive thematic presentations on Hawaiian marine life, conduct on-site exhibit tours that reinforce grade level themes, answer student and teacher questions, and interpret and explain Aquarium exhibits. They stimulate observation and discovery by students and guide close-up observations and hands-on interactions with interpretive specimens, prepared or living.

### **Training**

The free four-week Docent training course takes place every Fall. Classes for 2016 will be held August 30 through September 22, in the Aquarium classroom on Tuesday & Thursday evenings from 6:30 – 9:00 p.m., and on Saturday mornings from 9:00 a.m. – 12:00 noon.

### **Commitment**

You will work one three-hour shift each week for the duration of the school year (October – May). Shifts are from 8:30 – 11:45 a.m. on Tuesday, Thursday or Friday.

### **Check out what some of the current Docent volunteers have to say about the program!**

*"I have volunteered other places in Hawai'i and on the mainland, but nowhere have I felt more appreciated than at the Waikiki Aquarium! The Docent program training prepares you well to tour your first group of students. Have no fear!"*

– Faith

*"If you love marine environments and have interest in reef interactions, and want to share that enjoyment with elementary level students, then you should consider the Docent Program. The benefits you receive from appreciative and eager students is priceless!"*

– James

*"What I like most is being able to serve the community and learn a lot along with the school children. We share essential messages such as; All living things need oxygen, food, and shelter. We are all similar, yet different at the same time."*

– Aunty Mieko

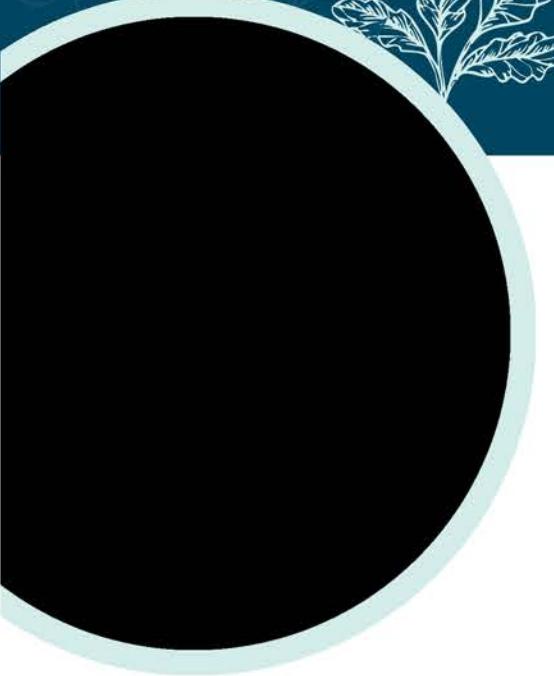
*"Prior to one of our first grade classes a student was asked, What is a Docent? He replied, 'A Docent is a teacher that doesn't get paid!' The adult chaperones and volunteers all laughed, they knew that was true. The entire Docent team has a common interest in sharing their knowledge in order to fulfill the Aquarium's Mission."*

– Paulette





# FRESH FACES



## JOHNATHAN ALLEN CASEY

**POSITION**

Quarantine and Disease Specialist

**EDUCATION**

George Fox University; University of Washington

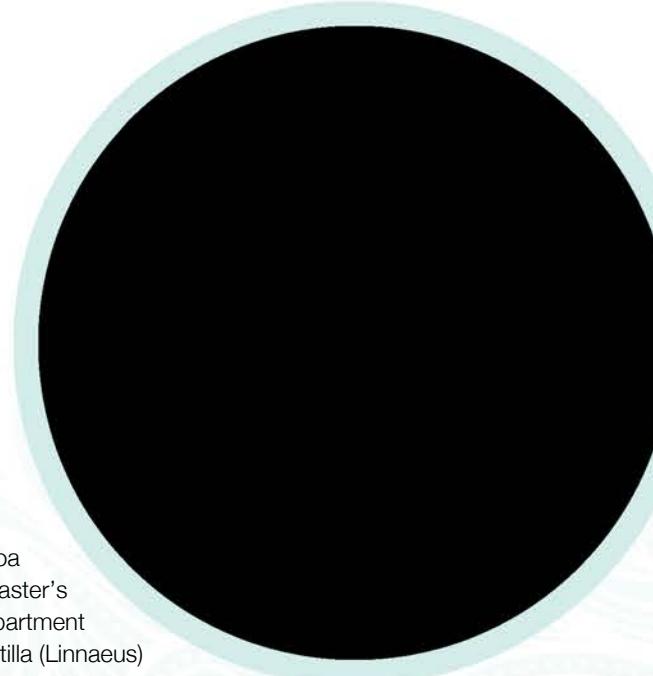
**FAVORITE AQUARIUM RESIDENT**

xxx

An avid underwater photographer, Johnathan is a member of Padi Diving Society and Divers Alert Network (DAN), as well as Aquatic Animal Life Support Operators (AALSO) and Aquarium Related Professionals (ARP). Born and raised in Seattle, Washington, he attended both George Fox and the University of Washington.

Before joining the Aquarium, Johnathan was Reef Life Supervisor at Sea Life Park and Senior Aquarium Technician at Clayton Aquariums in Washington state. He currently serves as a Volunteer Diver, Educator and Environmental Steward at Wikoliana Educational Excursions.

In his free time, Johnathan loves free diving and scuba diving throughout the islands.



## LAUREN VAN HEUKELEM

**POSITION**

Volunteer Program Coordinator

**EDUCATION**

Education: B.S. in Marine Biology; M.S. in Marine Biology, University of Hawaii at Mānoa

**FAVORITE AQUARIUM RESIDENT**

Caulerpa in the pipe fish tank

**FAVORITE AQUARIUM RESIDENT**

Chambered Nautilus because it is one of the oldest Cephalopods alive.

Born on Oahu, where she lived in Hauula and Palolo Valley till the age of 9, Lauren loves to swim and participate in outdoor activities. Afterward, she moved to the Big Island and lived in Laupahoehoe and Honomu on the Hamakua Coast.

Lauren graduated from Hilo High School and attended the University of Hawaii at Manoa where she was on the women's water polo team and earned both a Bachelor's and Master's in Marine Biology. Van Heukelem was advised by Dr. Celia Smith of the UH botany department on her master's thesis entitled "Does the initial diet of hatchery-reared Tripneustes gratilla (Linnaeus) impact their effectiveness as a biocontrol for invasive seaweed?", which looked at the diets of collector urchins -on five native species of algae and three invasive species that are present in the Waikiki region.

In her short time at the Aquarium, Lauren has already assisted with the coordination and running of multiple events. She has assisted with the Outrigger's OZONE initiative, the first of the KKoKK concert series and Dory Day. Of her job, Lauren says "Each volunteer is unique and my job is to get to know them and help them to achieve their goals as a volunteer as well as provide a fun and educational environment for our patrons."

Lauren is a member of the Society for Integrative and Comparative Biology (SICB), USA swimming, the Honolulu Museum of Art and an active member of DAN who volunteers regularly at algae and beach cleanups around Oahu. She enjoys working with community members and giving back to the local community and the environment.

# Assisting Corals to Survive the Future

*Ruth Gates, PhD*

*Director and Research Professor  
Hawai'i Institute of Marine Biology*

Many reefs, including some in Hawaii and the Great Barrier Reef, have experienced the worst bleaching event on record this past year. Coral bleaching is a stress response driven by warmer than normal seawater temperatures. With climate change intensifying, oceans will continue to warm and this will push coral reefs closer and closer to the temperature at which they will collapse completely. This would be catastrophic for humans because we depend on animals that live there for food. Corals also deposit skeletons that form reefs and protect our coastlines from wave energy and they are support tourism and influence the economic health of the places they grow. Although it's easy to get demoralized by the scale of the problem, there are large differences in the way that corals themselves respond to the same temperature disturbance. Some corals seem unaffected and healthy when exposed to conditions that cause bleaching in the corals right next to them. In the Gates Lab at the University of Hawaii's, Hawai'i Institute of Marine Biology's (HIMB) we are focusing on these strong corals and exploring whether we can harness their strength to develop or breed corals that are able to survive the warmer and more acidic waters of our future ocean. Our goal is to develop corals that can be used to stabilize reefs while society takes care of the bigger issue of reducing fossil fuel burning, action needed to slow and stop climate change.

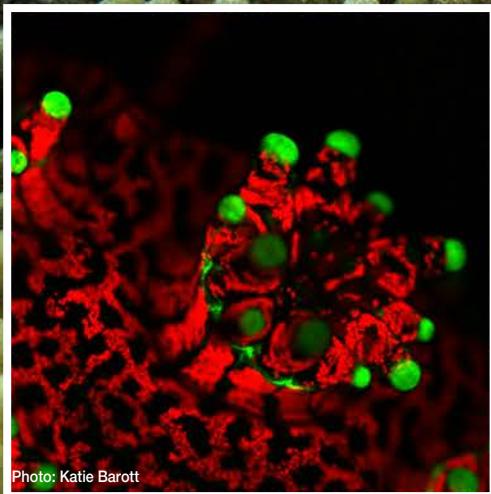


Photo: Katie Barott

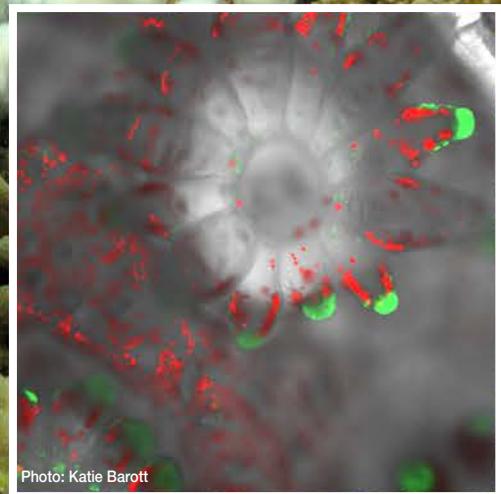


Photo: Katie Barott



Photo: Vulcan, Inc. (Ruth Gates and Elizabeth Lenz, Graduate Student)

The ability of some corals to survive stresses that kill others lies in fascinating aspects of their biology that vary depending on the coral species or among members of the same species. Corals are ancient marine organisms that have been on the planet for over 200 million years and they are able to thrive in the clear, nutrient poor waters of the tropics because they form an intimate partnership, a symbiosis, with tiny plant cells, dinoflagellates, called zooxanthellae that live embedded in the corals tissues inside their cells! These zooxanthellae do what all plants do, they photosynthesize. They, combine gaseous carbon dioxide with water using the energy of the sun to produce oxygen and a small sugar. They give this sugar to their coral host, so essentially, the coral has a food factory living inside of it. In return the zooxanthellae get protection and access to waste products produced by the animal, which they recycle for growth.

A bleaching coral turns pale and eventually turns white because their white coral skeletons show through transparent coral tissues devoid of zooxanthellae. The word zooxanthellae literally means “brown blob” and the characteristic brown color of corals reflects the presence of millions of zooxanthellae inside the transparent tissues of the coral itself. The coral zooxanthellae symbiosis breaks down during bleaching because the zooxanthellae no longer photosynthesize

efficiently and the animal sees them as being a threat rather than a benefit so kicks them out. A coral that goes completely white has lost well over ninety percent of its zooxanthellae and is likely to die unless the conditions that are causing the interaction to malfunction are lifted. If conditions improve, the small number of zooxanthellae left in the corals' tissues start dividing, their populations increase and gradually obscure the white skeleton and the coral browns back up and survives.

This symbiosis is an extraordinary example of co-evolution of two very different organisms that live, grow and communicate one another over extended periods of time and in doing so tune their biology to one another. There are hundreds of species of corals on the reef, and all of those species are different shapes and sizes. We now know that there are also hundreds of different types of zooxanthellae that associate with these corals. These zooxanthellae all behave slightly differently in interacting with their host and the type of zooxanthellae a coral has can influence whether it bleaches or remains a healthy brown color when faced with warm water. It is also clear that corals with just one type of zooxanthellae in their tissues do better than corals that partner with many different types.

Armed with this type of knowledge, the Gates Lab has started to think about

ways we might take action and develop strategies to help corals survive the changes in the marine world that are predicted for the future. Can we, for example, assist coral survival by tweaking that combination of zooxanthellae to develop corals that can withstand future warmer conditions? And if this is possible, how do we make sure that these corals reproduce and pass along their zooxanthellae so that the future generations of corals are also better suited for the future? Can we selectively breed the corals that don't bleach? Can we use these corals to restore partially damaged reefs?

At this point we don't know whether we're going to be successful, but we are committed to trying. The scary reality is that unless we start being more proactive in taking care of and actively intervening to sustain reefs, we are facing the global collapse of reef ecosystems by 2100.



Photo: Raphael Ritson-Williams

# BLUE PALETTE TANG

By Guerin Earhart, Education Specialist

Darting about in mid-water, the blue palette tang is certainly among the most spectacular of coral reef fishes. Even before the 2003 Disney-Pixar® classic film, Finding Nemo, made Dory a household name, the blue palette tang was a popular marine fish in its own right.

Recognized for its vibrant coloring, most of the tang's body is a deep royal blue, its intensity of blue rivaled only by the blue damselfish. It has a yellow tail and a black design reminiscent of a painter's palette along the top of the body. Blue palette tangs are capable of adjusting the intensity of their hue - from light blue to deep purple. These colors will often fade as the fish ages. And, as the fish ages, dots similar to freckles form on the face and become more prominent.

Scientists know the blue palette tang as a member of the Surgeonfish family. Surgeonfishes are aptly named for the sharp spine on the side of their tail, which may be used for both defense and offense. Surgeonfishes are able to slash other fishes (or humans who do not handle them carefully) with their sharp caudal spine by a rapid side sweep of the tail. Some species, including the blue palette tang, have bright hues around their spines to serve as warning coloration.

Surgeonfishes are diurnal (day active), and typically sleep at night in small caves or crevices in the reef. Blue palette tangs are native to tropical reefs across the Indo-Pacific, most commonly inhabiting clear, current-swept terraces of seaward reefs. They typically live among cauliflower corals (*Pocillopora*), and to resist strong currents have developed a tendency to lie down on their side when stressed. This apparent "fainting" serves the fish well in the wild, when needed.

Blue palette tangs are omnivores, meaning they eat both plants and animals, feeding on zooplankton and grazing on algae. Younger tangs feed almost exclusively on plankton, but their diet will diversify as they age to include algae and invertebrates. Blue palette tangs are often found swimming in large schools cruising over the reef top. These mixed schools, a sign of a healthy reef, are often composed of multiple species within the Surgeonfish family.

Blue palette tangs are a relatively hardy aquarium fish. Although they may simply be called blue tang in the Aquarium trade, this is the official common name of a different western Atlantic species that is a solid blue color. They have relatively small fins, yet these tangs have a secondary secret weapon for defense. Interestingly, the blue palette tang is one of a few species of surgeonfish that retains venomous fin spines as an adult. These numerous spines cover the back and tail. When caught by a predator, the fish will unfold these spines and thrash violently. The results are usually deep, painful wounds.

During mating season, small harems will form with one male and several females. Females broadcast their eggs into the water column while the males will rush to fertilize them. The resulting larvae must survive as part of the plankton population, prior to settling in a coral territory. They will wedge themselves into a hole in the reef when they sleep at night.

As the title character and star of a new movie, the blue palette tang is sure to become more popular than ever. We encourage you to "Find Dory" among the myriad of amazing species in our award-winning Barrier Reef exhibit, complete with likely the oldest giant clam raised in captivity. Other favorites in the beautiful Barrier Reef exhibit include the red-toothed triggerfish and the fire clownfish nestled among their anemones' tentacles. We hope this amazing window to the sea will inspire you to learn more about coral reef ecology and conservation.

# CLASSES & ACTIVITIES

## BEHIND THE SCENES

Every Thursday at 3:00 p.m.

Learn what makes the Aquarium run, from fish food to quarantine, and many stops in between. Climb up and peer into the backs of the exhibits. Visit the Coral Farm and the Jelly Hale, where sea jellies are raised. Minimum age 7 years; youngsters must be accompanied by an adult. Accessibility is limited. \$16/adult, \$10/child; members receive a 40 percent discount.

## AFTERNOONS AT THE AQUARIUM

Every Wednesday at 3:00 p.m.

Every Wednesday, the Aquarium hosts an interactive learning activity near the Monk Seal Deck. Join us for a critter encounter or a marine science craft designed for families. Free with admission to the Aquarium.



## ACTIVITY STATIONS

July 6  
July 13  
July 20  
July 27

The Teen Volunteer program will have free hand-on activities and crafts, all day on Wednesdays in July. Come learn about Hawaiian Sea Snails or learn about Hawaiians and the Sea. Free with admission to the Aquarium.

## CLASSES FOR GROUPS

Waikiki Aquarium offers a variety of classes for community and family groups from 8 to 45 people. Book a Private Aquarium Tour or Critter Encounter for your clan. Or, an Aquarium After Dark or Fish School for your club or scout group. Call 808-440-9007 for more information or email reservations@waqarium.org.

Register online at [www.waikikiaquarium.org/interact/activities-classes/](http://www.waikikiaquarium.org/interact/activities-classes/)

## CRITTER ENCOUNTERS

June 2, 14, 16, 28 and 30 at 9:30 am  
July 7, 14, 21 and 28 at 10:30 am

Sneak a peek behind the scenes, and learn about Hawaiian reef animals. Hold a sea star, feel a sea cucumber and feed an anemone. This half-hour program is a great addition to any visit to the Waikiki Aquarium. Perfect for families with children 4 and up. \$5/person, plus Aquarium admission.



***Join us for one of our many youth activities!***



# *June is* **WORLD OCEANS MONTH**

When we think of the ocean in Hawaii, most of us instantly associate recreational activities, such as surfing, swimming, stand up paddle boarding, canoeing, angling, etc. But beyond that, why should we care about the oceans?





## OCEANS ARE VAST:

More than 97% of the Earth's water occurs as the salt water that forms the oceans. The average depth of the ocean is 2.5 miles, and more than 90% of the ocean exists in the deep sea, known as the abyssal zone. They provide 99% of the Earth's living space, and form the largest known space in our entire universe that is known to be inhabited by living organisms. Even today, more than 90% of the oceans remain unexplored – we know more about the surface of the moon than our own Earth's biggest habitat.

## OCEANS ARE COMMERCIALLY IMPORTANT:

In today's global economy, oceans are a critical link between trading partners that may be at the opposite sides of the Earth. More than 90% of international trade between countries is carried by ships, and 76% of all U.S. trade involves some form of marine transportation. Almost 50% of international communications use underwater cables. The U.S. ocean economy employs almost three million people, and produces \$282 billion in goods and services annually.

## OCEANS PROVIDE US WITH FOOD:

More than 3.5 billion people depend on the oceans for their primary source of food, and ocean fishing accounts for 80% of the world fish catch. Fish sourced from the oceans provide about 16% of global animal protein consumed by humans. In addition to fish and shellfish, ingredients from the sea are also found in foods such as ice cream, peanut butter and soy milk.

## OCEANS PROVIDE US WITH MEDICINAL PRODUCTS:

The oceans are the source of many medicinal products, including those that help fight cancer, heart disease, leukemia, Alzheimer's disease, arthritis, pain, stroke, epilepsy, and a myriad

other diseases and conditions. Thirty percent of all marine-derived medications under development, and 75% of recently patented marine-derived anticancer compounds, come from marine sponges.

## OCEANS REGULATE OUR CLIMATE:

The oceans cover nearly 71% of the Earth's surface and transport heat from the equator to the poles, regulating our climate and weather patterns. The top ten feet of the ocean hold as much heat as the entire atmosphere.

It used to be said that the Amazon rainforests were the lungs of the planet because of the oxygen they produce through photosynthesis. However, we now know that the oceans provide up to 80% of the air we breathe... that is two of every three breaths you take!

They also store fifty times more carbon dioxide than the atmosphere, and absorb 30 – 50% of the carbon dioxide produced by burning fossil fuels. The continued capacity of the oceans to absorb these unnaturally large amounts of carbon dioxide is questionable, and even now, the existing carbon dioxide load has caused ocean acidification, with huge negative implications for marine ecosystems worldwide.

In World Oceans Month, and beyond, reflect on the manifold importance of the oceans, and the sobering facts that they are under greater threat from global climate change, pollution, overfishing, etc., than ever before, and that less than one half of one percent of marine habitats are protected, compared with 11.5% of global land area. And then seek ways in which you can act to conserve and restore the oceans to their former state.



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MARCH - MAY 2016

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Mahalo to all those who support us through their generous donations.

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Left to right: Leighton Lam, Owner & Artist, Leighton Lam Designs; Dr. Andrew Rossiter, Director, Waikiki Aquarium; Kaily Smitson, Sales Director, Leighton Lam Designs

### FRIENDS OF WAIKIKI AQUARIUM BOARD MESSAGE



### VOLUNTEERS ARE VITAL!

Yes, our small army of helpers make possible the Aquarium's mission to educate, inspire, and promote understanding, appreciation, and conservation of Pacific marine life. While the Friends of the Waikiki Aquarium (FOWA) board is made up of volunteers largely concerned with fundraising, they are mindful of and grateful for the contributions of fellow volunteers who help with summer concerts, tour student groups through the galleries, teach eager visitors at the edge-of-the-reef, show up for invasive algae clean ups, or take on many other important roles.

In an era of budget cuts and uncertain funding from traditional sources, volunteer hours are increasingly important to our mission and even our aging facility. Research from 2015 pointed to a ratio of eight volunteers to each paid staff position. Each of these passionate volunteers spends hours each week working at their particular job, and we need to thank our volunteers in the blue t-shirts for making our Aquarium a better place.



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