

PACIFIC **Currents**

Aquarium of the Pacific

FALL 2017



Mighty Mangroves



Reducing Plastic Pollution

This issue affects every part of the ocean, as well as lakes and rivers.

THE AQUARIUM OF THE PACIFIC has joined with eighteen other aquariums across the country to raise awareness of the threats plastic pollution in our ocean, rivers, and streams pose to aquatic life and ecosystem health. As part of this campaign, the participating aquariums have pledged to eliminate plastic bags and straws at their facilities and significantly reduce or eliminate plastic beverage bottles.

Plastic is found in almost every aquatic area on Earth—from the ocean, to lakes, to rivers. According to a recent study, over half of all marine mammals are impacted by plastic in their lifetimes. Aquatic animals ingest plastic, mistaking it for food, or can become entangled in plastic trash. It is estimated that about 8.8 million tons of plastic enter the ocean each year.

You can make a difference by looking for ways to reduce your consumption of single-use disposable plastic.

Because plastic is not biodegradable, it remains in our environment permanently, simply breaking down into smaller and smaller pieces. At this time, it is unknown how this will affect the health of our environment and human health

in the long term. However, plastic absorbs toxins in marine environments and when ingested by fish and other marine animals, these toxins may travel up the food chain.

Through our choices we can make a difference. By using alternatives to single-use disposable plastics in our everyday lives and asking companies that manufacture plastics to make changes, we can help reduce the amount of plastic in our environment. Reduce your consumption of single-use plastics by carrying a reusable water bottle with you, using reusable shopping bags, and asking for beverages without a straw when dining out.

As this campaign begins, you will notice some changes in your visitor experience at the Aquarium. Shoppers in the Aquarium's gift stores have been taking their purchases home in paper bags since 2011, when a citywide ban on plastic bags was enacted in Long Beach. The Aquarium switched from plastic to compostable drinking straws as of July 10, 2017, and will significantly reduce or eliminate plastic beverage bottles by December 1, 2020, transitioning to fountain drinks in its dining facilities.

The Aquarium's water quality lab has been particularly effective in reducing single-use plastics. Technicians use cleaning processes that allow them to reuse items that are normally used once in labs and thrown away. This has resulted in a reduction of an estimated 502 pounds of plastic since 2013.

This is an example of the kind of creative thinking needed to transition away from single-use disposable plastic products. The Aquarium will continue to seek out alternatives and solutions to the problem of plastic pollution.



Plastic drinking straws are among the top items collected at beach clean-ups.



Reusable water bottles, shopping bags, and other non-disposable items can make a difference.



Refill your water bottle at the Aquarium.

Letter from the CEO

Dear Members,



ONE OF THE AQUARIUM'S important functions is serving as a gathering place for people to connect with ocean issues and to examine our relationship with our planet. The Aquarium regularly hosts forums that bring experts and stakeholders together to explore these issues and to look for ways to move us toward a more sustainable future.

In November the Aquarium will host a two-day forum called *Sato-umi in the Anthropocene*. This is the second of two forums co-sponsored by the American Honda Motor Company. *Sato-umi* is a Japanese term that encompasses the relationship between coastal and marine areas and humans and how humans manage these areas for sustainability. Forum speakers will discuss the theory and application of *sato-umi* in the Anthropocene, the current geological era denoted by the dominating global influence of humans and our activities on the planet. Speakers will include experts from Stanford University, the National Oceanic and Atmospheric Administration (NOAA), the University of California, Santa Barbara's Bren School of Environmental Science and Management, and the National Marine Protected Areas Center. Also, Avis Kuuipoleialoha Poai, an expert in Native Hawaiian Law from the University of Hawaii at Manoa, will introduce *ahupua'a*, the Hawaiian analog to *sato-umi*.

After presentations are made, a panel will explore how *sato-umi* might be applied in Southern California. Panelists will include experts from the University of Southern California's School of Policy, Planning, and Development; Duke University; the California Council on Science and Technology; and the University of California, Davis' Policy Institute for Energy, Environment, and the Economy. After the forum, the Aquarium will release a report on its findings. To read reports from past forums, visit aquariumofpacific.org/mcri/forums/.

We also provide opportunities for the general public to get involved through our lectures and through our Aquatic Academy. The fall Aquatic Academy course will explore the role the World Ocean plays in modulating Earth's climate and how the World Ocean and its ecosystems are responding to climate change. Participants will learn from experts about the implications of those changes for the future. Speakers will include scientists from NASA's Jet Propulsion Laboratory, Scripps Institution of Oceanography, NOAA, and the University of California, Irvine. For more information, visit aquariumofpacific.org/events/info/aquatic_academy/ and to register call (562) 590-3100.

As you may have noticed on recent visits, the construction for the new Pacific Visions wing is well underway, and the locations of some facilities have been shifted to accommodate normal visitor activities. We thank you for your ongoing support during construction and hope you can excuse the change in scenery while we work on this important addition to serve you better in the future.

Sincerely,

Jerry R. Schubel

Cover: Mangrove in Sumatra, Indonesia

CREDIT: ISTOCK.COM/DAVORLOVINIC



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Pacific Currents is published for members of the Aquarium of the Pacific. Please send your comments to our editorial staff at pacificcurrents@lbaop.org.

Our Mission: To instill a sense of wonder, respect, and stewardship for the Pacific Ocean, its inhabitants, and ecosystems.

Our Vision: To create an aquarium dedicated to conserving and building natural capital (nature and nature's services) by building social capital (the interactions between and among peoples).

Pacific Currents Staff: Editor/Writer: Claire Atkinson | Copy Editor: Cecile Fisher | Designer: Andrew Reitsma | Contributing Artist: Alice Hsieh | Contributing Writer: Lindsay Yates.

Aquarium Hours: Open daily from 9:00 a.m.–6:00 p.m. except December 25.

Membership Office Hours: 8:00 a.m.–5:30 p.m. daily

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The Aquarium of the Pacific is a non-profit 501(c)3 institution. To provide exciting and innovative exhibits and educational programs, we rely heavily on the generous donations of individuals, foundations, and corporations.

HONDA
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ASSOCIATION OF ZOOS & AQUARIUMS

Look for Tadpoles in FROGS Exhibit

The lifecycle exhibit is located on the left side as you enter the FROGS area.

Look for the inch-long, brown-colored tadpoles in the water at the bottom of the exhibit.



ANDREW REITZMA



THE TRICOLOR POISON DART FROGS (*Epipedobates tricolor*) on display in the *FROGS: Dazzling and Disappearing* exhibit have successfully reproduced, resulting in tadpoles. Native to Ecuador, Tricolor Poison Dart Frogs are found on lowland forest floors and in wetlands.

These frogs produce a clutch of about ten eggs, which the male cares for. After the eggs hatch the male will carry the tadpoles on his back to be deposited in water.

Aquarium staff expect tadpoles to be visible in this exhibit throughout the year.



The chick hatched in May to Roxy and Floyd, also the parents of Skipper, Lily, Heidi, and Anderson.

ROBIN RIGGS

Tenth Penguin Born at the Aquarium



The new chick is now in the June Keyes Penguin Habitat with the rest of the penguins.

A MAGELLANIC PENGUIN CHICK HATCHED at the Aquarium in late May and went on public view in the June Keyes Penguin Habitat in August. Parents Roxy and Floyd cared for the baby penguin until it was ready to go to its behind-the-scenes nursery to learn to take whole fish from keepers for feedings and to swim in shallow pools.

This year's chick represents the fifth generation of Aquarium-born penguins and is the tenth to hatch here. Two penguins hatched in 2016: Fisher and Astaire. One penguin hatched in 2015 (Lily), four hatched in 2014 (Paddles, Jayde, Mattson, and Skipper) and two hatched in 2013 (Heidi and Anderson).

Magellanic Penguins (*Spheniscus magellanicus*) are a temperate species native to the coasts of Argentina and Chile in South America. It takes between thirty-eight and forty-three days of incubation before a Magellanic Penguin egg will hatch. Magellanic Penguin parents take turns incubating the eggs on the nest and feeding and raising the chicks after they hatch. The chicks fledge, or replace their downy newborn feathers with watertight adult feathers, after about ninety days.



Aquarium Announces Two Baby Shorebirds

Visit the new arrivals in Shorebird Sanctuary.

TWO BABY BLACK-NECKED STILTS hatched in late June in the Aquarium's Shorebird Sanctuary exhibit. Gigi, their mother, has lived in this exhibit since it opened in 2002, but this year was the first that she laid eggs and hatched chicks. The two young birds are on public view in the exhibit with their mother and father, George, an Aquarium resident since 2015. When they hatched, the chicks

Black-Necked Stilts live in estuaries and wetland areas.

had light-colored, downy feathers. Today, their plumage and size is similar to that of adults, but the dark feathers on their backs still have lighter-colored markings.

Black-Necked Stilts (*Himantopus mexicanus*) can be found in and around shal-

low brackish and freshwater estuaries and marshes, marginal wetland areas, shallow lake shores, coastal bays, prairie ponds, and flooded fields. They are usually migratory birds, but there are some resident populations in coastal Southern California and western Mexico. Locally, there are smaller groups at the Bolsa Chica Ecological Reserve, Seal Beach National Wildlife Refuge, and the northern area of Upper Newport Bay.

Females lay dark-spotted, buff-colored eggs that are about 1.7 inches long. Both parents incubate the eggs for twenty-two to twenty-six days and then care for the chicks. The chicks leave the nest about two hours after hatching. Their down is light brownish-gray with black spots. Chicks fledge in about twenty-eight to thirty-two days.



ROBIN RIGGS

At hatching, the chicks' plumage was light-colored and downy. Now, it is white and black like the adults.

New Bird to Join Program Animal Group

Program animals participate in animal meet-and-greets and events in the local community.

THE AQUARIUM RECENTLY ACQUIRED a year-old Blue-Throated Macaw (*Ara glaucogularis*). After undergoing a quarantine period of about sixty days in the Molina Animal Care Center (MACC), this large parrot is intended to join the Aquarium's group of animals and birds known as program animals. These animal ambassadors are used in animal meet-and-greet sessions usually held outside the MACC. Native to Bolivia, Blue-Throated Macaws grow up to 34 inches long and feed on seeds, fruits, nuts, and berries. This species is critically endangered; the primary threat to their populations in the wild is illegal capture for the international pet trade.

Aquarium visitors will have the opportunity to learn about this bird's biology, behaviors, and conservation issues while seeing it up close.

The Aquarium's new macaw is in training to meet Aquarium visitors up close.

ROBIN RIGGS



Mangroves are critically important ecosystems for both marine life and people around the world—but they are rapidly disappearing.

Mighty Mangroves

COASTAL PROTECTORS

A dense forest of shrubs, many as big as trees, standing on a tangled net of stilt-like roots lines the coast in the tropics. These are mangroves. Here in Southern California people may not be as familiar with mangrove forests because to see them, you would have to travel south of the Mexican border into Baja or across the country to Florida's coast.

WHAT ARE MANGROVES?

Mangrove forests are made up of shrubs or trees that grow in the intertidal zone along shorelines in tropical and subtropical areas. The term mangrove can apply to both the individual shrub or tree and the ecosystem as a whole. Their branch-like roots, also called prop roots, grow in a dense network that is submerged at high tide. The roots break the force of tides and waves, allowing sediment to settle, and provide shelter for fish and other marine life that make their homes among the mangroves.

There are seventy to eighty species of mangrove trees, and they can tolerate varying levels of salinity. Mangrove trees have adapted to survive in saltwater with special mechanisms to remove salt from their tissues. Some expel salt through their leaves, while others avoid taking up salt through their roots. They grow in waterlogged soil that lacks oxygen, instead absorbing oxygen through their exposed roots.

Many mangrove species have an interesting method of reproduction. Instead of dropping seeds that grow in soil, mangrove seedlings sprout while they are still attached to the parent plant. The seedlings sprout roots and leaves, then fall into the water below where they float until they reach a spot shallow enough for their roots to take hold.

Brown Pelicans roost in mangrove trees.



RACHEL FRIEZE, ECOSYSTEMS INSTITUTE

A Mangrove Cuckoo at J.N. Ding Darling National Wildlife Refuge in Florida.



NOAA

Great Egrets roost in mangroves in the Florida Keys National Marine Sanctuary.

In the United States mangroves are found along the coast of Florida and in U.S. territories Puerto Rico and Guam.

WHERE ARE MANGROVES FOUND?

Mangroves are found along coastlines in most tropical and subtropical areas, including Central America, the Caribbean, the northern coasts of South America, the coasts of central Africa, Southeast Asia, Australia, and the Indo-Pacific. In the United States, mangroves are found along the coast of Florida and in U.S. territories Puerto Rico and Guam. The largest single tract of mangroves in the world is the Sundurbans, a group of low-lying islands, mudflats, and tidal waterways in the Bay of Bengal straddling the border of India and Bangladesh.

Why are mangroves so important?

MANGROVE ECOSYSTEMS

Mangroves are like dense cities. Animals like the endangered Bengal tiger native to the Sundarbans can stealthily hunt for prey in the mangrove forest.

Reptiles, amphibians, and a few small mammals like rats live in the mangrove forest. Animals like crocodiles, sea turtles, crabs, fish, and shrimp live in the water among the mangrove root systems. Manatees forage for food in the warm, shallow water near mangroves. Insects populate the mangroves above water and at its surface. Algae, oysters, mussels, sea anemones, brittle stars, barnacles, and sponges grow on mangrove roots and help filter the

water. Snails and worms inhabit the muddy soil. Species of orchids and bromeliads also grow among mangrove branches.

Birds, particularly migratory birds, rely on mangroves for nesting, roosting, foraging, and wintering sites along their migratory routes.

In addition to providing habitat, foraging grounds, and protective nurseries for many types of animals, mangroves protect coral reefs from being covered by sand and sediment. Their ability to slow tidal and wave action and allow sediment to settle protects the reefs and also acts as a water filtration system.



DR. IGOR SMOLYAR, NOAA/NMFS/NOEC

MIGHTY MANGROVES

While mangroves do not take up a very large portion of our planet's surface, they play a key role in protecting coastlines and providing economic value.

Many fish and shellfish species that are sold commercially rely on mangroves as juveniles while they grow to adult size, then as adults for foraging. In addition to seafood, people also use mangroves as a resource for timber and a place to gather honey, firewood, and medicines.

During storms, mangroves serve as a buffer on the coastline, breaking the impact of high tides, strong waves, and storm surges. Areas that have mangroves suffer less damage

from hurricanes and cyclones. The mangroves' sturdy roots also stabilize soil, preventing erosion.

Mangroves are also considered key "blue carbon" habitats, because they are especially efficient at absorbing and storing atmospheric carbon—an important function as increasing amounts of carbon emissions enter our atmosphere leading to climate change. They are natural "carbon scrubbers," pulling carbon dioxide from the air and storing it in the soil for thousands of years. With all these factors taken together, it is estimated that mangroves provide an economic value of about \$8,100 per acre.



AT THE AQUARIUM

Aquarium visitors can see examples of mangrove forest habitats at the mudskipper and archerfish exhibits outdoors on Harbor Terrace.

Mudskippers live among the mangroves, digging burrows into the muddy soil between mangrove roots. This exhibit even features a simulated tide, with water levels rising and falling twice per day. The archerfish exhibit shows how fish live among mangrove root systems protected from predators and foraging for prey. Upside-down jellies were recently added to this exhibit.

Kids can also experience what it's like to crawl through mangroves in the play area next to Shark Lagoon.

Learn more about mangrove conservation when you visit these exhibits at the Aquarium, and read more on page 27 about how sustainable seafood can help mangroves.



DAVID BURDICK

Threats to Mangroves

Despite providing many benefits to both humans and marine life, mangrove forests are disappearing at a rate of 1 to 2 percent per year. The primary threats to mangroves include deforestation, pollution, water diversion, and rising sea levels.

SEA LEVEL RISE

Rising sea levels, a result of climate change, could force mangroves to grow further inland, but they will only survive if there is available open space.



POLLUTION

Human activity on land causes pollutants like agricultural pesticides to wash into mangrove habitats. Mangroves help filter these pollutants from the water, but in excess these can damage mangrove forests and the plants and animals that make up the mangrove ecosystem.



DEFORESTATION

Mangrove forests are cut down and removed to make space for seafood cultivation, primarily shrimp farms, and other development, like coastal resorts and harbors. Mangroves are also unsustainably harvested for timber and animal fodder.



WATER DIVERSION

Dams and irrigation that alter tidal flow or the paths of rivers can starve mangroves of the sediments they need to grow or increase the salinity of their ecosystem beyond the normal range.



In a study published in 2011, researchers estimate that 30 to 50 percent of mangrove areas have been lost in the past fifty years.

* Member Events

Please join us for these select events just for our members and donors.

Adult Member Night

■ **Thursday, September 28**
6:30 P.M.–9:00 P.M.

Calling all adult members (ages 21 and up, only)! This is the night when you can explore a kid-free Aquarium and get some quality time in with your favorite animals.

- Free for members. Member guests receive 20% off general admission.
- RSVP: (562) 437-3474 by September 24

Member Month

■ **Entire Month of November**

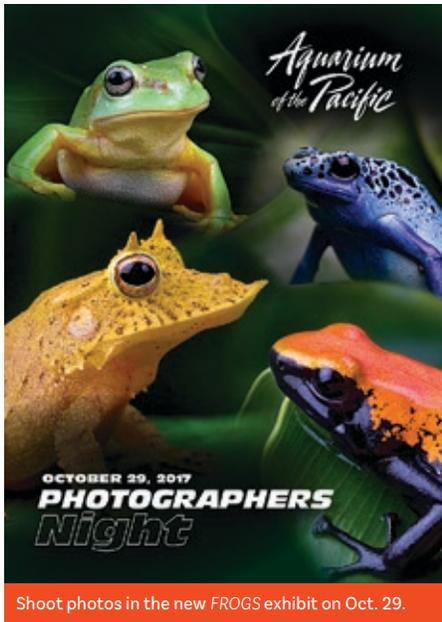
Thank you for being part of the Aquarium family! As a token of our appreciation, we're taking the entire month of November to celebrate YOU, our supportive and loyal members. Get ready for a month-long discount on guest tickets and other surprises that will delight you.

Member Appreciation Night

■ **Thursday, November 16**
6:30 P.M.–9:00 P.M.

Aquarium members are jelly-rific, which means absolutely fantastic and utterly terrific! That's why we're throwing a special celebration just for you. Enjoy an evening full of sea jelly-themed fun, and learn about some of the most majestic members of our animal family. Plus, members who are 21 and older won't want to miss the adult lounge in the Ocean Science Center with a cash bar.

- Free for members. Member guests receive 20% off general admission.
- RSVP: (562) 437-3474 by November 12



Shoot photos in the new FROGS exhibit on Oct. 29.

* Special Events

The Aquarium of the Pacific hosts a variety of performances, fundraisers, dinners, and other special events throughout the year. Check our website for more details and additional events.

Seniors Day

■ **Wednesday, October 4**
8:30 A.M.–1:30 P.M.

Event sponsored by:



The Aquarium will open its doors for free to people ages 50 and above on this special day. Special exhibits and presentations for seniors will be featured.

- Free for members and visitors ages 50 and over with a valid photo ID.

Shark Lagoon Nights

■ **Fridays, October 6 - December 29 (except 10/20, 10/27 & 11/10)**
6:00 P.M.–9:00 P.M.

Get up close with the ocean's ultimate predators for free during Shark Lagoon Nights. Guests will have the opportunity to touch bamboo and epaulette sharks as well as cownose rays and see large sharks such as sand tiger and zebra sharks in the Aquarium's Shark Lagoon. Cold beer, sodas, and snacks are available for purchase.

- Free for everyone.

Aquarium 5K and One-Mile Kids Fun Run

■ **Saturday, October 7**
7:30 A.M.–2:00 P.M.

The Aquarium will be partnering with the JetBlue Long Beach Marathon to host the annual one-mile Kids Fun Run and 5K Run/Walk, which will run through the Aquarium. Sign up early as both events are expected to fill up quickly. The Kids Fun Run will start in age group waves from 9:00 a.m. to 10:30 a.m.

- Aquarium 5K: \$40
- Kids Fun Run: Free

Sea Fare

■ **Saturday, October 21**
7:00 P.M.–11:00 P.M.

Fall into a festival of flavors at the Aquarium's fourteenth annual Sea Fare Fundraiser. Sip and savor your way through the Aquarium galleries with an open bar and tastes from over 25 local restaurants, bid on an array of items in the live and silent auctions, and dance with the fish. Proceeds will benefit the Aquarium's education, conservation, and animal care programs.

- \$125 per person

Photographers Night

■ **Sunday, October 29**
5:30 P.M.–10:00 P.M.

This is your chance to take the photos you have always wanted at the Aquarium. Professional and amateur photographers are invited to capture the Aquarium's wildlife during exclusive "photographers only" hours. Meet vendors, test new equipment, attend workshops, and meet other wildlife photo enthusiasts.

- \$26.95 per member, \$29.95 per non-member

Night Dive

■ **Friday, November 10**
7:00 P.M.–11:00 P.M.

The Aquarium presents Night Dive, an adults-only event featuring food and drink, live performances, and other special programming for an 18-and-over crowd. Discover the Aquarium at night, and explore its galleries in a new way, with DJs and local artists creating an eclectic ambiance. Live bands take the stage in front of the Honda Blue Cavern, turning the Great Hall into Long Beach's unique music venue.

- Free for Aquarium members, \$17.95 for non-members
- Open to ages 18+ only

For tickets and information, visit aquariumofpacific.org or call (562) 590-3100, ext. 0.

Veterans Day

■ **Saturday, November 11**
9:00 A.M.–6:00 P.M.

In celebration of Veterans Day, the Aquarium honors veterans and military personnel. These men and women are invited to enjoy the Aquarium with free admission on Veterans Day.

- Free for veterans and military personnel with service I.D.

Scout Day

■ **Sunday, November 12**
9:00 A.M.–6:00 P.M.

Cub Scouts and Girl Scouts are invited to complete steps toward badges, utilizing self-led activity sheets that are specifically designed for scouts.

- **Members: Free with reservation. Non-members: \$14/adult, \$8/child; must be purchased in advance on the Aquarium website.**

Autism Families Night

■ **Sunday, November 12**
6:00 P.M.–9:00 P.M.

Spend a special evening at the Aquarium exclusively for families with adults or children with autism. The entire Aquarium, except Lorikeet Forest, will be open until 9:00 p.m. On this evening, guests can enjoy the tranquility of the Aquarium’s exhibits and meet 11,000 animals from the world’s largest ocean.

- **Free for members, \$7 for non-members**

Thanksgiving Lunch

■ **Thursday, November 23**
11:00 A.M.–5:00 P.M.

Come gobble gobble with the sea otters and the entire Aquarium family. You and your family can meet over 11,000 animals from the world’s largest ocean, and savor an expanded menu of traditional Thanksgiving buffet in the Aquarium’s Café Scuba.

- **Members: \$45 per adult, \$22.50 per child. Non-members: \$55 per adult, \$27.50 per child.**

Aquarium Closed

■ **Monday, December 25**



New Year’s Eve Night Dive

■ **Sunday, December 31**
8:00 P.M.–1:00 A.M.

This special edition of Night Dive will feature live bands, DJs, and the usual Night Dive offerings, plus a midnight countdown in the Great Hall. Café Scuba will be open, providing “small bites.” Tickets go on sale November 1.

- **Cost | \$24.95 for Aquarium members, \$29.95 for non-members.**

* Festivals

Experience our community’s diverse cultures and their connections to the ocean and environment. All festivals are free for members; member’s guests receive 20% off regular admission.

Scarium of the Pacific

■ **Sat. & Sun., October 14–15**
9:00 A.M.–5:00 P.M.

Discover the creatures lurking in the depths at the Aquarium’s eighteenth annual Scarium of the Pacific—a spooktacular, educational Halloween event for the whole family. Enjoy special Halloween programs, including the annual children’s costume contest, the creepy coloring contest, magic shows, underwater pumpkin carving, spooky storytelling, and kooky crafts, and meet eerie animals in the Great Hall.



Autumn Festival

■ **Sat. & Sun., November 4–5**
9:00 A.M.–5:00 P.M.

Delve into the arts, cuisines, cultures, and marine environments of Asia during the Aquarium’s sixteenth annual Autumn Festival. The Autumn Festival highlights the traditions and cultures of Japan, China, Korea, and the Philippines through a weekend of learning opportunities and family entertainment celebrating the rich diversity of Asian and Asian-American cultures.



Aquarium Holidays

■ **December 2–22**
9:00 A.M.–5:00 P.M.

Aquarium Holidays features special holiday décor, a display of gingerbread houses, snow fall in the Great Hall, and the Aquarium’s costumed characters in their holiday outfits. Visitors can also enjoy holiday music, shopping, and a special holiday menu offered daily in Café Scuba. On weekends the Aquarium will have a snow play area, underwater shows with Santa Diver, children’s crafts, photo opportunities with Santa and holiday characters, and Hanukkah storytelling with opportunities to play dreidel.



November 18: NOAA and Our Planet Day

NOAA and Our Planet Day

Saturday, November 18
9:00 A.M.-5:00 P.M.

Find out what the National Oceanic and Atmospheric Administration (NOAA) does for you, our nation, and our world at this annual event. The event will feature interactive booths where you can learn more about a variety of NOAA programs, the ocean, and weather. Learn how NOAA, a government agency, works to understand and predict changes in Earth's environment to help protect people and property and to conserve and manage coastal and marine resources.



December 2-3: Holiday Treats for the Animals

Holiday Treats for the Animals

Sat. & Sun., December 2-3
9:00 A.M.-5:00 P.M.

In celebration of the holiday season, Santa Diver will be delivering an ocean of gifts to the Aquarium for its animals, including penguins, sea otters, seals, sea lions, lorikeets, and fish. Holiday Treats for the Animals festival kicks off Aquarium Holidays, which runs through December 22, featuring festive décor, a display of gingerbread houses, holiday music and shopping, "snowfall" in the Great Hall, a special holiday menu in Café Scuba, and daily appearances by Aquarium characters in their holiday outfits.

* Guest Speakers

Lectures are free for Aquarium members, teachers, seniors age 62 and up, and students with valid ID and advanced reservations. Otherwise, tickets are \$5. All lectures are streamed live and start at 7:00 p.m. Visit aquariumofpacific.org/news/lectures.

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Chip Heath | *The Power of Moments*

Tuesday, October 17

Author Chip Heath will preview his newest book, *The Power of Moments*, about how we can build moments that are more meaningful and memorable. The book will explore why certain brief experiences can jolt us, elevate us, and change us—and how we can learn to create such extraordinary moments in our life and work. This could have many applications, from teachers crafting a lesson that students would remember twenty years later to parents designing moments to inspire their kids. Heath is the Thrive Foundation of Youth Professor of Organizational Behavior in the Graduate School of Business at Stanford University.

Murray Fisher | *Billion Oyster Project*

Thursday, October 19

Murray Fisher will discuss the Billion Oyster Project and its goal to restore one billion live oysters to New York Harbor by 2035 and to engage the community in that effort. The project plants oysters in New York Harbor as a way to improve water quality, engage students in science learning, restore a native oyster species, and engage the community. Fisher is the executive director of the New York Harbor Foundation and founder of the New York Harbor School.



October 19: Billion Oyster Project.



October 24: Elizabeth Keenan.

Elizabeth Keenan | *Tools for Tackling Issues in Conservation: Lessons from Social Science*

Tuesday, October 24

Behavioral science can help bridge the gap between abstract science and practical, on-the-ground programming. While behavioral science has played a large role in health and financial policy, it is less commonly applied in environmental conservation. Elizabeth Keenan will discuss novel tools to improve our ability to tackle some of our most pressing environmental issues, including how to foster and motivate environmentally friendly choices and communicate concerns about climate change to general audiences. Keenan is an assistant professor of business administration in the Marketing Unit at Harvard Business School. Prior to pursuing her doctoral studies, she spent nearly ten years in the education department at the Aquarium of the Pacific.

Luca & Sergio Gamberini | *Nemo's Garden*

Thursday, October 26

Sergio and Luca Gamberini, a father-son team and owners of SCUBA gear company Ocean Reef Group, have developed Nemo's Garden, a method for growing plants underwater in a biosphere. This could potentially introduce new areas for sustainable agricultural cultivation using minimal energy and protecting crops from pests and harsh weather. They currently operate five biospheres growing plants like basil and arugula off the coast of Savona, Italy. In their lecture they will explain the science behind Nemo's Garden and what it could mean for the future of sustainable agriculture.

Chris Lowe | Beach Babies: White Shark Nurseries of the Northeast Pacific

■ Thursday, November 2

Coastal waters, particularly areas with high seal and sea lion densities, can be important feeding grounds for white sharks. Female white sharks also come into coastal waters to give birth to their young, which have been found to use shallow open beach habitats and bays as nurseries. These areas provide safety, easily obtained food, and warm temperatures. Researchers have learned all this using a variety of new technologies, like acoustic and satellite transmitters, autonomous underwater and aerial vehicles (spybots), and underwater camera stations. In this lecture, Chris Lowe, professor of marine biology and director of the Shark Lab at California State University, Long Beach, will discuss what researchers think makes for a good white shark nursery and predictions of where the next ones might develop.

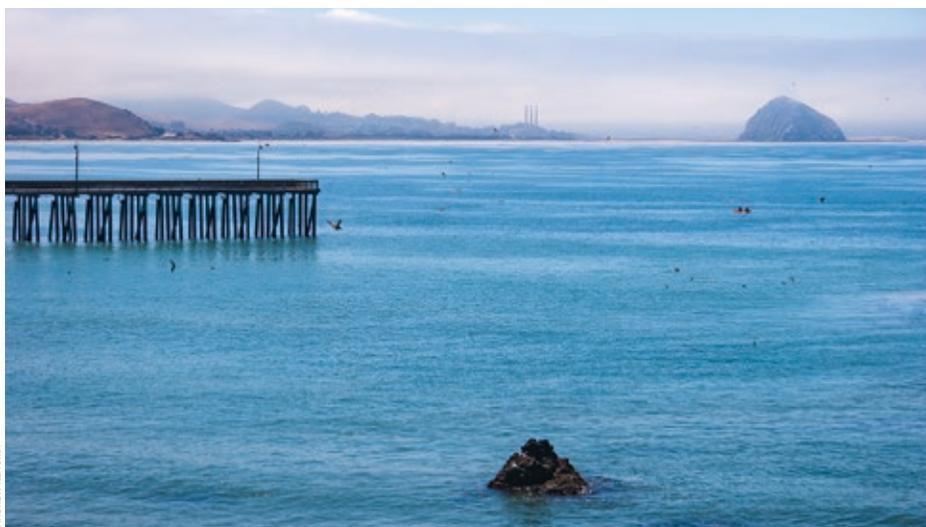
Nancy Knowlton | From Doom & Gloom to #OceanOptimism: Success Stories in Marine Conservation

■ Thursday, November 9

An unrelenting torrent of bad news about coral reefs dying, fish populations collapsing, and shorelines choked in plastic has led many to believe we have done irreparable damage to the ocean. Yet the past decades have also witnessed a growing number of successes in saving species, protecting places, harvesting wisely, reducing pollution, and restoring habitats. These and other examples inspired the Ocean Optimism initiative, whose goal is to recognize, learn from, replicate, and celebrate our successes. Knowlton is the Sant Chair for Marine Science at the Smithsonian's National Museum of Natural History and co-host of the Earth Optimism Summit in Washington, D.C.



November 9: Nancy Knowlton



ANDREW REITSMA

November 14: The New Blue Economy: A Revolution in our Relationship with the Oceans

Judith Kildow | The New Blue Economy: A Revolution in our Relationship with the Oceans

■ Tuesday, November 14

For centuries, societies believed the oceans were large enough to accommodate everyone and that they could take all our waste without harm. This proved wrong. Population growth, economic development, and massive consumerism, compounded by impacts of climate change, have shown that the oceans have limits and that we have surpassed them. Dr. Judith Kildow will discuss the development of a "Blue Economy" movement to change how we treat and think about our oceans. She is founder and director of the National Ocean Economics Program at the Center for the Blue Economy at the Middlebury Institute of International Studies at Monterey, California.

professor of Earth and planetary sciences at the University of California, Santa Cruz, and is a frequent contact for news media on questions of climate change, sea-level rise, and coastal erosion. Steinhardt is a former state administrative law judge and litigator, as well as a long-time conservationist and public interest advocate who is currently working with National Geographic on an upcoming book featuring his sea otter photography and storytelling.

Kim Steinhardt & Gary Griggs | The Edge: The Pressured Past and Precarious Future of California's Coast

■ Thursday, November 30

Kim Steinhardt and Gary Griggs will discuss and sign copies of their book, *The Edge: The Pressured Past and Precarious Future of California's Coast*. The book examines the California coast's past, present, and probable future in a time of climate change and expanding human activity. In this lecture the speakers will touch on personal adventures, science, nature, conservation policy, and history. Griggs is a distinguished

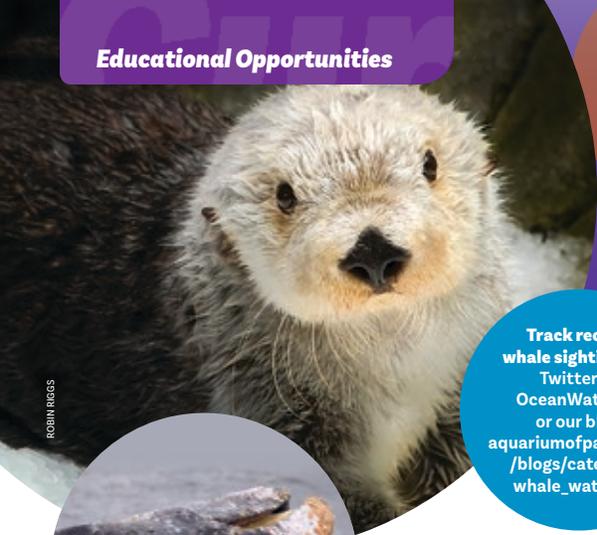
Nov. 30: Kim Steinhardt and Gary Griggs discuss their book, *The Edge: The Pressured Past and Precarious Future of California's Coast*.



*Aquarium
of the Pacific*







ROBIN RIGGS



Track recent whale sightings on Twitter @ OceanWatchLB or our blog aquariumofpacific.org/blogs/category/whale_watching

Whale Watching CRUISES

Gray Whale Watching Trips

■ Fall Season

Enjoy a voyage out in the open Pacific Ocean in search of one of the world's longest-migrating mammals. Learn new, exciting information about gray whales and other local marine life from an on-board Aquarium educator. Cruisers will also have the opportunity to spot dolphins, seals, sea lions, and other marine animals.

- **Members: \$25 per adult, \$20 per senior (ages 62+), \$15 per child (ages 3-11). Non-members (includes Aquarium admission): \$49.95 per adult, \$45.95 per senior, \$33.95 per child.**
- **2 to 2.5 hours**
- **(562) 590-3100, ext. 0**

Aquatic Academy

The Ocean and Climate Change

■ **Wednesdays, October 25–November 15**
7:00 P.M.–9:30 P.M.

In this four-week course for adults, explore with experts the role the World Ocean plays in modulating Earth's climate and how the World Ocean and its ecosystems are currently responding to climate change. Learn more about the implications of those changes for the future. Scientists and researchers from NASA's Jet Propulsion Laboratory, Scripps Institution of Oceanography, the National Oceanic and Atmospheric Administration, and the University of California, Irvine will share their research findings on the connections between the ocean and climate change.

- **\$35 per member, \$40 per non-member, \$10 extra for CEU credit through CSULB**



Tours & Encounters

These programs are opportunities to see the Aquarium in a different light and get up close to the animals.

Behind-The-Scenes Tours

See what it takes to maintain a world-class aquarium, from water filtration to animal care and feeding. Venture to the top of our largest exhibit and discover more about the Aquarium!

- **\$15 per member, \$19 per non-member**
- **Children must be age 7 or older.**

Animal Encounters

Animal encounters offer a chance to feed a sea otter, train a sea lion, feed a shark, or hang out with a penguin. Age restrictions apply.

- **\$99 per member, \$109 per non-member (Aquarium admission included). Pre-registration required at least 24 hours in advance.**

Dive Immersion

■ **Daily with reservation 3:00 P.M.–5:00 P.M.**

Certified SCUBA divers can dive in our warm 350,000-gallon Tropical Reef Habitat with more than 600 animals.

- **\$279 per member, \$299 per non-member**
- **Age 15 and up. Ages 15 to 17 require a supervising adult to also sign up for the dive.**

VIP Experiences

■ **By reservation.**

Get even closer to our animals in this all-new experience! Tour the Aquarium and meet two separate animals. Choose from Otters and Octopus, Penguins and Sea Lions, or Sharks and Rays. Participants must be 10 years old for VIP experiences, except for Sharks and Rays (minimum age: 13).

- **\$330 per member, \$350 per non-member (Aquarium admission included).**
- **Pre-registration required at least two weeks in advance.**



EDUCATIONAL OPPORTUNITIES



Family Programs

Public family programs give children of all ages the chance to participate in fun classes with an Aquarium educator. Every class brings another opportunity for learning more about the ocean, discovering new things about the Aquarium, and exploring marine life. Pre-registration is required.

Job Shadow Class

Four rotating themed programs.

- **First Saturday and third Sunday of every month**
9:00 A.M.-12:00 P.M.
- Ages 13 to 17
- \$35 per member, \$39 per non-member (Aquarium admission not included)

Family Overnights

- **Fridays, October 27 or January 12**
5:00 P.M.-7:00 A.M.

Grab your sleeping bag and prepare for an adventure at the Aquarium! Explore our exhibits with your family and touch marine animals like sharks, sea stars, and sea jellies. Choose from two evenings celebrating Halloween or the winter season.

- \$80 for members, \$90 for non-members
- Ages 5+

Parent and Me Programs

Beginning in January 2018 the Aquarium's Aquatots and Saturday Family Fun programs will be replaced with Parent and Me, a fun-filled class for adults and children ages 2 to 6.

Aquatots

- **Sept. 16, Oct. 21, Nov. 18 & Dec. 16** 10:00 A.M.-11:30 A.M.
- Ages 2 and 3 with an adult

Saturday Family Fun

- **Sept. 23, Oct. 28, Nov. 25 & Dec. 23** 10:00 A.M.-11:30 A.M.
- Ages 4 to 6 with an adult
- \$36 for adult/child member pairs; \$15 per additional guest. Non-members: \$49 per adult/child pair; \$20 per additional guest (Aquarium admission included).

Parent and Me

- **Every third Saturday beginning January 20** 10:00 A.M.-11:30 A.M.
- 2-6 years old with an adult
- \$19 per member/child pair; \$10 for additional guests. Non-members: \$49 per adult/child pair; \$20 per additional guest (Aquarium admission included).

Junior Biologist

Six rotating themed programs.

- **Second Saturday of every month** 9:30 A.M.-11:30 A.M.
- Beginning in 2018, Junior Biologist will also be available on the fourth Saturday of every month.
- Ages 7 to 12
- \$25 per member, \$29 per non-member (Aquarium admission not included)

Winter Camps

Dive into fun this winter! With programs for ages three to fifteen, we have a perfect camp experience for your child. Our camps feature exciting animal interactions, tours, crafts, games, and experiments. For more information, visit aquariumofpacific.org/camps or call (562) 590-3100.

Winter Sea Squirt Camp

- **January 2-4**
8:30 A.M.-11:30 A.M.
- \$95 per member child, \$120 per non-member child
- Ages 5 to 6

Winter Day Camp

- **December 27-29**
8:00 A.M.-12:00 P.M.
- \$125 per member child, \$150 per non-member child
- Ages 7 to 12

Teen Overnight

- **Wed. & Thu., December 27-28**
5:00 P.M.-7:30 A.M.

Enjoy a night sleeping with the fishes in this teens-only event. Start the night with a pizza party before becoming an ocean explorer to discover the mysteries of the deep sea. This overnight camp program includes Aquarium exploration, hands-on activities, a pizza party, light snack, cereal breakfast, and a souvenir T-shirt.

- \$80 per member, \$90 per non-member
- Ages 13 to 15

For program scheduling and to reserve spaces, visit the Aquarium's website or call (562) 590-3100, ext. 0.



ARCHERFISH

Insect Hunting Game

Mangrove forests are made up of shrubs or trees that grow along shorelines. They grow in the muddy or silty ground at the water's edge with stilt-like roots that prop them above the water. The roots provide shelter for fish and other animals that make their homes among the mangroves, like archerfish.

Archerfish have the ability to hunt for prey by shooting a jet of water above the surface. They target insects and other small prey resting on low overhanging mangrove branches when they cannot find food on the surface of the water. They are able to accurately shoot streams of water as far as 5 feet. How far can you shoot water to hit an insect target?

Game Instructions:

Tear out the target game page, and use scissors to cut along the dotted lines around the insect targets. Hang the target game in a place that's safe to get wet, like your backyard, at the park, or in the bathtub. You can attach the game to a clothes hanger or edge of a countertop to hang it. Using a water gun or spray bottle, aim for the insects and see if you can hit the targets like an archerfish.

NOTE FOR PARENTS:

Because water will deteriorate the paper quickly, you might consider making copies to play the game multiple times or laminating the page for durability.

Dwarf Indian Mudskipper

Periophthalmus novemradiatus



*Aquarium
of the Pacific*

HARBOR TERRACE

Banded Archerfish

Toxotes jaculatrix



*Aquarium
of the Pacific*

HARBOR TERRACE

Upside-Down Jelly

Cassiopea sp.



*Aquarium
of the Pacific*

HARBOR TERRACE

Dwarf Indian Mudskipper

Periophthalmus novemradiatus

PHYSICAL CHARACTERISTICS

This species of mudskipper is grayish-brown in color with white spots or stripes and bulbous eyes that sit on top of its head. It uses its modified front fins to crawl and hop on land. They range from 2 to 4 inches long.

DIET

Mudskippers are omnivores that feed on small crabs, insects, invertebrates, and algae. At the Aquarium, they are also fed bloodworms, mysid shrimp, krill, and occasionally crickets.

HABITAT

This species is found in the coastal regions of the Indian Ocean. It prefers mudflats at the water's edge.

FUN FACT

Mudskippers are territorial and aggressive. When defending their territory, they will raise their dorsal fin to scare off intruders.

ANDREW REITSMA

Banded Archerfish

Toxotes jaculatrix

PHYSICAL CHARACTERISTICS

Banded archerfish are usually silvery in color with four or five vertical black bands on the upper half of the body. They can grow up to 8 inches long.

DIET

They typically eat insects and plant matter, but their diet also includes zooplankton, aquatic insect larvae, and worms.

HABITAT

Archerfish can live in both saltwater and freshwater. They typically inhabit shallow, murky water in coastal mangrove estuaries as juveniles and around shallow reefs as adults.

FUN FACT

The banded archerfish's specialized body shape and eyesight allow it to shoot a jet of water above the surface to knock insects into the water for food.

ROBIN PIGGS

Upside-Down Jelly

Cassiopea sp.

PHYSICAL CHARACTERISTICS

These sea jellies spend most of their adult lives upside-down. Using their bells like suction cups, they settle at the sea floor with their tentacles facing the surface.

DIET

Preying on brine shrimp and other types of microscopic animals, these sea jellies do not have one central mouth. Instead they use branching arms that have hundreds of tiny mouth openings.

HABITAT

These sea jellies are commonly found living in shallow coastal areas of the mangrove forest and lagoons.

FUN FACT

Upside-down sea jellies can live in areas where oxygen is low, because they can use the oxygen made by algae that live on them.

#AquariumMemberPhotos



@alilmo



@kl0ny



@stephanieabonte

For a chance to be featured, tag your public photos with **#AquariumMember** on Instagram, or email your favorite photos to MemberServices@lbaop.org.

Students Visit on Scholarship During Grand Prix

STUDENTS FROM MCKINLEY ELEMENTARY SCHOOL

in Long Beach visited the Aquarium in April thanks to a donation from Premier Long Beach. The corporation donated to the Aquarium's scholarship program for the twelfth consecutive year, allowing children to visit during the week of the Grand Prix of Long Beach.

Premier Long Beach has donated over \$148,000 in scholarships since 2003.

Since 2003 Premier Long Beach has donated more than \$148,000 in scholarship funds, providing Aquarium visits for more than 19,500 students.

Premier, the food and beverage division of special event venue management company SMG, currently provides food and beverage, catering, and special event services to the Aquarium.



COURTESY OF NEW EARTH

Webcam operators monitor live feeds for explore.org at New Earth in Culver City, California.

Aquarium Webcams Showcase Unique Partnership

SINCE 2011 THE AQUARIUM has partnered with explore.org, a philanthropic media organization founded by Director and Vice President of the Annenberg Foundation Charles Annenberg Weingarten to host webcams that stream live views of the Aquarium's animals online. This past summer viewers had the opportunity to watch the Aquarium's new penguin chick in its behind-the-scenes nursery as it learned to interact with and take feedings from penguin keepers. Today there are up to nine live webcams at the Aquarium available to view on explore.org.

The webcams are operated remotely, and some operators are paired with these jobs by New Earth, a nonprofit organization based in Culver City, California. New Earth offers vocational training and employment opportunities for young people recently released from juvenile detention. By training program participants as part- and full-time remote operators for explore, New Earth helps them to learn the mechanics of camera operations, film editing, film production, and social media and multimedia development. These and other job skills help ensure the participants are competitive in the employment market. The camera operators also have the chance to experience natural environments from around the world through explore's virtual portal, observing animals and their behaviors throughout the day.

View the Aquarium's webcams by visiting aquariumof-pacific.org/exhibits/webcams.



McKinley Elementary students visited the Aquarium thanks to Premier.

Aquarium Climate Change Programs Now a NOAA Case Study



THE AQUARIUM'S EFFORTS to help make Long Beach a model of a climate resilient city have been highlighted as a case study on the U.S. Climate Resilience Toolkit website (toolkit.climate.gov), hosted by the Na-

tional Oceanic and Atmospheric Administration (NOAA). This website provides a variety of tools designed to help cities, institutions, and organizations build resilience, from engaging their community to developing a climate action plan.

The case study describes how the Aquarium helped the City of Long Beach assess threats posed by climate change, develop an action plan, and conduct outreach to identify local leaders and inform decision making. View the Aquarium case study by visiting <https://toolkit.climate.gov/case-studies/creating-model-climate-resilient-city>.



Katelyn Sullivan is an Aquarium biologist and educator.

Aquarium Educator Joins Scientific Expedition

KATELYN SULLIVAN, an Aquarium biologist and educator, was selected as a 2017 Alta-Sea Nautilus Ambassador and sailed aboard Exploration Vessel (E/V) *Nautilus* during its six-month 2017 expedition. Sullivan joined the Corps of Exploration aboard E/V *Nautilus* in late July as the ship explored the Eastern Pacific Ocean off the central California coast. The Nautilus Ambassador program is an Ocean Exploration Trust (OET) program supported by the Goldhirsh Foundation's My LA2050 Grants Challenge.

During the five-day leg of the expedition, Sullivan experienced life aboard a research vessel and saw firsthand how deep-sea exploration and research are conducted. Sullivan will now be able to share her experiences with students and other Aquarium visitors.

While on board, Sullivan also had the opportunity to interact with Aquarium visitors via Nautilus Live, a web portal connecting expeditions in the field to people on shore via telepresence technology. This live link allows the public to see what life is like on a scientific expedition at sea and ask questions of the scientists and educators on board.



Attendees Elaine Lasnik-Broida and Michael Broida admire the Aquarium's American Kestrel.

Blue Whale Gala Raises \$320,000 for Aquarium Programs

APPROXIMATELY 480 GUESTS attended the Blue Whale Gala held on June 10, which raised over \$320,000 for the Aquarium and its ocean conservation and education initiatives. Attendees of the Aquarium's black-tie gala enjoyed a cocktail and hors d'oeuvre reception on the front plaza, gourmet dinner in the Great Hall of the Pacific, and after-dinner drinks and dancing on the outdoor Harbor Terrace and Veranda. Dr. Marcia McNutt and Peter Kareiva were presented the Aquarium's Ocean Conservation Award. Premier sponsors included Esther S.M. Chui Chao, The Johnny Carson Foundation, Bank of America, The Boeing Company, David and Kathy Cohen, Kathie Eckert, Dr. Allen and Charlotte Ginsburg, The Olson Company, Port of Long Beach, Dr. and Mrs. Jerry R. Schubel, and Sidley Austin LLP.

Mattison Priest, Brian Oshiro, Anna Coomans, Jack Stark, Natalie Gath, Zyanya Young, Reid Bobrownicki (front) participated in the 2017 Student Eco Ambassador program.

Student Eco Ambassadors traveled to Ecuador in July.

Gath and Coomans test water samples with Aquarium Mammalogist Meagan Nadal.



Aquarium's Scientific Dive Team Helps Tag Giant Sea Bass

THE AQUARIUM'S SCIENTIFIC DIVE TEAM started work in June on a project led by a graduate student from California State University, Long Beach, to assist with tagging and monitoring giant sea bass off Catalina Island. The Aquarium team will continue to work on this project through its duration of one-and-a-half to two years. The goal is to determine this fish species' aggregations sites and abundance around the island and to look at the size of the aggregation sites and how the giant sea bass move among those sites. So far, the Aquarium's team has conducted seven dives for this project.

Also in early 2017 the scientific dive team gained a new sponsor. San Diego-based dive equipment company Ocean Management Systems will provide donated and discounted equipment on an annual basis in support of the scientific dive team's projects.



ROBIN RIGGS

Divers are studying giant sea bass off Catalina Island.

Student Eco Ambassadors Return From Trip to Ecuador

IN JUNE seven high school students traveled to Ecuador as Student Eco Ambassadors (SEA) in the second year of this Aquarium program. SEA focuses on conservation ecology and community service with the goal of creating globally conscious citizens. In the months leading up to the trip, the students studied issues that affect both the Pacific Ocean and the Amazon rainforest, including habitat destruction, endangered species, and the relationship between humans and their environment. While in Ecuador, the participants studied animals, helped build a school, collected data for citizen science projects, and developed leadership skills.

The group returned to the same community visited by SEA students in 2016. This year's cohort visited a local school and shared their research on ocean animals. In return, community members shared information on the environmental issues faced in the region, particularly access to clean drinking water. The people living along the Napo River are often surrounded by water, but little is safe to drink. The SEA students related this to their experience in California, where water managers must keep a large population supplied with the resources they need. As a result of these experiences, the SEA students are creating a project to raise awareness about water conservation. Information about the 2018 SEA program can be found at aquariumofpacific.org/volunteer/sea.

Plan Your Event!

The Aquarium of the Pacific in Long Beach provides both a beautiful and unique atmosphere for your event. You can choose from one of our many stunning backdrops to host your guests including our two-story kelp exhibit, Veranda, Premier Watershed Classroom, and more!



Aquarium of the Pacific

100 AQUARIUM WAY LONG BEACH, CA 90802
yourevent.aquariumofpacific.org 562-951-1663

Aquarium of the Pacific

THANKSGIVING LUNCH

GOBBLE GOBBLE WITH US!

CAFE SCUBA
 THURSDAY NOVEMBER 23, 2017

Enhanced Menu!

PRICING:
 Includes Aquarium admission

General Public:
 Adults: \$55
 Child 3-11: \$27.50

Members:
 Adults: \$45
 Child 3-11: \$22.50

Fundraising Highlights

The Aquarium of the Pacific relies on individuals, corporations, foundations, and government partners to support its mission and vision with contributions to the operating budget and a diverse range of projects.

Bank of America Donation Inspires Students' Interest in Science

Supporting youth empowerment, Bank of America Charitable Foundation continued its Aquarium support with a recent gift of \$25,000. This gift will provide educational opportunities and skills-based volunteer programs to middle, high school, and college students. Through hands-on experiences, one-on-one interactions with career scientists, and skills-based trainings, these students will be exposed to careers in science, technology, engineering, and mathematics (STEM). The Aquarium recently welcomed Justin Wong, senior vice president, market executive - commercial banking at Bank of America Merrill Lynch, to the Trustees of the Pacific. As a Trustee, Wong will act as an ambassador in the community and further Bank of America's longtime support of the Aquarium's mission.

Edison International Promotes Access to STEM Education

Edison has provided a \$50,000 grant toward the Aquarium's Science on a Sphere programs for grades three through twelve, Advanced Placement Biology class for high school students, and the VolunTEENs program that develops communications, career-building, and science literacy skills. Edison's support improves access to education and programs that emphasize STEM topics. This support helps the Aquarium to offer education programs for middle and high school students that align with the Next Generation Science Standards and incorporate the practices of science and engineering.

Miller Foundation Invests in Education for Long Beach

In June 2017 The Earl B. and Loraine H. Miller Foundation awarded a \$41,000 grant to support programs for students, teachers, and families from the most vulnerable communities in Long Beach. A family science night, teacher workshop, and access to the Aquarium through field trips and videoconference programs will encourage students to become more engaged in science, while providing families and teachers with tools to encourage children to question, wonder, and experiment. The Miller Foundation has supported the Aquarium's education programs since its opening in 1998.

Long Beach Water Department Supports Water Conservation Outreach and Education

A longtime partner and collaborator, the Long Beach Water Department provided \$50,000 to the Aquarium's recently renovated *Our Water Future* exhibit. Along with cash support, the Water Department was involved with the development and content of the new exhibits, which focus on where our water comes from, major water uses, and ways to conserve water in our daily lives. These messages help to educate youth and our communities about the importance of water conservation.

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(as of 8/1/17)
www.aquariumofpacific.org

Share Your Story

Leading up to the Aquarium's twentieth anniversary in 2018, we are asking our members and visitors to share their stories about their experiences at the Aquarium. Aquarium members Sarah Wahrenbrock and William Holtz wrote in to share what makes visiting the Aquarium especially memorable and rewarding for them and their families. If you would like to submit your own story, please go to aquariumofpacific.org/about/share/.



Sarah Wahrenbrock's daughter Elizabeth poses with the penguin models.

Sarah Wahrenbrock

We have been visiting the Aquarium since our daughter Elizabeth was a few months old; she is now almost four. During every visit, we take a photo with the penguin statues next to the penguin exhibit. On our most recent visit, we realized that our daughter is now almost as tall as the largest statue! We decided to make a collage of these photos and add to it after each visit, showing how much our daughter has grown in relation to the penguin. Your aquarium will have a permanent place in our family's history!



William Holtz kayaks off Monterey, California.

William Holtz

We love the otters! This is a photo of me kayaking at Elkhorn Slough near Monterey with a sea otter in the background. At the Aquarium, we also love to watch the otters. The best time was when you had an older fella in there who was swimming back and forth, back and forth. I got up close to the glass and suddenly he stopped and stared me right in the eyes. We had the same coloring, brown and grey beard with a mustache. He seemed to think I was a close relation! Even the Aquarium educator who was leading a tour took notice and enjoyed a laugh.

Aquarium Accolades

The Aquarium presents awards to individuals and organizations in recognition of their service to the community and achievements in conservation.

Connor Berryhill

Young Hero Award

The Aquarium presented the Young Hero Award to Connor Berryhill at the International Children's Festival in April. Berryhill is a ten-year-old from Vista, California, with a passion for the ocean that led him to become "The MicroActivist." He started a website (microactivist.org) to document his activities and post educational "micro-movies" to inspire other kids to join the movement to protect the ocean. In March he organized his first all-kids 'MicroActivist Team' beach clean-up and plans to organize more beach clean-ups for kids.

A Cecile Fisher, Aquarium vice president of marketing and communications, and Connor Berryhill, Young Hero Award honoree.



Regina Quenga

Heritage Award

The Aquarium presented Regina Quenga with the Heritage Award at the Pacific Islander Festival in June. Quenga was born in Guam. With key community members, she began a group in 1993 that ultimately became the nonprofit Kutturan Chamoru Foundation. Chamoru is the word used for the indigenous people, language, and culture of Guam and the Northern Mariana Islands. The foundation's mission is to preserve and share Chamoru culture through language and movement. It provides tuition-free education to community members in Chamoru cultural dance, song, language, and career guidance, and its Kutturan Chamoru Performers dance ensemble performs at various festivals across the country.

B Regina Quenga, Heritage Award honoree, and David Bader, Aquarium director of education.



MUSE Award

The Aquarium, in collaboration with Cortina Productions, won a 2017 MUSE Award from the American Alliance of Museums (AAM) for a video telling the story of the Aquarium's first major expansion, the Pacific Visions wing. Aquarium visitors can see the video on screens at the Aquarium and at pacificvisions.org. The Aquarium and Cortina Productions were presented with the Bronze MUSE Award in the category Public Outreach on May 7 during the awards reception at the 2017 AAM annual meeting in St. Louis, Missouri.

C Joe Cortina, founder and creative director at Cortina Productions, and Jerry Schubel, president and CEO at the Aquarium of the Pacific.

The Climate Registry Award

On May 17 the Aquarium was honored by The Climate Registry (TCR) with a Special Recognition Award as one of its founding members and a participant in Southern California Edison's Cool Planet Project, which is operated in partnership with TCR. It recognized six organizations as founding members to commemorate the Registry's tenth anniversary.

D Diane Wittenberg, TCR's founding executive director; Jerry Schubel, Aquarium president and CEO; John Rouse, Aquarium vice president of operations; and Ida Starr, SCE's Cool Planet Project program manager.

Ocean Conservation Award

The Aquarium presented Marcia McNutt and Peter Kareiva with the Ocean Conservation Award at the Blue Whale Gala in June. McNutt is president of the National Academy of Sciences. Her other positions have included president and CEO of the Monterey Bay Aquarium Research Institute, director of the U.S. Geological Survey, and editor-in-chief of the Science family of journals. Kareiva is director of UCLA's Institute of the Environment and Sustainability. Previously, he was the chief scientist and vice president of The Nature Conservancy and director of conservation biology at NOAA's Northwest Fisheries Science Center.

E Schubel; Peter Kareiva and Marcia McNutt, Ocean Conservation Award honorees; and Rex Richardson, Long Beach vice mayor and city councilmember.

How Sustainable Seafood Can Help Mangroves

People have practiced coastal aquaculture, or the farming of fish or shellfish for food, in Southeast Asia for hundreds of years. While many of these types of farms have had little adverse effects on mangroves, there are some methods that are destructive. One of the primary threats to mangrove forests is clearing for human activities, such as agriculture and more recently, the construction of aquaculture ponds.

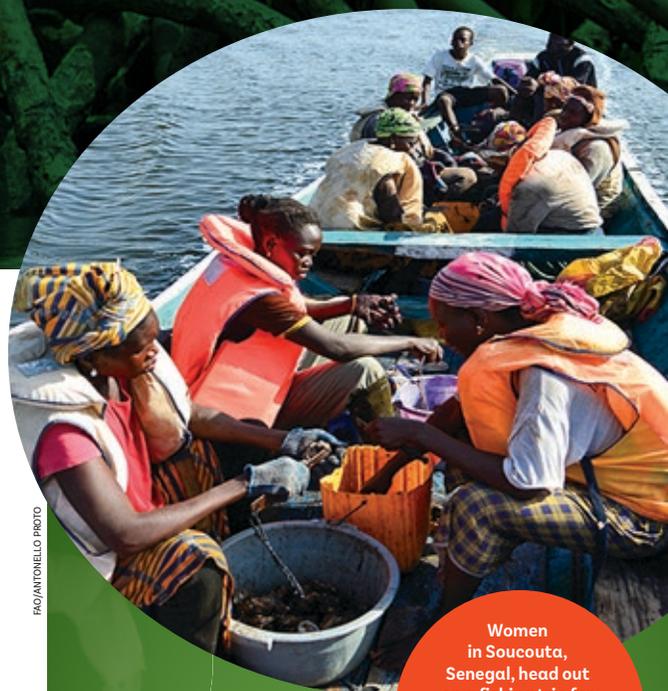
Because of the known benefits provided by mangroves, many countries have now restricted or banned their conversion into aquaculture ponds. Communities in Southeast Asia are working with government and other organizations to find ways for aquaculture and mangroves to coexist, and some responsible operations are now serving as working examples. In this process economically and environmentally sustainable livelihoods must be made available for people living in these areas, and science-based management of any seafood production must be used within mangrove habitats.

Seafood farmers can serve as mangrove stewards.

Shrimp and other types of seafood farmed in existing mangrove forests benefit from the shelter and protection from predators provided by the mangroves and the naturally occurring sources of food available in the mangrove habitat. On top of these benefits, seafood companies can incentivize mangrove conservation by providing farmers a higher income for mangrove-raised seafood. Farmers can supplement their income with alternative economic opportunities, such as tourism and learning to sustainably harvest wood from the mangrove forest to sell as firewood.

One of the shrimp products raised in a mangrove-friendly manner is Selva Shrimp®. The product is responsibly produced in Vietnam using a business model that supports small-scale farmers and local communities and encourages the conservation of the mangrove forests, which the shrimp need to thrive. The Aquarium features this product in food service at special events.

Another way to provide jobs in local communities and protect mangroves is payment for ecosystem services. In other words, funds could be provided for local people to conserve or restore mangroves so the whole community can enjoy the benefits they provide. In areas where governments are already spending significant funds on seawalls and other coastal protection measures, some of these funds could be diverted for mangrove restoration. Tourism operators could also fund this work, as they benefit from maintaining mangrove forests as scenic destinations. Aquaculture operators could contribute as a means of offsetting any mangrove loss incurred from building their farms. If payment for ecosystem services is used, development experts emphasize that the local community must be actively involved in the process to ensure it is fair and transparent and that the community, rather than outsiders, benefits. The potential for programs like these is being studied in places like Vietnam and the Solomon Islands.



FAO/ANTONELLO PHOTO

Women in Soucoute, Senegal, head out on a fishing trip for oysters in the mangrove forest. Programme Italien pour la Sécurité Alimentaire, Senegal.

Shrimp Shopping Tips

From the Aquarium's Seafood for the Future Program.

1. Look for well-managed wild-caught and responsibly farmed shrimp from the U.S. In the U.S. regulations are in place to ensure that environmental impacts, such as bycatch and nutrient pollution, are minimized and that fishers and farmers can maintain their livelihoods. Learn more about well-managed U.S. shrimp at fishwatch.gov.
2. Choose certified farmed shrimp. Ask your seafood purveyor about farmed shrimp options certified by Best Aquaculture Practices (bap.gaalliance.org), Aquaculture Stewardship Council (asc-aqua.org), or Naturland (naturland.de/en/). These certifications were found to improve environmental performance beyond the "status quo" in a 2009 study conducted by the University of Victoria Seafood Ecology Group.
3. Choose certified wild shrimp. Ask your seafood purveyor about shrimp certified by the Marine Stewardship Council (msc.org).

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