UPSIDE DOWN

A closer look at an unusual jellyfish

PLUS: NEW Backstage Pass, Conservation News and Special IMAX Shows
Of Glass, Stars, and Baby Jellies

As Aquarium visitors enter Jellies: Living Art in Ocean Journey, I often hear a natural progression of excited exclamations. First are the “ooohs” marveling at the brilliant splashes of color in the Chihuly macchia art glass installation. Next, I often hear “Wow! Look at how tiny those jellies are!” as visitors peer into the umbrella jellyfish exhibit. Inevitably, though, every guest, as well as many aquarium employees and volunteers, comes to a complete stop at the upside-down jellyfish exhibit. This exhibit draws people in — partially because of its bright lights and its placement in the middle of the gallery, but mostly because of the jellies themselves.

Upside-down jellyfish are truly unique in the world of jellies. Instead of gracefully pulsing through the water, they rest on the top of their bell with their oral arms facing skyward. This position allows zooxanthellae, symbiotic algae living in the jellyfish tissues, to collect sunlight for photosynthesis. Like other true jellyfish, upside down jellies use stinging cells to capture and eat zooplankton. However, like corals, they derive much of their nutrition from their photosynthetic tenants. This distinctive behavior also plays a role in the scientific name given to the genus of upside-down jellies, Cassiopeia. According to Greek mythology, Cassiopeia was a queen who believed she and her daughter, Andromeda, were more beautiful than the Nereids, nymph daughters of a sea god. This arrogance enraged the gods, who unleashed their wrath on Cassiopeia’s kingdom. To avoid destruction, Cassiopeia and her husband, King Cepheus, offered their daughter Andromeda as a sacrifice. Andromeda, chained to a rock at the edge of the sea, narrowly escaped certain death at the hands of a sea monster with the help of the hero Perseus and the two were married. Poseidon was not satisfied with this outcome and felt that the vain queen should not escape punishment so easily. He placed her in the heavens as a constellation, but in such a way that Cassiopeia, seated on her throne, circles the celestial pole upside down. (You won’t need the Hubble Space Telescope to spot Cassiopeia in the night sky. Just look for the W-shaped constellation opposite the Big Dipper.)

Another exceptional feature of our upside-down jellyfish display is that it is the only jelly exhibit in which almost the entire jelly lifecycle can be seen. The large adult jellies, or medusa, typically

Baby upside-down jellyfish pulse like tiny stars in a distant constellation. The ephyra, the third stage of jellyfish development, start out the size of a sixteen-point font asterisk (※). The jelly babies shown on this page are about the size of a pencil eraser.
sit clustered in the middle of the tank. They are drawn to this area of the exhibit because it has the highest intensity of light. Sitting edge to edge, the jellies look like a pulsing, multi-colored, living carpet. Looking a little closer, small white polyps stand out among the blue glass beads in the bottom of the exhibit. These polyps are the asexual phase of the jelly lifecycle. When conditions are right, jelly polyps segment and produce small larval jellyfish called ephyra. This process is known as strobilation. Small golden ephyra can often be seen pulsing on the window of the exhibit or swimming out above the adult medusa for some time in the “sun.” Newly released ephyra measure 1-2 mm in diameter. After about 10 days, these little jellies have doubled in size and start to look and act more like the adults. Their oral arms start to develop and they begin to spend more time on the bottom. Upside-down jellies are known to be very prolific and this is true in our exhibit as well: Over the last few months, more than 200 ephyra have been moved to a holding tank in the quarantine room to grow, about 250 ephyra have been sent to other aquariums, and countless other upside-down jellyfish ephyra are growing up in the actual exhibit.

Next time your visit to the Aquarium brings you to the Jellies: Living Art gallery, stop and see what’s going on in the upside-down jellyfish exhibit. It truly is unlike any other jelly exhibit in Ocean Journey.

About the Author: Senior aquarist Sharyl Crossley cares for the animals on display in Jellies: Living Art. She authored a scientific paper about jellyfish care which was published last year in the Journal of Zoo and Wildlife Medicine.
Fish Tales from the Field

Just like anglers, fish biologists like to swap our favorite fish tales from our field work. However, since we’re working on scientific research, we aren’t allowed to exaggerate about the abundance or size of the fish we catch. That means we mostly embellish our reports about how great the weather was while we’re sampling. These stories aren’t just professional bragging, though. When we tell our tales, we’re actually exchanging a lot of information about the fish and their habitats that ultimately helps in our conservation work.

While we may lump field work into a big category, biologists study fish in the wild to answer many different questions, from behavioral observations to habitat requirements. At the Tennessee Aquarium Conservation Institute (TNACI), a lot of our field work is to learn more about rare aquatic animals so that we can help protect them. For some of our projects, we make estimates of how many individuals are in a population, study what types of habitats are necessary for certain species of fishes, and determine if our restoration projects are working. For me, summer is the height of field season, when days are long, temperatures are warm, and river levels have dropped with the end of spring rains. This summer, I’ll be visiting two different river systems, the Conasauga River and the upper Tennessee River, to learn more about their aquatic life.

The Conasauga River is one of the nation’s most biologically diverse rivers, with more than 90 species of fish found in its waters, including colorful tricolor shiners and southern shad. Meanwhile, many upper Tennessee River tributaries pass through the scenic Blue Ridge province and are home to vivid tangerine darters and warpaint shiners. Though these two watersheds border each other, the Conasauga River is part of the Mobile Basin, and it drains into the Gulf of Mexico through the Coosa and Alabama Rivers while the Tennessee River drains through the Ohio and Mississippi rivers. Because of this, many fish species are found only in the Conasauga River or the Tennessee River. This is one of the reasons that Chattanooga is such a great place to work for fish biologists; there are so many different fish species within a short drive.

One of the Conasauga River fish I study is the cold-water darter, a rare fish only found in springs in Tennessee, Georgia and Alabama. Last fall, TNACI started a project to remove the three feet of sediment that coated the bottom of Colvard Spring. Before we began the sediment removal, we sampled each part of the spring three times to calculate our population estimate of 408 individual darters. In February, we visited Colvard Spring for the first time since we started the restoration project. While we didn’t use the rigorous population estimate technique, we observed that the cold-water darters are thriving. At top: Warpaint shiners are normally shy creatures. But colorful species like these can be seen while snorkeling for fun or during field research projects.
water darters were abundant in the spring and even occupying some new habitat that was uncovered by the sediment removal. We’re eager to complete another population estimate this fall to see if the sediment removal has made a big difference for this population of coldwater darters.

Meanwhile, we’re finishing up a larger study about the biodiversity of the upper Tennessee River. We have been examining many fish species from this region to determine which streams have more species, and therefore, high species diversity. We’ve also identified which species, like the girt darter, have high genetic diversity within the species. High diversity, whether species or genetic, is a good sign, because it usually means that the ecosystem or species is healthy. This information helps us prioritize which streams and species are in good shape, and which could use a little extra help. This summer, we’ll head up to the Holston River system in southwest Virginia to finish sampling streams for this study.

The best field days are when we gain unexpected knowledge or find new populations. Trispot darters are another rare fish found in the Conasauga River drainage. Though only two inches long, they migrate into smaller tributaries in the fall in order to move into tiny streams and seeps to spawn in the late winter and early spring. Fish biologists previously thought that the streams they use were in open pastures and fields. This spring, we helped some University of Alabama researchers who are surveying trispot darter populations to study their genetics. We stopped at a new site on the way home “just in case” and found a new breeding population in a tiny creek running through a pine forest. This habitat is similar to two new breeding populations of trispot darters that have been discovered in Alabama recently and means we may have been too narrow in thinking about what type of spawning habitat trispot darters need. Finding these populations helps us determine which streams we need to protect to ensure that these darters have the right kind of habitat for all stages of life — from eggs to adulthood.

It doesn’t take an advanced degree to start field work in your own backyard. This summer, try snorkeling in a clear river to make your own observations on fish abundance and behavior. Soon you’ll be telling your own fish tales!

**Freshwater Snorkeling** By Aquarist Ben Stenger

Most people think snorkeling is limited to tropical locations with brightly-colored reef inhabitants. However, there’s some great snorkeling here in our own backyard. The Southeast is home to crystal clear, though chilly, streams filled with beautiful aquatic creatures. All that you need is a mask, snorkel, and, depending on the time of year, a wet suit.

Starting in the spring, many of the area’s fish begin to break out their breeding colors. Darters and minnows that were dull in the fall and winter now have streaks of red, orange, blue and green. Sunfish develop bright green and orange patterns and start to build nests that they defend well into summer. While you’re in the water, you can carefully turn over rocks to find all sorts of fascinating insect larvae. Many species of fish will hover nearby, grateful for any free meals you can stir up. Often, you can look behind you to see a huge school of shiners picking at any debris you leave in your wake. If you’re lucky, you may even run into a musk turtle or hellbender.

Picking the right location for your snorkel trip is very important. Many state and national parks in the area are a good bet. The water is usually clear because of protected headwaters, and you don’t have to worry about being on private property. As with any hobby, safety is important. Make sure to get out of the water before you become too cold and go with a buddy or group. Whether you’re a scuba diver looking for something to do between trips, or you’re looking for a new way to view wildlife, snorkeling can be a rewarding new hobby if you’re willing to brave the cold.

**Snorkel the Conasauga River with Dr. Anna George on Saturday, July 24th.** Details on page 11.

**About the Author:** Anna George, Ph.D., is the director of the Tennessee Aquarium Conservation Institute. Anna keeps busy with numerous field studies and restoration projects including the award-winning Saving the Sturgeon project.

Volkswagen Group of America, Chattanooga Operations, is the Official Sponsor of the Tennessee Aquarium Conservation Programs.
**Malebo Pool**

Zoos and aquariums play a significant role in allowing the general public to experience exotic locales without the expense and inconvenience of international travel. The Tennessee Aquarium leads people on a fascinating global journey in the *Rivers of the World* gallery. In the last 10 years, we have added six new exhibits to this gallery, with the newest being the *Malebo Pool* exhibit.

Most of us will never travel to Africa. Of those that do, most will miss experiencing Africa’s underwater wilderness. But now, with the addition of the *Malebo Pool* exhibit, Aquarium visitors can explore a fascinating portion of the Congo River, formerly known as the Zaire River. At slightly less than 3,000 miles long, the Congo River is the second largest river in Africa. Starting in the rift valley and Lake Tanganyika in East Africa, it travels through nine countries and Malebo Pool before spilling down Livingstone Falls near Kinshasa, Democratic Republic of the Congo, and eventually into the Atlantic Ocean.

Originally named Stanley Pool after British explorer Sir Henry Morton Stanley, Malebo Pool was renamed in 1972 after the rise of Lieutenant General Joseph Mobutu as self-declared president of Zaire. Malebo Pool covers an area of 174 square miles but is rarely more than 30 feet deep. It is not a particularly pristine body of water, but it’s a vital source for food, water and trade to the capital cities of Kinshasa and Brazzaville. The Aquarium’s version of Malebo pool was developed to showcase many of the more reclusive and interesting fishes found in this area.

While cichlids comprise a large portion of endemic fishes in Africa, they are only a small component of the over 200 species found in the Malebo Pool. Catfish, tetras and odd-looking fish in the family Mormyridae are most prevalent in this region because of the murky conditions in which they thrive. Catfish of the family Mokidae, or upside-down catfishes, are mostly nocturnal and possess striking patterns that counter shade them and allow them to blend in while they swim on their backs sucking food from the surface of the water. The black-belly upside-down catfish, *Synodontis nigriventre*, can be found in this exhibit along with another unusual top dweller, the African butterflyfish. The only species in the family Pantadontidae, the small African butterfly fish swims on the surface and grabs insects with its trapdoor mouth whenever possible. Crickets are its favorite Aquarium diet.

Probably the most unusual fish in this exhibit, or perhaps any of the *Rivers of the World* exhibits, is the elephantnose. Elephantnose fish are in the family Mormyridae. While they look unusual, with very small eyes and elephant-like trunks, which are actually chins, they possess very large brains. In fact, elephantnose fish have brain to body ratios that are close to human ratios. Their learning ability is attributed to their overly large cerebellums and they have also been known to engage in “play” behavior, which generally consists of batting objects around with their heads. All of the 40 species of mormyrids found in Malebo Pool produce a weak electrical signal from their caudal peduncle (tail region) that acts much like a bat’s sonar. Along with exceptional hearing, this electrical ability allows them to communicate and navigate through the murky waters in which they live as well as avoid predators. Also in this exhibit is the “baby whale” which is not really a whale but a chinless version of the elephantnose, complete with electric senses and large brain. These fish are often reclusive and can be seen on the right-hand side of the exhibit foraging in the dark for food.

Look into the adjacent Congo River exhibit for other interesting animals such as the dwarf crocodile and climbing perch. Climbing perch, *Ctenopoma sp.*, can actually drag themselves across land to go from one water source to another. Tilapia is a restaurant favorite and is easy to farm because of its mouth brooding reproductive behavior. Across the hall are many beautiful cichlids from Lake Tanganyika and the reproductively sly cuckoo catfish, *Synodontis multipunctatus*, who lays its eggs in the nests of other fish to fool them into doing all of the rearing! Africa is truly a magical place, and the Aquarium is a great way to experience three very different underwater safaris from half a world away.

**About the Author:** Assistant Curator of Fishes Carol Haley coordinates the aquarist staff and works closely with education staff and volunteers. She has been with the Aquarium since October 1991.
Discover ways to support Tennessee Valley conservation at www.tnaqua.org.
NEW AT THE AQUARIUM

Have you ever dreamed of being one of the Aquarium’s animal keepers? Would you like to chat with a diver about what it’s like floating side by side with toothy sharks? Want to know if penguins have personalities? What’s it like to feed the fish? With more than 10,000 animals, we know you have ten times as many questions. Beginning May 28, you can go behind the scenes, get hands-on and get answers.

The Tennessee Aquarium’s NEW Backstage Passes give you VIP access like never before, to get up-close, feed, and in some cases, actually touch Aquarium animals. Two NEW 45-minute Backstage Pass options will give you access to keeper-only areas while you and your family get up-close and personal with the Aquarium’s most amazing animals.

11 AM  Backstage Pass: Ocean Journey
• Watch the playful penguins from the behind-the-scenes observation deck
• Meet SCUBA divers getting into the Aquarium’s shark habitat, Secret Reef, our largest exhibit
• Try on SCUBA gear and learn about Aquarium diving
• Learn what it takes to feed 10,000 hungry mouths with a visit to the animal food prep area
• Feed sting rays in the Tropical Cove Touch Exhibit
• Get up close and personal during an animal encounter

1:30 PM  Backstage Pass: River Journey
• Pick up food for the sea turtle and fish from the Aquarium Food Prep Room
• Feed the colorful reef fish
• Get above the exhibit and only a few feet away from the massive green sea turtle
• Meet the divers about to get in with the sharks, turtle and fish
• Meet many of the new and unique animals in the Aquarium’s Quarantine Room (This area has never been opened to the public; be among the first to see it.)
• See the huge pumps behind the world’s largest freshwater aquarium
• Get up close and personal during an animal encounter

Advanced reservations are recommended for Aquarium Backstage Passes: $12/Member; $15Non-Member (plus Aquarium admission). Children must be at least six years old and accompanied by an adult. Tours offered daily. Be among the first Backstage Pass holders by purchasing online today at: www.tnaqua.org/PlanYourVisit/TicketInformation.aspx.

Go green and get Riverwatch online! Visit www.tnaqua.org/Membership/Riverwatch.aspx
**TENNESSEE AQUARIUM**

**EVENTS**

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Note: All events are held on Eastern Standard Time

**MEMBER EVENTS**

Shark Fest at Ocean Journey

**Friday, Aug. 6 • 6 - 8:30 p.m.**

Learn fascinating facts about our sharks as you get an exclusive view of the toothy beauties in Ocean Journey. Touch shark teeth and skin as Aquarium experts engage you with special hands-on activities, costumes, a craft and animal facts. Enjoy special dive shows and experience the inside of a diver’s shark cage. See what we feed our sharks and how we make sure our divers are safe. Bring your camera! **Note:** Check-in at the Ticketing Center (blue awnings) on the Aquarium Plaza.

All Ages • Free/Member and Non-Member guests using Member Night Guest Passes (one person per pass) • Additional Non-Member guests: Half-price admission: $7.50/Child; $12.50/Adult

REGISTER NOW online at www.tnaqua.org/Events.aspx or mail form on page 16 or call 423-267-FISH (3474).
Family Canoe Trips

Sunday, June 20 & Aug. 22 • 1:30 - 4:30 p.m.; Saturday, July 17 • 10 a.m. - 1 p.m.

Get up close and personal with creek critters as you float the pastoral waters of the North Chickamauga Creek in single canoes with guides from Outdoor Chattanooga OutVenture. All equipment, transport and water are provided. Meet at Greenway Farm.

Adults and ages 5 and older accompanied by an adult • Limited to 16 per session; minimum 6 • Child (5-12): $12/Member; $17/Non-Member • Adult: $16/Member; $21/Non-Member • Meet at Greenway Farm

Collecting Creek Critters Adventure

Saturday, July 17 • 9 a.m. - Noon

Discover how our aquarists collect fish for Aquarium exhibits and learn about the lifestyles of the wet and slippery as we explore life in a local stream with an Aquarium biologist. By pulling a large net along the shallow stream bottom, we will net and examine a variety of aquatic insects and fish, including darters. Wear water shoes, shorts or a bathing suit and bring a towel and change of clothes for this wet adventure! We will provide a snack and drink.

Adults and ages 8 and older • Limited to 20 • $6/Member; $12/Non-Member

Sleep in the Deep

Celebrate the Fourth — Aquarium Style!
July 3 - July 4 • 6 p.m. Saturday - 8:30 a.m. Sunday

Don’t miss your chance to sleep in the deep and celebrate America’s Birthday as you watch the “Pops on the River” fireworks from the Aquarium patio with special 3D glasses. Your night of adventure takes you around the world inside River and Ocean Journey as you explore behind the scenes with our staff, get up-close critter encounters and do all the fun stuff sleepovers are known for. At lights out, you’ll bed down in the Undersea Cavern, while sharks and thousands of colorful fish swim over and around you. Includes overnight, guided tours, special activities, pizza and continental breakfast. Add a souvenir patch for $3.50!

Families with children ages 6 and older accompanied by an adult • $45/Member; $55/Non-Member • Minimum of 30; maximum of 40

REGISTER NOW online at www.tnaqua.org/Events.aspx or mail form on page 16 or call 423-267-FISH (3474).
Bug Club

Bug Club is for kids who love learning about fascinating multi-legged creatures. Clubs meet from 5 to 7 p.m. on the third Thursday of each summer month and membership includes a monthly newsletter, T-shirt and field trips. Games, snacks and experiments round out the fun.

June — Lost Lady Bug Hunt; July — Great Bug Hunt; August — Natural Garden Pest Control

Ages 5-11 • $20 Member; $30 Non-Member per quarter (every 3 months) plus a one-time $15 initiation fee – Call Aquarium Educator Julia Gregory at (423) 785-4054 to register and pay. (The membership department does not take registrations for Bug Club!) Please alert us about any food allergies.

Butterfly Field Day
at Tennessee River Gardens

Saturday, June 12 • 10 a.m. - 12:30 p.m.

Learn about our native butterflies as we explore the beautiful Tennessee River Gardens, which features special plantings to attract butterflies. Bill Haley, Aquarium educator and president of the Tennessee Valley chapter of the North American Butterfly Association, will help you identify and collect valuable data for NABA’s annual national survey. Add an optional field guide, Butterflies and Moths, for $5. Meet at the Tennessee River Gardens on Highway 41.

Adults and ages 8 and older accompanied by an adult • Limited to 25 $5/Member ($10 with book), $10/Non-Member ($15 with book)

Savannah Springs Koi Farm

Saturday, June 12 • 10 a.m. - Noon

The Aquarium’s Nishikigoi Exhibit in the Rivers of the World gallery features several species of Koi. These common carp hybrids are bred to be highly colored and are usually stocked in outdoor ponds where their patterns are distinct and attractive when viewed from the surface. Learn more about Koi at Savannah Springs Koi Farm in Riceville where owner Dan Womach has been breeding and raising Koi since 1974. Dan will lead you on a walking tour of nine ponds to observe different varieties of Koi at various stages and learn how they are bred and raised for eventual sale. Get advice for building or improving your koi pond and receive a coupon for a free Koi for your own pond. Bring your own lunch and beverages to eat in the scenic picnic area. Koi and aquatic plants are for sale.

All Ages • Limited to 30 • Free

Picture the Aquarium
Photography Workshop

With Tom and Pat Cory
Tuesday, June 22 • 6 - 9 p.m.

Capture images of stunning marine life, fabulous penguins, jellyfish and tropical butterflies. Begin with a short clinic before photographing in both Aquarium buildings with hands-on advice by professional nature photographers Tom and Pat Cory. Digital or traditional cameras or camcorders are welcome.

Adults • Limited to 20 • $30/Member; $45/Non-Member

REGISTER NOW online at www.tnaqua.org/Events.aspx or mail form on page 16 or call 423-267-FISH (3474).
Nickajack Bat Cave Paddle  
Friday, June 11 & July 30 • 7:30 - 9:30 p.m.  
Enjoy an amazing spectacle from the water, as nearly 100,000 endangered gray bats exit the Nickajack Cave. Explore the waters of Nickajack Lake while the sun sets before the main attraction at dusk. *Includes all equipment and Outdoor Chattanooga. BYO snack and drink. Meet at Nickajack Lake.*

Adults and ages 12 and older accompanied by an adult  
Limited to 12, minimum 6 • $20/Member; $25/Non-Member

Downtown Chattanooga Sunset Paddle  
Thursday, June 17 & Aug. 5 • 7:30 - 9:30 p.m.  
Tour the heart of Chattanooga on the Tennessee River by launching kayaks at Renaissance Park, adjacent to Coolidge Park. We will paddle past downtown landmarks and around Maclellan Island, a beautiful bird sanctuary where large blue herons roost at sunset. *Meet at Coolidge Park. BYO snack and drink.*

Adults and ages 14 and older accompanied by an adult  
Limited to 12, minimum 6 • $20/Member; $25/Non-Member

Full Moon Paddle  
Saturday, June 26  
8 - 11 p.m.  
Paddle by the light of the full moon around the islands of Harrison Bay. *All equipment and transport are included with guides from Outdoor Chattanooga. BYO snack and water bottle. Meet at Greenway Farm.*

Adults only • Limited to 12, 6 minimum  
$25/Member; $30/Non-Member

Touring Kayak Clinics  
Saturday, June 19 & Aug. 7 • 10 a.m. - 1 p.m.  
Learn kayaking basics from the experienced guides of Outdoor Chattanooga. Proper paddling techniques, how to adjust, enter and exit a boat, safety guidelines and what to do if you turn over will all be covered. Dress in clothing that may get wet and bring dry ones in case you want to experience a wet exit first-hand. *Meet at Greenway Farm.*

Adults and ages 14 and older accompanied by an adult  
Limited to 12 per session; minimum 8 • $20/Member; $25/Non-Member

REGISTER NOW online at www.tnaqua.org/Events.aspx or mail form on page 16 or call 423-267-FISH (3474).
Tennessee River Gorge Paddle

Saturday, July 10 • 9 a.m. - 5 p.m.

Paddle the “Grand Canyon of Tennessee,” a nine-mile section of Chattanooga’s 50-mile “blueway.” This four to five hour paddle runs through the heart of the Tennessee River Gorge past majestic cliffs and ends at Raccoon Mountain. All equipment, guides and transportation provided from Greenway Farm by Outdoor Chattanooga. **BYO lunch, water bottle and wear shorts, t-shirt and shoes that can get wet.**

Adults and ages 14 and older accompanied by an adult • Limited to 12, minimum 8 • $35/Member; $40/Non-Member • Meet at Greenway Farm

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**WOW — Women on the Water**

Wednesday, July 14 • 7 - 9 p.m.

Ladies! Strap on a pair of water sandals and paddle with us on a laid-back adventure as we explore local rivers and lakes with other women. All equipment is provided, including an expert female guide. You don’t have to be an expert and can even register for a kayak clinic if you want some practice before the trip. **Meet at Greenway Farm. BYO snack and drink.**

Adults (women only) • Limited to 12, minimum 8 • $20/Member; $25/Non-Member

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Sale Creek Paddle by Touring Kayak

Sunday, Aug. 15 • 1 - 6 p.m.

Paddle off the beaten path and leave the hum of motor boats behind as we explore clear waters fed by mountain rivers on Sale Creek, a unique tributary of Lake Chickamauga. **Includes guides, gear and transportation. BYO snack and a drink.**

Adults • Limited to 12, minimum 6 • $25/Member; $30/Non-Member • Meet at Greenway Farm

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REGISTER NOW online at www.tnaqua.org/Events.aspx or mail form on page 16 or call 423-267-FISH (3474).
Stephen Rolfe Powell Exhibit: Member Preview

At the Hunter Museum of American Art
Friday, June 25 • 6:30 - 8 p.m.

As part of our partnership with the Hunter Museum, Aquarium members are invited to be among the first to view a solo exhibition of contemporary glass sculptor, Stephen Rolfe Powell that features selections of the artist’s work from the last twenty years. Powell, who is recognized for his colorfully patterned pieces, draws his inspiration from nature and ancient Italian murrini techniques. Included will be work from his Teasers, Whackos and Screamers series. Many of the works are new and have never been shown before. This exhibition is in celebration of the Hunter’s continuing partnership with the Tennessee Aquarium where Powell’s work is also featured in Jellies: Living Art.

Adults Only • Limited to the first 50 Aquarium Members to register
Free, Hunter and Tennessee Aquarium Members Only

America’s Birthday Cruise

On the Tennessee River Gorge Explorer
Saturday, July 3 • 6 - 9 p.m.

Celebrate America’s birthday on one of America’s great rivers aboard our exciting high-speed catamaran that will whisk you into the heart of the “Grand Canyon of Tennessee.” From turtles to osprey, an Aquarium naturalist will talk about the All-American animals found on the river with a special close-up critter encounter! Deep inside the river gorge, step outside onto viewing decks and immerse yourself in the scenic beauty as the sun begins its descent. Continue the adventure by watching the Pops on the River fireworks show on the Aquarium “patio” with complimentary 3-D glasses and a snack pack. Cash bar, soft drinks and snacks available for purchase.

All Ages • Limited to 70 • Adult: $28/Member; $33/Non-Member
Child: $22/Member (age 0-12); $26/Non-Member (age 3-12); $22/Non-Member (age 0-2)

A Taste of Asia Dinner at 212 Market Restaurant

Thursday, July 15 • 6:30 - 8 p.m.

The Aquarium’s Rivers of the World gallery features exquisite fish from Tropical Asia. Our summer dinner reflects three distinct Asian cuisines — Japanese, Thai and Chinese. Begin with a sampler plate of sushi rolls such as spicy tuna roll with cucumber and avocado, tempura shrimp roll, crab salad, daikon salad and salmon rolls. Our Thai entrée is green curry mussels and shrimp served over coconut rice with ginger stir-fried vegetables. Chinese five-spice banana-mango “summer” roll with house-made ginger ice cream and a drizzle of plum wine syrup completes our exotic menu. Includes dinner, cooking demonstrations, a glass of house wine, tax and gratuity.

Adults • Limited to 35
$35/Member; $45/Non-Member

Curator’s View of Stephen Rolfe Powell

At the Hunter Museum of American Art
Thursday, Aug. 5 • 6 - 7:30 p.m.

As part of our Jellies: Living Art partnership, Aquarium members are invited to a special Members-Only event at the Hunter Museum to view their new exhibit of vessels by glass artist Stephen Rolfe Powell. Get an intimate look at this stunning exhibition with a special guided tour by Curator of Contemporary Art Nandini Makrandi. A cash bar will open at 6 followed by a curator-led tour at 6:30 with the Palate Café open until 8 p.m. The rest of the museum will be open to the public. No registration required, just show your Aquarium membership card for admission to the exhibit upstairs.

All Ages • Free, Aquarium and Hunter Members Only

REGISTER NOW online at www.tnaqua.org/Events.aspx or mail form on page 16 or call 423-267-FISH (3474).
Trekking with Tykes
At Shackleford Ridge Park
Saturday, July 24 • 10 a.m. - Noon
A leisurely hike in a tranquil setting rejuvenates the spirit and is a great way to introduce young children to the wonders of nature. Our guide will lead you on a discovery hike through the pleasant woodland of Shackleford Ridge near the new high school on Signal Mountain. We will follow the trail to Mushroom Rock, a spectacular geological formation on the Cumberland Trail North. Bring your own snack or lunch and drink. Pre-registration is required. (Un-paved, mostly level trail except for a moderate slope)
Parents and young children • Limited to 20, minimum of 8
Free/Member; $5/Non-Member

Aquatic Biologist Adventure
On the Conasauga River
Saturday, July 24 • 10:30 a.m. - 2 p.m.
The Conasauga State Scenic River in the Cherokee National Forest has crystal clear waters that make it ideal for exploring or snorkeling. Get nose to nose with brilliantly colored fish including darters and bream and search for the endangered Conasauga log perch and threatened blue shiner. Dr. Anna George, director of the Tennessee Aquarium Conservation Institute (TNACI) will help you discover the life-styles of the finned, shelled and scaly. Find out what you can do to keep rivers and streams healthy with Anna and Cherokee Fisheries Biologist Jim Herrig. Includes use of all snorkeling equipment and wet suits or bring your own. Underwater viewers will be provided for children under eight. Bring your own lunch, snack and drink.
Limited to 20 • Adults and ages 5 and older accompanied by an adult • Adult: $10/Member; $20/Non-member • Child: $5/Member; $10/Non-member

Register now online at www.tnaqua.org/Events.aspx or mail form on page 16 or call 423-267-FISH (3474).
PROGRAM REGISTRATION — REGISTER NOW! www.tnaqua.org/Events.aspx

Registration is required for all programs with payment in full.

ONLINE:
www.tnaqua.org/Events.aspx

PHONE: 423-267-FISH (3474) or 800-262-0695, ext. 3400, 8:30 a.m. - 5 p.m. weekdays. Please have event and credit card information ready.

PAYMENT is required by credit card, cash or check prior to event.

CONFIRMATION with event details will be mailed upon receipt of event fees.

CANCELLATIONS/REFUND: No refunds for no-shows. Unless noted differently, cancellations must be received no less than two weeks prior to event date for a refund. We reserve the right to cancel a registration not paid for within two weeks of event date. A full refund is made if the Aquarium cancels an event or if an event is full.

PROGRAM REGISTRATION FORM

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<th>Member Name</th>
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*Indicates second choice of date/time if program is offered more than once.
*Guests who are not members must pay non-member fees.

MAIL TO:
Member Programs
Tennessee Aquarium
P.O. Box 11048
Chattanooga, TN 37401-2048

Card Number
VISA □ Mastercard □ Discover □ Amer.
Exp. Date

Check Enclosed (payable to Tennessee Aquarium)

Mailholder's Signature

You can also read about member programs online at: www.tnaqua.org

RENEW ONLINE — ANYTIME! Visit www.tnaqua.org

Think Green, Go Paperless!
We recently transformed Riverwatch into a new electronic magazine. You can now receive your full-color Riverwatch in your inbox. It’s a great way to conserve paper and promote ‘green’ practices at home. Our new electronic Riverwatch not only offers the same great articles, vivid photos, and listings of fun-filled events as the print version; but it’s now enhanced with additional features like video and interactive links. Visit www.tnaqua.org/membership_riverwatch.aspx for a quick demo then “Think Green and Go Paperless” by signing up today.

Renew Yourself and Your Membership
Stop by for an Aquarium visit and enjoy the simple serenity and opportunities for reflection that each gallery has to offer. Reward yourself and your family by renewing your membership. You’ll continue to receive the great benefits of unlimited admission, rewarding events and exclusive discounts without interruption. Renew online anytime at www.tnaqua.org — it’s fast and convenient. Or give us a call at 423-267-FISH (3474).

Membership 101
Everything you need to know about your Aquarium Membership is online at www.tnaqua.org/membership_benefits.aspx.

Official sponsor of the Tennessee Aquarium Membership Program.
Hey Kids! In each “Riverwatch” issue, look for fun activities in this section. Collect the Tennessee Aquarium’s Animal Trading Cards, send us your own Animal Art or Silly Animal Jokes and Riddles and ask us your “How Do They Do That?” questions. Send all submissions (along with your name & age) to jal@tnaqua.org.

CONTENT FOR “GETTING OUR FEET WET” PROVIDED BY THE TENNESSEE AQUARIUM EDUCATION DEPARTMENT

TRANSPERSION

Through transpiration, plants release water through small openings called stomata on their leaves. Transpiration enables the flow of nutrients and water through the plant and allows the plant to cool itself. Gather the items listed below to do this fun experiment.

What you will need:

• Plastic bag
• Reuse a sandwich bag or the bag in which you brought your produce home from the grocery store. Make sure it has no holes.
• Twist tie, rubber band, string, yarn, etc…

Follow these steps:

• Place your bag over the leaves at the end of a plant. Your plant may be a tree, bush, shrub, etc…
• Secure the bag over the leaves with a twist tie or other fastening item.
• Leave the bag and return later in the day to see the water that has accumulated.

Some variations you may do:

• Track your study. Do the exact same procedures for a week. Put the bag out at the same time every day and leave it for the same length of time. Keep track of weather conditions and compare your results. Was it more cloudy one day than another? Did it rain one day? How was the amount of water collected different?
• At the same time of the day, place a bag over leaves on a plant that gets full, direct sunlight all day and a bag over leaves on a plant in the shade. After the same amount of time, is there a difference in the amount of water from each plant?
• Pick a plant. Place the bag over the leaves early in the morning (6 am) for a set amount of time (two hours). Remove the bag and measure the water. Place the bag back on at different times throughout the day (10 am, 2 pm and 6 pm) for the same time intervals. Did the amount of water vary with the time of day? Was it clear and sunny all day? Did clouds move in at some point? Could this have changed the amount of water collected?
It’s mushroom coral, which occurs in many colors and prefers indirect light and gentle currents. It gets food from its symbiotic algae, zooxanthellae. If another coral colony grows too close, the mushroom coral will sting with its tentacles.

I have wings but I’m not a bird. I am small and colorful. I live in gardens and fields and forests. I used to be a caterpillar. I am a ________? Answer: butterfly

How do jellyfish catch their food?

Without eyes or a brain, how can a jellyfish catch a meal, which might range from tiny zooplankton, to fish or other jellies? Jellies have tentacles that surround their mouths. They are covered with a specialized stinging cell called a cnidocyte (Ny-doe-site). The cnidocyte contains a stinging capsule called a nematocyst (new-MAT-a-cist). The nematocyst is coiled up like a spring when it’s not being used. One end is attached to the cell, the other end resembles a harpoon tipped with barbs, hooks or spines. When a small animal brushes against a tentacle, the nematocyst springs out very quickly and sticks into the passerby. This takes place in milliseconds and is one of the fastest cellular processes in nature. Some nematocysts inject poison, others just entangle the prey. These little harpoons are a pretty neat way for an animal with no eyes or brain to catch food.

WHAT IS IT?

Habitat — Slightly acidic, slow moving or standing bodies of water with lots of surface cover in West and Central Africa.

Diet — Carnivorous, eating adult and larval insects, crustaceans and smaller fish.

Size — 13-11.9 cm, (5.1-4.7 in)

The African butterflyfish can be seen in the Malebo Pool exhibit in Rivers of the World Gallery in River Journey.

HOW DO THEY DO THAT?

THUMBPRINT TREE CRAFT

WHAT YOU WILL NEED:
• Brown paper
• Large sheet of blue paper
• Green finger paint
• Scissors
• Glue

DIRECTIONS:
1. Trace your arm and hand from the elbow to your fingers onto the brown paper. This will be the tree trunk. Cut this out and glue the trunk onto a larger sheet of blue paper.
2. With the finger paint, make thumbprint leaves on the finger branches of your tree.

WHAT IS IT?

Habitat — Muddy and slowly moving rivers and pools in West and Central Africa.

Diet — Nocturnal carnivore, Feeds on worms and insects.

Size — Average length of 23–25 cm (9-9.8 in) and lives 6-10 years.

The Elephantnose fish can be seen in the Malebo Pool exhibit in Rivers of the World Gallery in River Journey.

WOW! The Elephantnose fish isn’t a nose at all, but a sensitive part of its chin that helps it navigate, communicate, and find prey that hides in the substrate!

So how do jellyfish catch their food without eyes or a brain?
Riverbend brings thousands of people to the banks of the Tennessee River to hear some of the nation’s hottest acts. This year, however, one talented artist will bring a wetlands conservation message to Chattanooga’s biggest music festival. Tab Benoit will perform his brand of sizzlin’ Cajun music during “The Bend Unplugged” on June 16th at the IMAX® 3D Theater and on the Unum Stage at Riverbend later that same evening.

Tab Benoit uses his bluesy electric guitar to celebrate his love for the Louisiana Bayou, and along the way, he raises awareness for the wetlands that help protect places like New Orleans. This musician turned activist co-founded “Voice of the Wetlands” in 2003, an organization dedicated to the preservation of endangered Mississippi Delta wetlands. According to Benoit’s official website, the artist was always seeking a way to reach people beyond his vocals and riffs. “Being able to have a forum because of the music is incredible,” Benoit said. “When I made a decision to do this, I told myself it has to be for a bigger reason. All I really want out of life is to make the world a little bit better than the day I was born and the Voice of the Wetlands is a way to do that.”

Tab Benoit’s guitar and vocals captured the attention of two-time Academy Award-nominated director Greg MacGillivray in 2005 when he began filming Hurricane on the Bayou. MacGillivray intended to produce a film that would alert people to the destruction of Louisiana’s vital wetlands and how a hurricane could lead to a massive flood in New Orleans. “We set out originally to tell the story of a future, hypothetical hurricane and how the rapid erosion of the wetlands left New Orleans more vulnerable to flooding,” said Greg MacGillivray. “But when Katrina struck in the middle of doing that, we were no longer filming what might happen, we were suddenly more like news reporters filming what did happen. We had to completely rethink the film, which evolved into a much broader and more deeply emotional story than we ever imagined. We realized we had a unique ability to capture footage of how Katrina impacted New Orleans with the tremendous sense of scale that IMAX theater photography brings with it—and to tell this story in a way that captures the humanity of it, the essential role of the wetlands environment and the undeniable, musical magic of the city all at once. The footage is unlike any other footage that has been seen.”

Hurricane on the Bayou will be shown at the Tennessee Aquarium IMAX Theater June 16-19, during Riverbend. Benoit is prominently featured in the film along with three other musicians with Louisiana roots. According to an interview with MacGillivray Freeman Films, Benoit’s music may be the only one that flows directly from the swampland. “I write out in the swamps, I get my inspiration there, I get my sounds and feelings from there — so from my point of view, there is a deep connection between the land and the music and that’s something you get to see in the film,” Benoit said. “The Louisiana Delta is one of the richest resources on our planet — and it’s at the very root of New Orleans culture. If we lose the root, the tree is going to die.”

Benoit will perform at IMAX at 2 pm on June 16th prior to a showing of Hurricane on the Bayou. The artist will interact with audience members after the film, a rare opportunity to enjoy some toe-tappin’ live music with an environmental message.
Docents Making a Difference

The Tennessee Aquarium is proud to be named the highest rated aquarium in the U.S. and one of America’s top ten tourist attractions for overall guest satisfaction. Certainly this is the result of great teamwork across the board. Staff and volunteers perform so many vital roles to make the guest experience special. For many visitors, docents make the difference between a pleasant experience and one they’ll tell their friends about. By sharing their friendly knowledge of the animals and exhibits, docents raise the bar on visitor satisfaction. If you know anyone who loves nature and interacting with others, send them our way. We’re looking for fun-loving adults, from college-age students to retirees, to become Aquarium docents. Candidates must be willing to volunteer for a half day shift every other weekend or one, full weekend day per month. To get started, go to: www.tnaqua.org/GetInvolved/GetInvolved.aspx. Applications are due by September 15th.

Like Having Your Own Exhibit

Click onto the award-winning Penguins’ Rock live webcam right now, www.tnaqua.org/Animals/Penguins.asp, and you’ll see a beehive of gentoo and macaroni nesting behavior.

Today’s technology makes it possible to take a virtual video tour of almost anywhere on Earth, including hidden bird behavior in your own backyard. The Tennessee Aquarium gift shop has new video birdhouses featuring the Hawk Eye Nature Camera. The color video camera comes equipped with a tiny microphone and infrared lights so you can watch and hear your celeb-birdies night and day. You and your family will enjoy hours of watching bluebirds, robins or perhaps even woodpeckers feeding and caring for their young. It’s like having your own wildlife exhibit—without the scrubbing and multiple daily feedings.

Aquarium members receive a 10% savings on gift shop purchases.
Summer Cruising in the Gorge

While the Tennessee Aquarium’s gentoo and macaronis are busy building nests inside Penguins’ Rock, some other spectacular birds are once again working on raising a family in the Tennessee River Gorge. The pair of ospreys that has successfully raised chicks on a channel marker at the downstream end of Williams Island is back. According to Aquarium naturalist John Dever, these birds quickly constructed their nest. “It seemed like the channel marker was empty one day and had a well-built nest atop it the next day,” said Dever. “These gorgeous birds are very popular with our passengers. Throughout the summer we get to observe them flying overhead, protecting their chicks or teaching the youngsters to fish later in the season. Lots of people get great pictures of these ospreys.”

This summer, the Aquarium will once again offer the “Early Bird Special” on the Explorer’s first cruise of each day. Tickets for ages 3 and up are only $20 for the 10 a.m. cruise when booked in advance. Call Reservations at 423-265-0698 and mention the “Early Bird Special” to receive your discount.

If you’d rather ply the tranquil evening waters, there’s a cruise just for you. The Sunset Special is a three-hour cruise into the Tennessee River Gorge for the same price as the regularly priced two-hour cruise. Passengers have a great opportunity to travel deeper into the scenic recesses of the Gorge on these longer excursions. According to Dever, the evening cruises might be the best time to be aboard the Explorer. “Late in the day may be the best time to relax and unwind aboard the Explorer,” Dever said. “The journey down river culminates with a view of the spectacular Tennessee Wall as we take the turn by TVA’s Raccoon Mountain intake. The evening sun appears to set a number of times as we are alternately shielded by the mountains along the winding route.”

Aquarium is StormReady

The Aquarium has completed a comprehensive severe weather preparedness review and staff training to earn the National Weather Service StormReady Supporter designation. Although an extensive safety plan was already in place, an added level of protection is now offered to guests and staff. “Visitor and employee safety is our number one priority,” said Rodney Fuller, the Aquarium’s facilities manager. “We have grown over the years, so we wanted to expand our safety plan to include severe weather preparedness to cover everyone from school groups and passengers aboard the River Gorge Explorer to our biologists working on conservation projects in the field.” The Tennessee Aquarium joins the Florida Aquarium and Sea World Orlando as the only aquariums in the nation that have earned the StormReady Supporter designation.
Dr. Sylvia Earle – The World is Blue

The Tennessee Aquarium will join in a global celebration on June 8th, designated as World Ocean Day. But if you ask the famous oceanographer Dr. Sylvia Earle about the event, she’ll tell you every day is World Ocean Day. “We need to understand the relevance of the ocean in our lives,” said Earle. “The ocean rules, governing climate and weather, producing most of the oxygen we breathe and acting as a sink for carbon dioxide. The ocean is also filled with life. From the very surface to the greatest depths, the water is full of living organisms that help make it possible for us to survive.”

Long before World Ocean Day was first proposed in 1992, Dr. Earle became the leading voice for protecting the two-thirds of the planet that make life on land possible. Shortly after astronauts were putting the first footprints on the moon, Earle was among the first to live in the underwater laboratory Tektite II. Throughout her career, she has been a marine science pioneer, becoming the chief scientist for the National Oceanic and Atmospheric Administration, NOAA, in 1990. Later, she would be named Time magazine’s first Hero for the Planet.

Dr. Earle was recently at the Tennessee Aquarium as part of a NOAA supported ocean-themed lecture series designed to help inland residents understand their connection to the world ocean. “Our oceans are vulnerable. We cannot keep taking life out of the ocean and putting chemicals into the ocean at the rate we are today,” said Earle. “We are substantially altering the nature of nature. In so doing, we have diminished the capacity of the planet to support us.”

But there is hope. Dr. Earle points to three steps land-locked residents can take to be part of the solution to our troubled seas.

First — Simply be informed. “Start checking things out,” said Earle. “What we do as individuals has a great impact collectively on the world’s oceans. Most people don’t consider what we pour down our drains. Those chemicals flow from the heart of America into the Gulf of Mexico helping to create a huge dead zone offshore. There are now more than 400 dead zones worldwide.”

Second — Convert lawns to natural lawns. “I suggest using more native plants, which use less water and require fewer chemicals,” Earle said. “People might also consider converting some of their lawn to an organic garden. Children should know the joy of a garden fresh tomato. It’s good for you, good for the Earth and good for the ocean.”

Third — Know what you are eating. “Everyone should do a little homework about what’s on the menu,” said Earle. “100 million tons of ocean wildlife is extracted every year. Much of that is discarded as bycatch. The trawlers that catch shrimp, for example, bring up all kinds of animals and sea grasses for just a few shrimp. 100 pounds of bycatch is discarded for every pound of shrimp served. It’s like using a bulldozer to catch squirrels.”

Earle’s new book, The World is Blue, shines a light on the challenges facing the oceans as well as the relatively small protected areas she calls hope spots. “The National Marine Sanctuary system is like our national forests. The diversity of life there helps stabilize the changes to the oceans,” Earle said. One of her favorites is the Flower Garden Banks, the marine sanctuary modeled in the Aquarium’s Secret Reef exhibit. “Not everyone is going to put their face in a lake, stream or ocean to see what fish look like alive,” Earle said. “Aquariums are windows on the world, changing the way most people view marine life. We should treasure these creatures for what they are.”

About the Author: Thom Benson is the Tennessee Aquarium communications manager. He is also the editor of Riverwatch.
Recently, the Tennessee Aquarium’s CEO, Board Chair and Outreach Coordinator paid a visit to Washington, DC to receive the National Medal for Museum Service from the Institute for Museum and Library Service. This is the nation’s highest honor for community service by an organization like the Aquarium. The Aquarium now stands in the national spotlight as one of only four aquariums in the country to ever receive this award. This accolade is a reflection of the community support we receive so we’d like to say, “Thank You.”

Each year, generous donations from members, volunteers, supporters, foundations and businesses help us expand our impact on the region through education and conservation initiatives. The Aquarium believes that no one should be turned away from our exceptional educational programs and facilities because of an inability to pay. Your support makes access and participation possible for thousands of people throughout the community. Help ensure future success stories like the National Medal for Museum Service by visiting our website and supporting the Aquarium’s outstanding work with your donation today.

www.tnaqua.org/donate.aspx

Serving the Community Because of Your Support.

L-R: Susan Sher, Chief of Staff to First Lady Michelle Obama; Tennessee Aquarium Outreach Coordinator Bill Haley; Aquarium President & CEO Charlie Arant; Aquarium Board Chairman Paul Brock, Jr.; IMLS Director Dr. Anne Radice.
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The Tennessee Aquarium inspires wonder, appreciation and protection of water and all life that it sustains.

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11 a.m., 1, 3, 5, 7 & 9 p.m.

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