

# WATERMARKS

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the Newest Sloth Addition

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Jeff Mauritzen  
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THEM THE WORLD?**  
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## STRICTLY BUSINESS

Corporate membership allows your organization to support our mission, share an array of thoughtful benefits with employees and clients, and meet corporate responsibility goals.

As we reflect on our 35th year, it is clear there is still so much we can do together to inspire conservation of the world's aquatic treasures. Support the National Aquarium by becoming a member or making an end-of-year charitable gift today.



Your generous support is the foundation for all that we do.

Make a donation, purchase a membership or learn about other philanthropic opportunities by contacting the National Aquarium at 410-576-8535 or [aqua.org/support](http://aqua.org/support).

## FOREST IN FLUX | PAGE 16

Poison dart frogs are part of the dramatic, but sometimes slow-paced, endurance race in the rain forest.



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#### ON THE COVER

Fern, seen here in the embrace of her mom, Ivy, is a baby Linne's two-toed sloth, born in April of this year in our Upland Tropical Rain Forest.



It has been a year of anniversaries here at the National Aquarium: 35 years since the grand opening of our Baltimore facility ushered in a new generation of modern aquaria; 25 years since we began rescuing and releasing stranded marine animals; and a full 140 years since the original National Aquarium began as a fish pond in Woods Hole, Massachusetts. Reflecting on these milestones, I am struck by the realization that there has never been a moment quite as important, with so much at stake and so much arrayed to ensure a global and positive impact.

When this innovative facility opened on Baltimore's Inner Harbor in 1981, it launched a tradition of bringing distant corners of the world to all whom we touch. In fact, our eye-opening look at the *Upland Tropical Rain Forest* on page 16 demonstrates just how much more there is to see and learn about that complex and dynamic ecosystem. Our painstaking re-creations of habitats near and far connect our guests to the natural world, a role we could not possibly play without the support and encouragement of people like you.

Looking to the future, we will soon transform our waterfront campus through a vision for a healthy, living harbor that includes floating wetlands, oyster reefs, native habitats and a new kind of urban ecosystem that will bring the Chesapeake Bay closer to students, locals and visitors in a way never before seen in the Inner Harbor (see page 6). In nearby Jonestown, one of Baltimore's original neighborhoods, we are building a state-of-the-art Animal Care and Rescue Center to house endangered species, newborn animals and our marine animal rescue and rehab center. Finally, when we announced in June that we would build the nation's first dolphin sanctuary by 2020, the response was immediate and overwhelmingly positive. Find details about the sanctuary on page 8.

We can make such bold plans only through the generosity of our donors and members. Our entire Aquarium team of 500 staff and 1,000 volunteers is already hard at work, and I sincerely hope you will continue to share this journey with us for years to come. Together, we can (and will!) protect, connect and share the world's aquatic treasures with millions from throughout our ocean planet. Thank you for joining us.

Sincerely,

— John Racanelli  
Chief Executive Officer

“ Together, we can (and will!) protect, connect and share the world's aquatic treasures with millions. ”

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# WELCOME, PUFFLINGS!

Over the summer, the National Aquarium welcomed two new puffin chicks, also known as puffling. Ziti and Valentine are the eighth and ninth puffins to successfully hatch in our *Sea Cliffs* exhibit since 2006. Atlantic puffins generally lay just one egg a year, with both parents involved in raising their chick. Ziti and Valentine began venturing from their burrows in *Sea Cliffs* in late summer.



## Female Wrasse Joins *Blacktip Reef*

A young female humphead wrasse, nicknamed Cena, was recently added to the *Blacktip Reef* exhibit. She looks nothing like her large, blue male counterpart, Tangaroa, who is named for the Maori god of the sea. Cena is only about 10 inches long and has pale coloring, with reddish-brown patterns covering her body and dark markings extending from her eyes. Female humphead wrasses can grow to 3 feet long, while males can reach 6 feet in length.



## Spotted Lagoon Jellyfish Return

Spotted lagoon jellyfish are back on exhibit in *Jellies Invasion: Oceans Out of Balance*. The last time this warm-water species was on exhibit was January 2015. They are native to lagoons, bays and saltwater lakes in the South Pacific, and have a symbiotic relationship with algae that are able to convert sunlight into a food source. While their coloration can be similar to that of the Aquarium's blue blubber jellyfish, you can identify these jellyfish by their spots.

## A Few More Hellos...

Two snakes have joined our team of ambassador animals—a woma python named Wallace and a milk snake named Grommet. Both snakes are nonvenomous and will be part of our Animal Encounters programs, which are geared toward both kids and adults. During Animal Encounters, guests get up close and personal with exotic animals while learning fun facts about them and ways to help protect natural environments.

## And Some Goodbyes...

National Aquarium Animal Rescue released two green sea turtles this summer that had been in rehabilitation since November 2015. Hardhead and Beachcomber were released at Assateague Island National Seashore.



Visit [aqua.org/blog](http://aqua.org/blog) to get up-to-date animal news, follow our animal rescue initiatives, go behind the scenes and more.



Baltimore County Executive Kevin Kamenetz and National Aquarium CEO John Racanelli.

## CELEBRATING 35 YEARS

Nearly 200 guests, including members of the Board of Directors, public officials, donors, community leaders and charter employees and volunteers, celebrated the Aquarium's 35th anniversary in August. Guests learned about major projects on the horizon, including the updated waterfront campus, state-of-the-art Animal Care and Rescue Center and seaside sanctuary for dolphins. Also, during the event, County Executive Kevin Kamenetz announced a six-figure, five-year grant from Baltimore County to the Aquarium.



Aquarium Chief Administrative Officer Candace Osunsade, University of Baltimore President and former Mayor Kurt Schmoke, Delegate Brooke Lierman and former Governor Parris Glendening.



National Aquarium Society members Jane Droppa, Board member, and her husband, Larry Droppa.



National Aquarium Society members Mo Jishi, Board member, and his wife, Allyson Jishi.



National Aquarium Society members David and Kathleen Lindenstruth.



## T. ROWE PRICE VOLUNTEER EVENT

More than 80 T. Rowe Price employees volunteered their time this summer to clean up wetlands at Fort McHenry. T. Rowe Price is the official community engagement sponsor of the National Aquarium.



Sarah, Helena and Annabelle Kijesky, children of Patron Society members Andrew and Crystal Kijesky.



Longtime Patron Society members Roland and Nancy Wentworth.

## CONSERVATION CRUISE

In June, Patron and National Aquarium Society members enjoyed a special cruise around the Inner Harbor. The Aquarium's conservation team joined passengers on board to talk about the important work being done in and around the Chesapeake Bay to restore vital ecosystems.

## MASONVILLE COVE INTERNATIONAL COASTAL CLEANUP

The National Aquarium is leading community-based conservation efforts in the neighborhoods around Masonville Cove, including Brooklyn and Curtis Bay. In September, our bilingual staff mobilized 93 volunteers in the collection of 81 bags of trash and marine debris weighing 1,150 pounds as part of the Ocean Conservancy's 2016 International Coastal Cleanup, fostering green and thriving neighborhoods. Our efforts in Masonville Cove are made possible through the support of the Environmental Protection Agency, Maryland Port Administration, National Fish and Wildlife Federation, U.S. Fish and Wildlife Service and The Ocean Project.



## BUILDING FOR THE FUTURE

Two BLUEprint priority projects gain momentum.

The National Aquarium is moving forward with key projects that are part of its BLUEprint master planning process which envisions how the Aquarium of the 21st century should look, operate and fulfill its mission.

### ANIMAL CARE AND RESCUE CENTER (ACRC)

When it opens in 2018, the Animal Care and Rescue Center (ACRC) will provide permanent headquarters for the Aquarium's animal care facilities and some of its rescue operations. The Aquarium's Animal Care Center has been in its current, rented warehouse space in Fells Point for 22 years. The future site will include everything found at the current center—such as space for off-exhibit animals, animal rescue and rehab and exhibit fabrication—as well as new behind-the-scenes opportunities.

“We’re so excited to move into this new space,” said Marine Animal Rescue Manager Jennifer Dittmar. “We’ll be able to continue to provide the high level of care to rescue animals that the National Aquarium is known for, but now we’ll be able to share more of what we do with the public.”

The new ACRC will be located in the Historic Jonestown neighborhood, 0.7 miles from the Aquarium's Inner Harbor home. Construction and renovation of the 50,000-square-foot property are slated to begin in 2017.

### WATERFRONT CAMPUS PLAN

The updated waterfront space on the main campus of the Aquarium aims to foster stewardship by showing that urban waterfronts can be healthy and thriving. Different elements will showcase working ecosystems and serve as living laboratories for residents and guests to learn about restoring habitats, supporting native species and improving water quality in urban waters.



Renderings show plans for the Aquarium's Animal Care and Rescue Center (top) and revitalized waterfront campus (bottom). Both of these BLUEprint priority projects are underway. Credits: Ayers Saint Gross (waterfront campus plan); Design Collective (ACRC).

“By reintroducing the critical habitats once established along the Patapsco River prior to urban development, we not only beautify the waterfront for residents and visitors but also restore natural ecosystem supporting our local wildlife,” said Charmaine Dahlenburg, who manages the National Aquarium's Chesapeake Bay program.

As part of this work, with a grant from the National Oceanic and Atmospheric Association, the Aquarium is collaborating with Baltimore City Public Schools and other partners to develop and pilot a curriculum in which students

conduct field work at our waterfront campus.

The waterfront campus plan project is now in the planning and permitting stage, with prototyping set to start in 2017. Installation and construction will gradually roll out through 2019.



To learn more about these projects, or to make a donation to support their development, please visit [aqua.org](http://aqua.org).

## SECOND SEASON OF READ TO REEF IN FULL SWING

“Chesapeake ABC,” “Mister Seahorse,” “Here Come the Humpbacks” and “Ocean Sunlight: How Tiny Plants Feed the Sea” are just a few of the titles kids can borrow at their local branch of the Enoch Pratt Free Library to earn a special trip to the National Aquarium.

Read to Reef invites kids in fifth grade and younger to read five aquatic-themed books and earn complimentary tickets to the Aquarium. By learning about these amazing ecosystems—and building their reading skills—participating kids make it possible for their families to experience the animals and habitats they have learned about firsthand.

During the book club's inaugural season earlier this year, 2,700 children completed their reading lists and nearly 7,000 kids and family members visited the Aquarium free of charge.

“It brings joy to my heart to see parents reading to their children and learning themselves about the natural beauty of our earth and the animals that live in it,” said Patricia Allen, a children's librarian at the Pennsylvania Avenue Branch of the Enoch Pratt Free Library.

Read to Reef's second season kicked off on October 1. To learn more about Read to Reef, and to hear from participating families, visit [aqua.org/read](http://aqua.org/read).



Aquarium CEO John Racanelli, Baltimore Mayor Stephanie Rawlings-Blake and former Pratt Library CEO Carla Hayden (now Librarian of Congress) celebrate Read to Reef.

## A SUMMER WELL SPENT

Students explore fragile aquatic ecosystems thanks to generous philanthropic support.

More than 200 students from Baltimore City Public Schools spent a portion of their summers participating in the Aquarium's Henry Hall Youth Conservation Leadership Programs. Made possible through grants and an endowment established by the Aquarium's generous community of philanthropic partners, the program is free to eligible students, age 9 and up, or recent graduates.

“The Henry Hall program is one of the most impactful programs I have ever had the privilege of being a part of,” says Kim Dixon, National Aquarium Youth Program Coordinator. “I get to watch children start their week timid and unsure about their locations—beaches, marshes, bayous, bays, lakes, rivers—and by Thursday they are masterful in their ability to take in all that is around them. They become confident. They are enriched, and they have new-found aspirations and dreams.”

The youngest Henry Hall participants explored their own backyard watershed, studying the Inner Harbor ecosystem or kayaking through two Chesapeake Bay habitats.

Older students, ages 11 and up, traveled near and far: cruising along the Delaware Bay in a University of Delaware research vessel; shark tagging off the coast of Ocean City; camping on the banks of the Susquehanna River; exploring uninhabited barrier islands in North Carolina; working with researchers from the Louisiana Marine Consortium near New Orleans; conducting sea turtle night patrols in Jupiter, Florida; snorkeling along coral reefs in the Florida Keys; and discovering the rocky coast of Maine.

In the past year alone, the program has grown from 132 participants to 202. To learn more, visit [aqua.org/henryhall](http://aqua.org/henryhall).



## ON THE ROAD AGAIN

Aquarium on Wheels program hires students to spend their summer teaching younger kids about conservation.

**Aquarium on Wheels**, a paid, afterschool work study program made possible by philanthropic community support, is powered by high schoolers interested in scientific or aquarium-related careers. This past summer, the group brought “Paradise in Trouble,” a conservation-themed dramatic performance, to more than 800 elementary and middle school students at Enoch Pratt Free Library branches throughout the city.

Selected student applicants hired as part of Aquarium on Wheels become knowledgeable about the Aquarium's animals, exhibits and mission through National Aquarium staff. For many, the experience is life changing. Baltimore City College High School student Ana Brown, 16, says, “This experience allowed me to find the passion I have for animals. Without AOW, I would have missed out on so many experiences that have helped shaped me as a person.... The Aquarium on Wheels program has been the best thing that has ever happened to me.”

# INSIDE THE DOLPHIN SANCTUARY

Following the summer announcement, plans are underway to create the nation's first dolphin sanctuary.

BY KRISTIN ZISSEL

Since the first of the National Aquarium's Atlantic bottlenose dolphins arrived more than 25 years ago, the Aquarium has learned firsthand about the remarkable habits, capabilities and needs of cetaceans. After research spanning the past five years, the Aquarium announced on June 14, 2016, its plans for the relocation of the dolphins to a seaside sanctuary. Here is a closer look at the Aquarium's plans for the sanctuary, public reaction and how you can get involved in this exciting initiative.

Since opening our doors to the public 35 years ago, the Aquarium has been committed to the welfare of the animals in our care. Our decisions surrounding the dolphin sanctuary are guided by three core convictions.

## Care

The health and welfare of the dolphins is our enduring priority. Expert staff will provide a lifetime of customized individual care, ensuring that the needs of each dolphin continue to be understood and enhanced in this pioneering sanctuary setting.

## Compassion

The sanctuary is not simply a place; it is also a set of "dolphin-first" principles and corresponding practices, which establish the well-being of the dolphins as the guiding philosophy of the new facility.

## Collaboration

Researchers will advance studies not feasible in either open-ocean or aquarium settings, expanding our understanding of wild dolphins and those in human care.



This artist's rendering is representative of the type of natural, seaside setting that would be appropriate for the National Aquarium's Dolphin Sanctuary. Credit: Studio Gang.

## SOMETHING TO TALK ABOUT

The Aquarium's announcement was heard around the world, generating news coverage from dozens of major outlets across the United States and around the globe, and receiving more than 2 billion media impressions. Hailed by the Washington Post as "an inspired idea," the proposed dolphin sanctuary has been received as a bold new alternative for the support of marine mammals in human care. The Aquarium's local community quickly reached out.

"Thank you for this step in the right direction. We have enjoyed the dolphins over the many years we've visited the Aquarium, but moving them to a more natural environment is the right thing to do."

THE CAMARDELLA FAMILY, COCKEYSVILLE, MD

"I am so proud of National Aquarium for doing what is best for the dolphins without regard to profits. Many thanks and kudos."

THE LEITCH FAMILY, BALTIMORE, MD

"I hope many, many people will support this decision and more organizations around the world will follow the National Aquarium's lead! I thank you. My 4-year-old dolphin lover thanks you, too. Much love to the thoughtful and talented people who are helping bring this decision and sanctuary to fruition!"

MARNIE GOLDMAN, REISTERSTOWN, MD

In order to be successful, North America's first dolphin sanctuary must provide a home where the dolphins will thrive. A team of internal and external experts is currently working to determine ideal conditions, and site selection is underway along the coastlines of Florida and the Caribbean. Criteria include:

### TROPICAL CLIMATE

The dolphins will live in natural seawater in a tropical or sub-tropical location.

### CONTINUED CONNECTION

The dolphins will continue to be a part of the National Aquarium community. Plans call for a digital connection between the new site and Baltimore.

### RESEARCH COMMITMENT

The Aquarium will conduct research at the new site in an effort to drive forward our knowledge of cetaceans and reflect our commitment to supporting enhanced understanding of wild populations and ocean ecosystems.

### NATURAL STIMULI

The setting will provide the dolphins with opportunities to express natural behaviors in a setting, with stimuli such as fish and marine plants.

### DYNAMIC HABITAT

The sanctuary's design will be flexible to allow for different spatial configurations to keep the dolphins engaged and able to form social groupings that suit them.

### CUSTOMIZED CARE

Marine mammal experts will continue to provide exceptional individualized care to each dolphin, supported by a full-time veterinarian, husbandry staff and on-site clinical care facilities.

## YOUR QUESTIONS. OUR ANSWERS.

### What will become of the dolphins' current home on Pier 4?

A team is currently evaluating options for re-purposing our space on Pier 4 and will be testing the most promising concepts based on their ability to inspire conservation, delight guests and ensure the Aquarium's continued success.

### What is the timeline for opening the new sanctuary?

Our site-selection team is in the process of evaluating several possible locations. Because we are committed to finding the best possible setting, we intend to allow the site-selection process to take as long as necessary while simultaneously preparing the dolphins to be transported to and live in an outdoor setting. Ultimately, we plan to move the dolphins to the sanctuary by the end of 2020.

### What will the sanctuary cost?

It is too early to give a precise figure, as the cost will be specific to the site chosen, reflecting the land price as well as the design and construction expenses for that location. The cost will be substantial, and we will rely on philanthropic support to make the sanctuary a reality.

### How will the dolphins be moved to the sanctuary? Is it safe for them?

The safety of the dolphins is our highest priority. A team of experts is evaluating all associated risks and determining how to provide our colony of dolphins with the safest possible transport and transition to the sanctuary. We are allowing four to five years for this process. Already, the dolphins are engaged in training, which at times may be visible to the public.



## JOIN THE MOVEMENT

A facility of this magnitude is ambitious, but we are fully committed to our sanctuary plans. We are actively seeking philanthropic support to create and sustain the sanctuary. You can help make North America's first dolphin sanctuary a reality with a contribution to the National Aquarium by visiting [aqua.org/sanctuary](http://aqua.org/sanctuary).

## THE NOT-SO-FAST AND FURIOUS

*Get up close with the Aquarium's youngest sloth, Fern.*

BY ASHLEY GOETZ

Ivy's outstretched arm reaches for a slice of zucchini. As if in slow motion, she wraps two curved claws around the vegetable and moves it toward her open mouth.

Ivy is a Linne's two-toed sloth, one of four here in the Aquarium's *Upland Tropical Rain Forest* exhibit. The other sloths are Ivy's offspring, two of which are now fully grown. The third, a pint-sized version of mom, rests gently on her belly.

The young sloth's name is Fern. At that time, only three months old, Fern was still covered in plush brown fur, a contrast to Ivy's coarse coat. Staff estimated her weight to be just under 2 pounds, a fraction of mom's 12.

BABY SLOTHS  
LIKE FERN SPEND  
NEARLY A YEAR  
CLINGING TO THEIR  
MOTHERS BEFORE  
VENTURING OUT  
ON THEIR OWN

With the exception of that first year, they tend to be solitary creatures.

### TASTE TEST

At such a young age, Fern had yet to master the art of eating upside down and was just beginning to explore solid foods. "Fern will grab trees and taste her surroundings. That's how she learns what you eat and what you don't," says senior aviculturist Debra Dial. She'll even taste what mom's eating.

The Aquarium's sloths eat a commercial leaf-eater biscuit and a variety of fruits and veggies, such as zucchini, sweet potatoes, squash, carrots, green beans and apples. They are cut into long strips, so the sloths can easily pick them up.

They have also been spotted grazing on exhibit plants, including leaves from the large cecropia tree, a favorite snack. A four-chambered stomach filled with bacteria helps break down the tough foliage and other food.

If you peek inside Ivy's mouth, you'll see a set of large teeth. These modified canines are permanently tinted yellow; unlike in humans, a sloth's teeth have no enamel.

LINNE'S TWO-TOED SLOTHS HAVE A FOUR-CHAMBERED STOMACH FILLED WITH BACTERIA TO BREAK DOWN TOUGH FOLIAGE.

### NOCTURNAL NAVIGATORS

A balanced diet is important for sloths, because they need the proper fuel for their active lifestyles. Yes, active.

Although it is true that two-toed sloths like to snooze—sometimes for 15 to 20 hours a day—they are hardly lazy. In fact, sloths are nocturnal and spend most of their nights at the Aquarium moving around.

During the day, the sloths sleep soundly and won't pay much mind to small disturbances, such as curious golden lion tamarins. It takes more than a passing monkey to rouse these animals from their slumber.

Despite their slow and gentle reputation, sloths are surprisingly strong. The name two-toed sloth is also a bit of a misnomer. All sloths have three toes on their hind feet. It's their front limbs that differ—two-toed sloths have only two claws. You can probably guess how many three-toed sloths possess.

SLOTHS ARE NOCTURNAL AND CAN SPEND 15 TO 20 HOURS A DAY SNOOZING.

### AT HOME IN THE TREES

Two- and three-toed sloths are uniquely adapted to life in trees. Their claws are perfectly suited for gripping branches, or, in Fern's case, climbing onto Ivy. Sloths typically only journey to the ground to defecate, and even that only happens about once every two weeks.

Sloths spend a lot of time upside down (almost all of it, in fact). They eat, sleep, mate and even give birth upside down! Last April, staff was lucky enough to witness Ivy giving birth to Fern. "You can't beat that," says Dial. "Ten years here, and that was the first time I had ever seen a little one born."

The Aquarium's sloths eat, sleep and explore at their leisure, so they can be difficult to spot. "It's our job to provide them the best possible environment and care, to allow them to do what they would do naturally," says Dial. "It's a choose your own adventure."

So, what's your best bet for spotting Ivy and Fern? Just ask! Staff keep their eyes on the sloths throughout the day and can likely point you in the right direction.

SLOTHS EAT, SLEEP, MATE AND EVEN GIVE BIRTH UPSIDE DOWN!

OPPOSITE: FERN CLINGING TO MOM, IVY  
UPLAND TROPICAL RAIN FOREST  
NATIONAL AQUARIUM

# \* Clean Kitchen \*

## WAYS TO BE LESS WASTEFUL

BY KATE SCHMELYUN

There's a reason the kitchen is called the heart of a home. It's where we bake birthday cakes and open champagne, or stir up soup for someone who's sick. It's the backdrop for elaborate holiday gatherings and simple, shared daily meals. It's a place that connects us, where we show we care about one another.

It can also be a place where we care for our oceans and our planet. The U.S. Department of Agriculture estimates that 30 percent to 40 percent of the U.S. food supply is wasted—the equivalent of 133 billion pounds of food—most of it at the consumer level. Food that's thrown away is a waste of the water, land, labor, energy, fuel and money used to produce, process, transport, prepare, store and dispose of it.

Fortunately, our kitchens are full of opportunities to make thoughtful choices. The National Aquarium's on-site food service, which includes the Harbor Market Kitchen, Harbor Market Café, catering for private events and food carts, sets an example that home cooks can follow.

The Aquarium partners with Sodexo for its food service. Chef Joe Cotton has served as the Aquarium's executive chef since 2013 and was recently promoted to Sodexo's executive chef for the Mid-Atlantic and Northeast U.S. "While sustainability in a commercial kitchen that feeds thousands of people per week looks a lot different than what's possible at home," he says, "much of what we do here at the Aquarium can be easily scaled down or adapted."

**"We are at once the problem and the only possible solution to the problem."**

—Michael Pollan,  
"SECOND NATURE: A GARDENER'S EDUCATION"

### GET CREATIVE ABOUT REDUCING + RECYCLING

Used cooking oil from Harbor Market Kitchen is recycled into biodiesel, a renewable, clean-burning diesel replacement.



### SCRATCH STORE-BOUGHT (WHEN IT MAKES SENSE)

Cooks at the Aquarium make soups, salad dressings and more from scratch. No small undertaking in a kitchen that goes through 40 gallons of pizza sauce a week.

### BUY SEASONAL + LOCAL

Aquarium chefs use seasonal, local fruit, vegetables and proteins.

*NOTE: The star of the fish and chips entrée is wild-caught blue catfish—an invasive species that's disrupting the local ecosystem—as part of the Aquarium's Seafood Smart sustainable seafood campaign.*



### SAY SO LONG TO SINGLE-USE

A linen company keeps the Aquarium's kitchens stocked with clean, reusable rags, towels and aprons. And if you've dined at the Aquarium, you may have noticed that bottled water is not available for sale and disposable straws and lids are only available by request.



### WASTE NOT, WANT NOT

The Aquarium's kitchens receive food deliveries six days a week. Perishable food is ordered and delivered as needed and cooked when it's at its freshest, while non-perishable items (such as flour, salt and sugar) are bought in bulk.



**BUY SEASONAL**

Your best source for these ingredients is, of course, your local farmers market. (In addition to a wide array of fruits and vegetables, you can find fish, meat, chicken and eggs at many markets.)

Don't forget your reusable shopping bag!

**GET CREATIVE**

Recycling oil into bio-diesel at home? Probably not happening. But did you know you can reuse cooking oil and bacon grease? Allow the used oil or grease to cool before straining out food particles and pouring it into a container to be refrigerated or frozen.

**SAY SO LONG TO SINGLE-USE**

Go with washable fabric towels, rags and table linens, rather than paper. For washing dishes and linens, look for environmentally friendly detergents that don't deposit harsh chemicals into the wastewater.

And skip disposable straws—Americans use (and toss) about 500 million plastic straws each day.

**WASTE NOT, WANT NOT**

Planning meals, buying only what you need and using (or freezing) ingredients before they go bad minimizes waste and is better for your wallet and the environment.

**BUY LOCAL**

The average item of food in America travels 1,500 miles from farm to plate. Through a community-supported agriculture (CSA) program, you can support local farmers and get weekly shares of fresh food grown or raised near where you live.

"COOKING IS EASIER THAN MANY PEOPLE THINK"



**SCRATCH STORE-BOUGHT (WHEN IT MAKES SENSE)**

Try trading instant oatmeal packets for old-fashioned rolled oats, which cook in about 10 minutes and can be deliciously dressed up with in-season ingredients such as sliced apples, maple syrup or toasted nuts.

"AND IT'S FUN, ESPECIALLY IF YOU CAN GET THE KIDS OR GRANDKIDS INVOLVED."

—Chef Joe Cotton, HARBOR MARKET KITCHEN





# FOREST IN FLUX

BY ASHLEY GOETZ

Ascending the escalator to the *Upland Tropical Rain Forest* exhibit, you're met with a heavy wave of hot air. It's not the arid heat of a mud-cracked desert but the familiar humidity that follows a mid-summer storm. A chorus of chirping birds greets you. And as you inhale, the fragrance of fresh plants mingles with the earthiness of sodden dirt.

That very balance of life and death defines a healthy rain forest—each fallen plant returning to the soil.

RAIN FOREST RIVALRY CAN BE FIERCE,  
AND WHAT UNFOLDS EACH DAY IS A DRAMATIC,  
ALBEIT SOMETIMES SLOW-PACED, ENDURANCE RACE.

"The death of a rain forest plant is not necessarily a bad thing," explains senior horticulturist Bobby Anderson. At least not when considering the entire ecosystem. Death, and consequently the recycling of nutrients, is an important aspect of rain forest ecology.

Across the globe, tropical rain forests scatter the equator, but the Aquarium's exhibit is modeled after the rain forests of Central and South America. They represent one of the most diverse and complex ecosystems on Earth. So, what you see here at the Aquarium is only a snapshot of the plants and animals you might find within a natural rain forest.

Consider this: Scientists estimate the Amazon alone is home to about 10 percent of the world's species, including hundreds of amphibians, reptiles and mammals, thousands of birds and fishes, nearly 40,000 plants and millions of insects—and those are just the ones we know about.

This dynamic environment inspired this year's group of Aquarium on Wheels students to create a play about rain forest conservation, which was then performed in libraries and public schools throughout Baltimore City in an effort to inspire those in our community to understand and appreciate these special places.

As these students learned, human-related impacts have devastated rain forests, turning these incredible woodlands into some of the most imperiled habitats on the planet. But for many rain forest plants and animals, people are not the only obstacle. Simply surviving within their environment is an exercise in adaptability.

"The rain forest environment is very competitive," says Ken Howell, curator of the *Upland Tropical Rain Forest* exhibit. Rain forest rivalry can be fierce, and what unfolds each day is a dramatic, albeit sometimes slow-paced, endurance race.

SEVERAL ANIMALS OWE THEIR POISONOUS PROPERTIES TO PLANTS. **DART FROGS** SEQUESTER TOXINS FROM THEIR LEAF- AND DETRITUS-EATING PREY.

## FORTITUDE ON THE FOREST FLOOR

Rain forest is not synonymous with jungle, which suggests an impenetrable mass of vegetation. In fact, traversing your average rain forest won't always require a machete, because the ground cover is not usually very dense.

That is because the leaves of trees hundreds of feet above prevent daylight from reaching this part of the forest. Down here, the air is still. It is dark and incredibly damp. Spiders, insects and frogs make their homes in this dimly-lit habitat.

While water is abundant, sunlight is in short supply, enticing many plants into a race to the top. And the deficiencies are not limited to sunlight. The very soil in which plants root tends to be shallow, with just a few inches to a foot of nutrient-rich leaf litter and topsoil.

Beneath that rests a thick layer of nutrient-poor laterite soil. This soil's composition has led some to describe rain forests as "trees growing in the desert." Still, despite the adverse conditions, many plants have managed to adapt to life in this shady undergrowth.

**LEAF-CUTTER ANTS** BRING LARGE BITS OF LEAVES TO AN UNDERGROUND NEST, CULTIVATING THE PIECES INTO A FUNGUS THAT FEEDS THE COLONY.

SCIENTISTS HYPOTHEZIZE THAT THE **WALKING PALM'S** AERIAL ROOTS ARE AN ADAPTATION TO WATER-LOGGED SOILS. OTHERS SPECULATE THAT IF THIS TREE FELL IT COULD GROW NEW ROOTS, "WALKING" ACROSS THE FOREST.

SOME SHADE-TOLERANT PLANTS, LIKE **TERRESTRIAL BROMELIADS**, HAVE PURPLE UNDERSIDES. THE DARK PIGMENT REFLECTS SUNLIGHT UP, HELPING THE PLANT MAXIMIZE A SMALL AMOUNT OF LIGHT.

**DUMB CANE** HAS MULTIPLE SEGMENTS CAPABLE OF PRODUCING ROOTS. IF IT GROWS TOO HEAVY, AN INTACT SEGMENT CAN PUT OUT NEW ROOTS.

THE **YELLOW-FOOTED TORTOISE** SPENDS ITS LIFE ON THE FOREST FLOOR, FEEDING ON FALLEN FRUITS, LEAVES AND THE OCCASIONAL CARRION OR INSECT.

**MOSS** CREEPS ONTO WOOD THROUGHOUT THE RAIN FOREST, OCCUPYING AREAS WITH CONSISTENT MOISTURE. SOME BIRDS COLLECT IT TO BUILD THEIR NESTS.

**BANANAS** ARE NATIVE TO ASIA BUT GROWN COMMERCIALY IN CENTRAL AND SOUTH AMERICA. IT'S UNLIKELY YOU'D FIND WILD BANANAS IN THE RAIN FOREST. YOU CAN, HOWEVER, FIND THEM AT THE AQUARIUM.

WHEN THE AQUARIUM'S BANANA TREE FLOWERS, **GREEN-AND-GOLD TANAGERS** GATHER NECTAR AND FEED ON VISITING INSECTS.

## IN THE SHADOWS

Many of us picture the rain forest in four distinct layers: the forest floor, understory, canopy and emergent. Truth be told, they are not so easily distinguished.

"Rain forests are vertically complex and species are adapted to living at specific levels, sometimes changing or transcending these levels throughout their lives," says Howell. Some plants begin life on the ground only to later take up residency in the canopy, or vice versa. That makes the space between difficult to define.

It's a vast landscape of dense foliage, scraggly shrubs, ferns, twisting vines and juvenile trees, all masked in the shadow of the leafy cover that looms overhead. For plants not well adapted to life on the ground, this is the starting line. And each plant is trying to outperform the next.

The climb is slow and steady for most, but every so often a tree falls creating a gap in the canopy. When sun meets soil, life erupts below. It's within those disturbed areas that young soursop seedlings, cecropia trees and other sun-seeking plants hit their stride. They tend to grow rapidly, vying for a short-lived spot in the sun.

THE CHOCOLATE WE EAT BEGINS LIFE AS A SEED-FILLED POD ON THE **THEOBROMA CACAO TREE**. POLLINATION IS SO PRECISE THAT FEW CACAO FLOWERS ACTUALLY BEAR FRUIT.

POINTED **DRIP TIPS** AND A WAXY LAYER, CALLED THE **CUTICLE**, ENCOURAGE RAINWATER TO DRAIN, PREVENTING THE GROWTH OF UNWANTED FUNGUS OR BACTERIA.

**ANTHURIUM'S** LARGE LEAVES ABSORB SUNLIGHT. ITS BASKET-LIKE STRUCTURE COLLECTS DECOMPOSING PLANT MATERIAL, WHICH FERTILIZES THE PLANT AND ALLOWS THIS ESSENTIALLY SELF-FERTILIZING PLANT TO THRIVE WHERE SOIL ISN'T OTHERWISE AVAILABLE.

RAINWATER COLLECTS IN A **BROMELIAD'S** WHIRL OF LEAVES. SOME DART FROGS CARRY THEIR TADPOLES ON THEIR BACKS, DEPOSITING THEM IN BROMELIAD CUPS FOR PROTECTION FROM PREDATORS.

## EYES ON THE SKY

Plants aren't out of the woods, so to speak, once they reach the canopy. They face torrential downpours, forceful winds and competition for sunlight. Still, some have found their niche.

The trees that have successfully fought their way to the top average 60 to 150 feet, with massive trunks and expansive crowns that cast everything below into shadow. But it's not only giants that make a life in the canopy.

Like the vines that wriggle their way up, other plants also use these trees as hosts. They root on massive limbs where leaves fall and compost, forming loose organic soil. "You have this whole ecosystem on top of a branch 100 feet up," says Anderson. Sometimes 3 feet deep, the soil is held together by plant roots and insects.

Walking through the Aquarium's exhibit brings plants from all altitudes of the forest to eye level. You get a glimpse of the floor, the canopy and that hard-to-define space in between. And you discover that the complexities of a tropical rain forest cannot be divided into four distinct parts, but rather demand to be viewed as intricate layers that overlap and interrelate.

IT CAN GET WINDY IN THE CANOPY, A FAVORABLE CIRCUMSTANCE FOR SOME SPECIES OF **ORCHID** THAT PRODUCE MILLIONS OF TINY, WIND-DISPersed SEEDS.

**MONSTERA DELICIOSA'S** LEAVES BEGIN SMALL AND HEART-SHAPED, INCREASING IN SIZE AND DEVELOPING SLITS AND WINDOWS AT HIGHER ALTITUDES TO PREVENT DRAG SO THE VINE ISN'T PULLED DOWN BY THE WIND.

**SCREAMING PIHAS** ARE FAMOUS FOR THEIR PIERCING CALLS. FEMALES BUILD TINY NESTS OF TWIGS AND TENDRILS TO RAISE THEIR CHICK. THE CHICK INSTINCTIVELY LAYS MOTIONLESS TO AVOID DETECTION WHILE ITS MOTHER IS AWAY FROM THE NEST.

# WORLD OF WONDER

PLEASE JOIN US FOR A MARJORIE LYNN BANK LECTURE  
FEATURING PHOTOGRAPHER

**JEFF MAURITZEN**

THURSDAY, NOVEMBER 10  
6:30 PM TO 8 PM

[AQUA.ORG/MLB](http://AQUA.ORG/MLB)

## A PHOTOGRAPHIC JOURNEY

For 11 years, Jeff Mauritzen has crossed continents, photographing some of the most fascinating places on Earth. In advance of Mauritzen's lecture, we spoke with him about how photography has shaped his view of our blue planet.

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### WHAT DROVE YOU TO PURSUE A CAREER IN PHOTOGRAPHY?

As far back as I can remember, I've always had a camera in my hands. A lot of them were cheap Kodaks or antique cameras that no longer worked. When I was 16, I finally saved up enough money to buy my first DSLR—I still have it! What I love most about photography is the ability to capture moments that otherwise would've been forgotten. Looking back on an image lets you travel back in time and experience that memory again.

### YOU'VE TRAVELED THE WORLD. WHICH ENVIRONMENTS ARE YOUR FAVORITE TO SHOOT?

Too many to list! Although if I had to pick a recent one, it would be Antarctica. The icy blue landscapes, tremendous wildlife and ethereal light have me begging for more. Thankfully, I get to head back again later this year.

### IN ADDITION TO THE MAGNIFICENT BEAUTY OF OUR NATURAL WORLD, WHAT DO YOU HOPE PEOPLE TAKE AWAY FROM YOUR PHOTOGRAPHY?

I find the world we live in to be such an amazing place. I've always had a passion to explore and bring back images that I could share with others. My hope is that I can inspire people to care about the places I visit and for the people and wildlife who inhabit them.

TO READ THE FULL Q&A, VISIT [AQUA.ORG/BLOG](http://AQUA.ORG/BLOG).

Previous: Spotted eagle rays off the coast of the Galapagos Islands. ©National Geographic Society/Jeff Mauritzen  
Above: A green sea turtle swims in the waters surrounding the Galapagos Islands. ©National Geographic Society/Jeff Mauritzen  
Opposite: A scarlet macaw in flight over Corcovado National Park, Costa Rica. ©Jeff Mauritzen





**ABOUT MARJORIE LYNN BANK**

Marjorie Lynn Bank was a native Baltimorean and a naturalist who promoted aquatic conservation and shared her extensive knowledge of marine biology through her award-winning underwater photography and educational lectures. Her legacy lives on through the National Aquarium Marjorie Lynn Bank Lecture Series, established by the Bank family upon Marjorie's passing in 1994.

**LOOKING AT THE WORLD WITH WONDER:  
HOW ADOPTING A CHILD'S PERSPECTIVE  
OF THE WORLD COULD HELP SAVE IT**

FEATURING JEFF MAURITZEN  
THURSDAY, NOVEMBER 10  
6:30 PM TO 8 PM

TO REGISTER, VISIT [AQUA.ORG/MLB](http://AQUA.ORG/MLB).

**ABOUT JEFF MAURITZEN**

Join Jeff Mauritzen on a photographic journey that begins in his own backyard, then expands across continents and around the globe. You'll discover how looking at the world in wonder, as most children do, can inspire us to be better environmental stewards—a lesson Mauritzen has learned through his own experiences as a father. Mauritzen is a seasoned and popular photography expert, guiding and lecturing on natural history-focused trips for National Geographic Expeditions. His adventures have immersed him in vivid landscapes in all 7 continents and more than 60 countries around the world. When not on an assignment, Jeff can be found at home in Loudoun County, Virginia, with his wife, daughter and rescue greyhound.

**MEET OUR MEMBERS**

My husband and I decided to bring our two daughters to the Aquarium after a visit to Johns Hopkins. My daughters and I have rare genetic disorders and we felt that, after a day of seeing doctors, they needed some fun time. Both girls were entranced with everything at the Aquarium.

**AMY KIPNIS**



**MEMBER MEMORIES**



As a Christmas present this past year, we received a family membership to the National Aquarium. Our children did not need any more toys, and we love to do activities as a family, so this was the perfect gift.

**LAUREN SMITH**

I have been going to the National Aquarium in Baltimore since I was 2 years old. I am now 27. My aunt was a member, and she took me at least once a year. I can definitely say that going to the Aquarium fostered an appreciation of aquatic ecosystems and conservation. I now visit frequently with my husband, Zack. On our last visit, I saw the sloth for the first time ever!

**RAYCHEL UPRIGHT**



My husband, Zachary, and I have been National Aquarium members for a few years now. Zachary proposed to me during a Member-Only Evening in 2013, and we were lucky enough to have our wedding at the Aquarium the following year. That night was more than I could have ever dreamed of, and the Aquarium will always hold a special place in our hearts.

**EMILY COVINGTON**

I have so many memories from the National Aquarium. I like visiting every month, and there is always something new to see! Thank you for making this possible for kids like me and for protecting the planet we live on.

**ISABELLA MAJAROWITZ (AGE 12)**



My husband and I had the best day when we brought our granddaughter to the National Aquarium to celebrate her 4th birthday. It was a day filled with wonder and discovery for her. What a joy to see her experience the Aquarium for the first time.

**DOTTIE BAUMAN**

When I came to Baltimore to attend Johns Hopkins, one of my first purchases was a membership to the National Aquarium. I would often visit on Friday afternoons and always found great peace and calm during my visits.

**LINDA MAGUIRE**

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