

T E N N E S S E E  A Q U A R I U M

RIVERWATCH

WINTER 2007 • \$1.50



THE DAILY AQUARIUM MENU

What it takes to prepare
meals for nearly 12,000
creatures everyday

PLUS: HO HO H₂O — A TROPICAL HOLIDAY • TURTLE CONSERVATION MILESTONES • BLACK SEA NETTLES

A large pile of various aquatic foods, including fish, shrimp, and squid, arranged in a way that suggests a feast. The top half of the image shows a dense collection of small fish and pieces of orange-colored food, possibly carrots or fishmeal. The bottom half features a large quantity of pink shrimp and white squid. The word "FEAST" is overlaid in large white letters across the middle of the image.

FEAST

It's a feast fit for a king snake, queen angelfish, octopus, shark, and alligator — in fact, all of the animals that call the Tennessee Aquarium home.

By Kathlina Alford, aquarist

PHOTOGRAPHY BY TODD STAILEY

A healthy and dynamic animal collection is central to the Tennessee Aquarium's vision to "inspire wonder and appreciation for the natural world." Superior animal husbandry calls for daily monitoring and careful planning to achieve the most nutritious and enriching diet for every creature. The husbandry department and volunteer chefs spend long hours preparing diets for the animals in each exhibit. For some species, tossing food into their enclosure is enough, but for others a bit of creativity and ingenuity is required.

Food plays a vital role in the health of all living things, and it also makes up a considerable portion of the annual husbandry budget. More than 22 tons of restaurant quality seafood is consumed at our facility each year, along with a substantial poundage of fruits, vegetables, mice, worms and other food supplements.

Whenever possible, frozen meats are fed to captive animals. This cuts down on cost as well as parasites that may enter the system through live food. Because Tennessee is landlocked, live seafood is also very expensive.

The bamboo sharks at *Shark Island* are prone to goiters, thought to be caused by an iodine deficiency. By soaking or stuffing seafood with kelp tablets that contain large amounts of iodine, these goiters can be prevented. Each penguin is fed vitamin-stuffed capelin (fish) by hand every day to ensure good health. The large sharks in the *Secret Reef* are fed whole fish, each stuffed with a calculated amount of vitamins that are specially formulated for sharks.

Sometimes live food is more appropriate, such as when an animal is not feeling well or when the fish are too young to respond to any other method. By enriching the live foods with vitamins, minerals and fatty acids, nutritional benefit is maximized for whoever eats them. A mini food web goes on behind the scenes every day at the Tennessee Aquarium. For example: Green water (jars of aquatic algae that are neon green) is cultured and fed to rotifers (super tiny aquatic relatives of round worms) which are fed to newly hatched brine shrimp (sea monkeys), which are fed to mysid shrimp which are fed to adult seadragons.

Delivering a balanced diet to each individual animal can still be a struggle, even when the food is very nutritious.



Above, right: Aquarist Jake Steventon hand feeds a beluga sturgeon. Right: Some butterfly species prefer eating from decaying fruit rather than flowers. Opposite page: The different foods prepared for Aquarium animals include (from top) clam, smelt, food gel, krill and squid.



Above, left: A longsnout seahorse dines by sucking mysid shrimp into its straw-like snout. Above, right: Aquarist Jake Steventon feeds green water algae cultures — the beginning of a behind-the-scenes food web. The algae cultures are fed to rotifers (tiny worms), which are fed to brine shrimp (sea monkeys), which are fed to mysid shrimp, which are fed to adult seahorses.

Horace and Boris, the two beluga sturgeon brothers in the *Volga River* exhibit, could easily eat all of the food provided, leaving their smaller tank mates to starve. All of the sturgeons in this tank, big and small, come to a specific feeding location at the water's surface and suck their food right out of the keeper's hand. This way everyone gets the right amount of size appropriate food.

Effectively feeding all of the animals in the *Secret Reef* exhibit is another challenge. The sea turtle is target-trained to respond to a feeding pole so the aquarist can make sure he gets enough vegetables and not too much seafood in his diet. Meanwhile, two people are needed to feed the large sharks from long white feeding poles at specific locations, while someone else, lying on their belly, hand-feeds the stingrays. The larger fish are fed pieces of seafood that are tossed into the tank from the top. At the same time, a unique feeding tube system uses water pressure to shoot small, chopped seafood down to four feeding locations at the bottom of the tank so that smaller fish get a chance to eat.

Some of our exhibits contain herbivorous fish. These vegetarians are fed broccoli and romaine lettuce that is placed into plastic pipes lowered into the water. But land-grown vegetables are not always easily digested by fish, so another veggie product is added. Gel food, as we call it, is made the same way as JELL-O®. Hot water is mixed with a prepared powder to form a thick batter. The bat-

ter is leveled out in a large pan and refrigerated until it becomes solid. The next day it can be cut into appropriate bite-sized pieces for specific animals. Gel food contains a balanced amount of vegetables, algae, protein, vitamins and minerals to guarantee optimal nutrition. Medicine or other foods can even be stirred into this batter as needed.

Food is also a way to enrich the brains of our animals and encourage more natural behaviors. The songbirds in the *Delta Swamp* and the *Cove Forest* are offered the most diverse diet of any animal at the Tennessee Aquarium. Pans full of colorful fruits, vegetables, seeds, meal worms and other visually stimulating foods are prepared daily and hidden in exhibits so that the birds can pick through them and find their favorites. The North American river otters enjoy the variety and play of food delivered in the form of ice blocks with fish frozen inside, or live goldfish released into the tank for them to hunt. Food for the giant Pacific octopus is hidden in different toys such as jars or hamster balls to make the hunt more exciting.

Research shows that these animals can wither away physically due to a loss of mental stimulation. Fish that are not feeling well are fed live fish or shrimp to arouse innate feeding enthusiasm.

There are also times when some animals do not need as much food as they do at other times. Reptiles that live in the *Delta Swamp* undergo metabolic changes throughout the year. During the summer, alligators eat rats or mice once each week.





A Mighty Grocery List

You might not believe it, but the animals that call the Aquarium's home consume nearly 45,000 pounds of seafood each year. Add in a few thousand pounds of produce and lots of creepy crawlies and you've just produced the perfect meal for the nearly 12,000 critters we care for each and every day. What's on our grocery list? Like yours, the Aquarium buys fruit, vegetables and meat, but in much, much larger quantities! Here is just some of the feasting that goes on at the Aquarium.

FOOD ITEM	CONSUMER
832,000 meal worms	birds
5,616 heads of romaine lettuce	turtles, fish
5,184 pounds of squid	sharks, green moray eels
40,000 crickets	frogs, salamanders, newts
10,800 pounds of capelin fish	penguins
2,584 heads of broccoli	turtles, fish
3,000 night crawlers	turtles, amphibians
681 pounds of grapes	macaws
2,000 pounds of shrimp	cuttlefish
4,697 mice and rats	reptiles
1,680 pounds of mackerel	sharks
1,056 oranges	butterflies
10,516 pounds of smelt fish	giant Pacific octopus
576 pounds of blood worms	lake sturgeon
200 pounds of macadamia nuts	macaws
120 pounds of mussels	sea stars, octopus
700 pounds of bonito fish	sharks
400 pounds of turtle brittle	turtles

Food Expenses: nearly \$125,000 per year!

You can help us continue to share the importance of conserving these amazing animals by helping us purchase our groceries. Contribute online at www.tnaqua.org or mail your donation to: Tennessee Aquarium, Development Department, One Broad Street, Chattanooga, TN 37402.



When the weather cools during the winter months, their metabolism slows down so the same alligators only eat once each month. Turtles will eat a dry prepared diet of turtle brittle in the warm months but won't eat as much when the weather cools. Many types of sharks stop eating during times of courtship and reproduction. Penguins often stop eating for a period of time during annual molting. The giant Pacific octopus has a short life span of only three or four years. Toward the end of life, they go through a process called senescence in which both metabolism and appetite decline.

What a wild feast it all turns out to be. It can be quite a challenge to keep up with the special dietary needs of each species, to say nothing of certain individual animals. Our dedicated scientists do an amazing job with this vast Aquarium menu. Cheers to all and bon appétit! 💧

Above: A plastic pipe cues the Aquarium's large green sea turtle that a meal is being served. By target-feeding this way, staff can ensure the turtle maintains a healthy diet.



To see behind-the-scenes video clips of cuttlefish, sea turtles and seahorses eating, go to www.tnaqua.org/media/mediagallery.asp.



Tiny Steps, Global Footprints

With more than 500 turtles representing 70 species, the Tennessee Aquarium exhibits more turtles than any other public facility in the world and is renowned for turtle conservation research. As a visitor to the Aquarium, you may have marveled at the beauty of the Indian star tortoise or been amazed by the snake-necked, pig-nosed or alligator snapping turtle. However, you may not be aware of the important husbandry work being done to help ensure imperiled turtles from around the world will survive. Tennessee Aquarium herpetologists are recognized leaders in their field. Here's a behind-the-scenes look at the challenges of turtle conservation with Curator of Forests Dave Collins.

By Dave Collins, curator of forests

PHOTOGRAPHY BY TODD STAILEY

“Don’t count your chickens before they hatch.” That old saying pretty well sums up the anticipation and anxiety Tennessee Aquarium herpetologists feel as we count down the final days while incubating eggs from some of the rarest turtles on the planet.

The Aquarium’s on-going Asian Turtle Conservation Program logged a number of notable successes this year by hatching three species not previously bred at the Aquarium. One of these, the Beal’s four-eyed turtle (*Sacalia bealei*) represents the first institutional breeding of this species in North America. A close relative, the four-eyed turtle (*Sacalia quadriocellata*) and the spiny turtle (*Heosemys spinosa*) are two other new species for us, and each have been hatched only a handful of times elsewhere in captivity. These, combined with three other endangered Asian turtle species that also successfully hatched this year — Chinese three-striped box turtle (*Cuora trifasciata*), Chinese pond turtle (*Chinemys nigricans*) and Japanese pond turtle (*Mauremys japonica*) — make 2007 a banner year for our program.

There are many challenges to overcoming and maintaining a consistent breeding program for these rare turtles. Our knowledge of wild Asian turtles is limited, even though these animals have been revered and used for food and traditional medicine for centuries in Asian cultures. Until recently there has been very little information about their natural history in Western scientific literature. Complicating matters is the fact that we often don’t know precisely where these rare turtles were captured. Animals in our collection come from a number of different sources. Many were “rescued” from Chinese markets where they are sold for food and traditional Chinese medicine. Others have come to us after being confiscated in illegal trade, and still others have come from other institutions. This can present serious challenges in captive breeding because it’s important to know the habitat in order to replicate it.

However, over the past ten years there has been a significant increase in research and international exchange of information about Asian turtles, driven largely by an appreciation of the serious threats to them. Much of this fieldwork, supplemented with research on captive animals, has provided



Above: These tiny hatchlings are a four-eyed turtle (left) and a Beal’s four-eyed turtle (right). False eye markings may fool predators. Opposite page: A rare spiny turtle hatchling emerges from its egg, revealing its jagged shape.

very useful information on the dietary and environmental needs of these turtles. Adult turtles, especially females, need good nutrition to produce viable eggs and strong hatchlings. At the Tennessee Aquarium, we pay close attention to the dietary needs of each species and monitor feeding closely. All turtles are weighed frequently to ensure each animal is holding good weight and young animals are growing well.

Our staff relies on a number of tools to monitor reproduction in our turtles. Female turtles are routinely handled to detect developing eggs. Once we think a female is carrying eggs, we use an x-ray to reveal the exact number, size and location of eggs. These images also give us a good idea about the stage of development, which is critical for both the female and the potential offspring. In the wild, females gain cues from nature about when to nest, which may be lacking in captivity. This might cause her to retain her eggs too long, a potentially life-threatening condition. By using x-rays to closely monitor egg development, we are able to take the necessary measures, including hormonal induction, to ensure all eggs are deposited at the right time.

Wild turtles dig a nest, lay their eggs, and leave them to the vagaries of the environment. In a captive environment, we are more successful if we artificially incubate our turtle



Turtle Survival Alliance Member

The Tennessee Aquarium is a member of the Turtle Survival Alliance, an IUCN (World Conservation Union) partnership network for sustainable captive management of freshwater turtles and tortoises (visit TurtleSurvival.org). To date, the Aquarium has hatched eight species of imperiled Asian turtles and a total of 38 species from around the world.



Top left: Herpetologist Bill Hughes uses a candling technique, which involves shining a light through an egg to illuminate the developing embryo. Middle: Chinese three-striped box turtle hatchlings emerge in their incubator nursery. Bottom: Chinese three-striped box turtles hatched at the Aquarium.



eggs. But the eggs of turtles from around the world display an astounding array of variation in their requirements for specific environmental conditions to develop properly. Some, like seeds, don't start developing until specific environmental conditions are met, such as a cooling period, an increase in humidity or, sometimes, complete flooding by water. All these are specific to the exact area where the species live and serve to synchronize the development of the embryo so that it develops and hatches at the optimum time for survival. In most turtle species, the incubation temperature even determines the sex of the animal!

All these details are critical to successful hatching and our herpetologists must seek out these answers through diligent research and practical experience. We can even track egg development by candling, where we shine a bright light through the egg in a darkened room, illuminating the developing embryo. The eggs must be handled with great care during this process, but this information is very useful in making sure our eggs have the best conditions for incubating.

Turtles don't seem to do anything in a hurry. Many species reward our efforts with only a few eggs a year — challenging us to get it right and produce strong, healthy young turtles. If we fail, we simply use the knowledge we've gained and look ahead to the next season. But each year, as we gain a better understanding of each of these imperiled turtles, we are able to add a few more healthy youngsters to their world-wide population. Our efforts help to offer an assurance that these species will survive while our colleagues across the globe are also hard at work striving to ensure that they will have a wild place in which to live. 💧

How you can help...

Partner with the Aquarium as we work to conserve turtle species native to our region, such as the bog turtle and the yellow-blotched map turtle. Here are just a few ways you can help.

Join the Conservation Society. Joining the Aquarium's Conservation Society is one way you can help in the fight to conserve imperiled turtles, right here in southeast Tennessee. Your contribution makes our turtle conservation programs,

as well as our many other conservation programs, possible.

Leave turtles alone. If you are out and about and come across a turtle, keep on moving. The best way to help turtles in the wild is to leave them alone, never handle them and try not to disturb them. If you find a turtle in a roadway, gently nudge it out of harm's way.

Never release pet turtles into the wild. Releasing a store-bought turtle into the wild can spread disease and make it harder for native turtles

to compete for food and space. Consider other animals that may make better pets than turtles.

Don't litter. Turtles may recognize litter as a potential food source, which can cause them serious harm. Don't litter, and if you see trash around, pick it up and place it in a trash can.

Steer clear of turtle products. You may see items made of turtle products, though this is becoming less and less common as conservation efforts take hold. If you do see such products, avoid them and find more animal-friendly alternatives.



In each *Riverwatch* issue, look for information and activities in this section. Collect the Tennessee Aquarium's Animal Trading Cards and look for special member programs for collectors.

CONTENT FOR GETTING OUR FEET WET IS PROVIDED BY THE TENNESSEE AQUARIUM EDUCATION DEPARTMENT.

TENNESSEE AQUARIUM
ANIMAL TRADING CARDS

Cut along dotted lines and start your own collection

HOW WE GET OUR FEET WET

Many folks visit the Tennessee Aquarium to discover what lives below the water's surface, and they do it without ever getting wet. More adventurous visitors might dip an arm into a touch exhibit for a feel of a shark, stingray or sturgeon and briefly experience their watery world.

That's not enough for the Tennessee Aquarium's Education Department. The real action is out there in the wild. Each year they take many different groups to area streams to wade right in and sample the aquatic life found there.

During the Aquarium Bug Club's annual field trip, excitement often runs high with screams of "Mr. Bill, look what I found!" or "Ms. Julia, I got a neat dragonfly nymph!" while the members sample for aquatic invertebrates. Home school students have similar experiences while participating in Aquarium classes and programs on Home School Day. Third graders from Gap Creek Elementary in Knoxville helped release endangered lake sturgeon into the French Broad River during the Tennessee Aquarium Research Institute's reintroduction program last year. Every year, Aquarium educators and aquarists assist Ooltewah High School biology classes as they sample for stream inhabitants near their school.

Elementary school children aren't alone in these watery learning experiences. George Bartnik, education programs manager, did two project WET workshops at the Ocoee Whitewater Center and the Conasauga River this past June that involved stream activity for teachers. The river portion included snorkeling, macro invertebrate sampling and water quality testing. George assures that everyone got wet!

See the craft on the next page to build your own underwater viewer!



Educator Julia Gregory

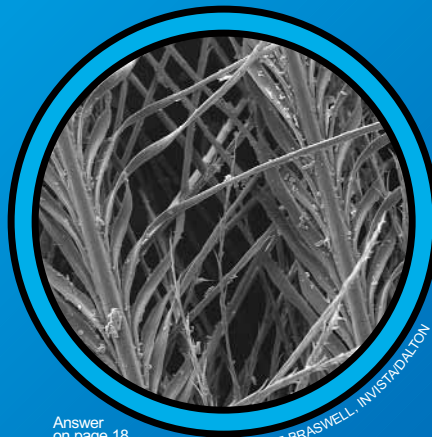


Beal's Four-eyed turtle
Sacalia bealei



Postman Butterfly
Heliconius melppomene

WHAT IS IT?



Answer on page 18

JEFF BRASWELL, INVIETADALTON



Arawana
Osteoglossum bicirrhosum

SILLY ANIMAL JOKES & RIDDLES

What do you get if you cross a parrot with a centipede?

A walkie-talkie.

We want you to participate!

Please send your silly animal jokes or riddles and your questions for "How Do They Do That?"

by e-mail to: jal@tnaqua.org

Please include your name and age on all submissions.

Cut along dotted lines and start your own collection

✂ Cut along dotted lines and start your own collection

Tennessee Aquarium **R015**

Beal's Four-eyed Turtle
Sacalia bealei

- **Habitat** — These endangered turtles are found in the mountain streams of southern China.
- **Diet** — Beal's four-eyed turtles are omnivorous and will feed on insects, worms, snails and aquatic plants.
- **Size** — Adults grow to about 5 1/2 - 6 inches in length.

WOW! The Beal's four-eyed turtle gets its name from the false eye markings (ocelli) found on its head and is known for its ability to climb.

Beal's four-eyed turtles can be seen in the *Rivers of the World* exhibit on Level 2 of the Tennessee Aquarium's River Journey Building.

Tennessee Aquarium **I502**

Postman Butterfly
Heliconius melpomene

- **Habitat** — Postman butterflies prefer open areas and can be found from Central America to Southern Brazil.
- **Diet** — Larva feed on plants in the passion flower family. Adult postman butterflies feed on nectar and pollen.
- **Size** — The postman butterfly has a wingspan of 3 1/4 inches.

WOW! This butterfly was named postman because of its feeding pattern. It visits the same flowers along the same route at about the same time each day much like the postman delivers mail to the houses on a route.

The postman butterfly can be seen in the *Butterfly Garden* exhibit on Level 4 of the Tennessee Aquarium's Ocean Journey building.

Tennessee Aquarium **F271**

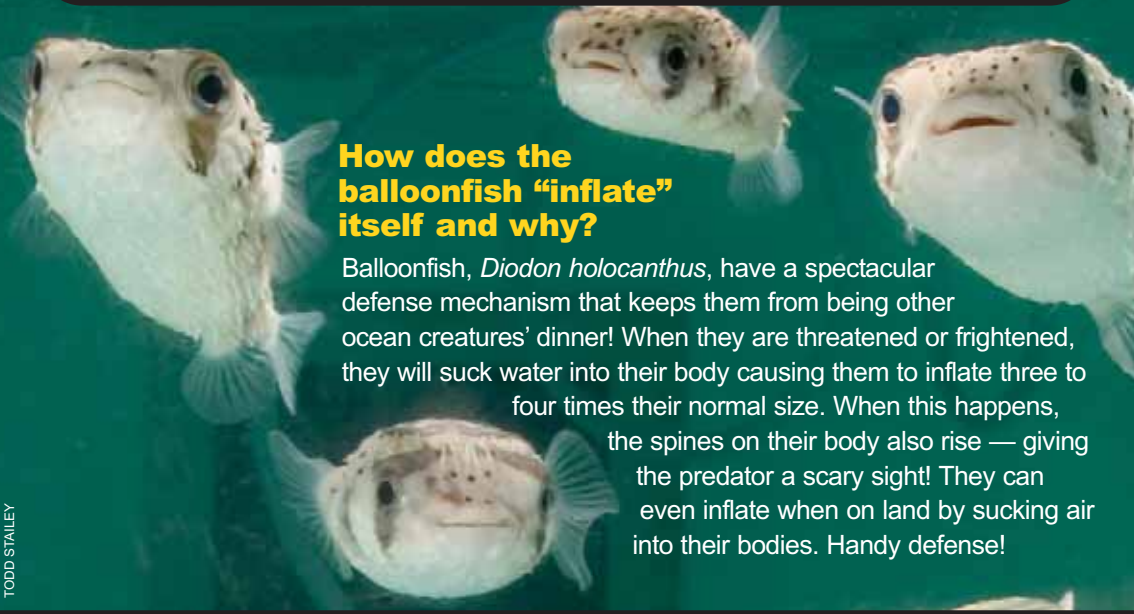
Arawana
Osteoglossum bicirrhosum

- **Habitat** — Arawana are found in the Rupununi and Oyapock Rivers of South America.
- **Diet** — The diet of arawana consists primarily of fish and insects.
- **Size** — Arawana can reach a length of 120 cm (47.24 inches).

WOW! Arawana have an upturned mouth, a great adaptation for eating from the surface. They also are great jumpers and will leap from the water to snatch prey off branches that overhang the river.

The arawana can be seen in the *Tropical Cove* exhibit on Level 4 of the Tennessee Aquarium's Ocean Journey building.

HOW DO THEY DO THAT?



How does the balloonfish "inflate" itself and why?

Balloonfish, *Diodon holocanthus*, have a spectacular defense mechanism that keeps them from being other ocean creatures' dinner! When they are threatened or frightened, they will suck water into their body causing them to inflate three to four times their normal size. When this happens, the spines on their body also rise — giving the predator a scary sight! They can even inflate when on land by sucking air into their bodies. Handy defense!

TODD STALEY

UNDERWATER VIEWER CRAFT



TODD STALEY

MATERIALS:

- A metal coffee can
- Can opener
- Plastic wrap
- Rubber band

DIRECTIONS:

1. Start with a large empty metal coffee can or maybe one of the large tin cans used by restaurants.
2. Use a can opener to cut the bottom out. Be careful and make sure there are no sharp edges. This will require help from an adult.
3. Then cut a piece of plastic wrap larger than the bottom of the can and stretch the plastic wrap tightly over the bottom, being careful not to poke any holes.
4. Use a large rubber band to hold it in place.
5. Now you have an underwater viewer with a see-through bottom! Dip the plastic wrapped end of the can under the water's surface and you will be amazed at what you can see.

WHAT IS IT?



TODD STALEY

It's a penguin feather: Much of a penguin's body is covered with 70-80 feathers per square inch. Their small, stiff feathers are tightly packed which helps insulate them. Oil from a gland at the base of the tail helps waterproof the feathers. When a penguin preens, it spreads the oil throughout its feathers as it cleans and smoothes them.

Here are two great websites that you can use to identify the aquatic life that you find with your viewer!
www.enchantedlearning.com/biomes/pond/pondlife.shtml
www.naturegrid.org.uk/pondexplorer/key.html



Charles Dickens would have written a much different novel in 1843 if Ebenezer Scrooge could have just had a little time for a tropical getaway. Instead of writing of a very cold-hearted, selfish man who had no love for children or anything that even provoked happiness, Dickens might have said Scrooge was a warm-hearted, giving

soul whose child-like lifestyle seemed carefree and relaxed.

What if Dickens had written of lush tropical forests, beautiful saltwater reef fish and a multitude of colorful butterflies fluttering around Scrooge's head? "A warm breeze made Ebenezer feel young inside and out," Dickens might have said. "Caribbean steel drum music made his eyes twinkle, his thin lips turned upward in a giant smile."

Imagine Scrooge in a brightly colored Hawaiian shirt. Sound too far-fetched? How about tropical "Santa" in the *Secret Reef* with big, toothy sharks for reindeer? Now you're talking "Ho, Ho, H₂O – A Tropical Holiday Adventure."

This is your chance to say "The weather's fine...wish you were here," without traveling any farther than downtown Chattanooga for your getaway. The Tennessee Aquarium is your place to recharge without wearing yourself out. Along the way you'll have the chance to hear holiday island music, brilliant hyacinth macaws calling in a rain forest, and learn a little bit about the coolest critters with fins, flippers and flappers.

There is something for everyone to enjoy, including surfing penguins that would make Ebenezer Scrooge wish he could spend all of his holidays past, present and future at the Tennessee Aquarium. ♦

"HO, HO, H₂O" Daily Schedule — Nov. 16, 2007 - Jan. 6, 2008
(The Aquarium is closed on Thanksgiving and Christmas Day.)

10:15 a.m.	Feeding at Shark Island	Ocean Journey — Shark Island, Level 4
10:30 a.m.	Butterfly Release	Ocean Journey — Butterfly Garden, Level 4
11 & 11:30 a.m.	"Santa" Divers Show	Ocean Journey — Secret Reef, Level 2
11:15 a.m.	Otter Program	River Journey — Cove Forest, Level 4
1 p.m.	Macaw Program	Ocean Journey — Tropical Cove, Level 4
1:45 p.m.	Penguin Program	Ocean Journey — Penguins' Rock, Level 3
2 & 2:30 p.m.	"Santa" Divers Show	Ocean Journey — Secret Reef, Level 2
3:30 p.m.	Seahorse Program	River Journey — Seahorses, Level A
4 p.m.	Butterfly Release	Ocean Journey — Butterfly Garden, Level 4

HO, HO, H₂O IS PRESENTED BY



Black Sea Nettle

By Sharyl Crossley, aquarist

PHOTOGRAPHY BY TODD STAILEY

In 1926, a monstrous black jellyfish was photographed off the coast of southern California. Its bell was a menacing three feet in diameter, and trailing below it were 18 feet of stinging pink tentacles and oral arms. The unidentified jellyfish soon vanished as quickly as it had arrived.

Over the next 63 years, occasional sightings of a very large unknown black jellyfish were reported, but the jellyfish remained nameless.

The black jellyfish resurfaced during the summer of 1989 on beaches from Baja California, Mexico to Venice, CA. Scientists quickly went to work to solve this half-century-old mystery. They collected video footage, still photographs and some of the actual jellyfish. Two years later, *Chrysaora achlyos*, the black sea nettle, was officially identified as a new species. Derived from the Greek *achlys*, meaning mist, darkness and obscurity, its scientific name is a fitting description of its striking coloration and its rare occurrence along the California coast. This “new” jellyfish also has the honorable distinction of being the largest invertebrate described in the 20th Century.

Despite its massive size and our ever increasing ability to explore the depths of the ocean, the life of the black sea nettle in the wild continues to be a mystery. Since 1989, large numbers of this jellyfish have only been spotted once. But this past summer, much to the dismay of lifeguards and beach goers, they began to reappear off the coast of San Diego.

Next time you visit the *Boneless Beauties* gallery in Ocean Journey, look for the black sea nettle (*Chrysaora achlyos*). Our black sea nettles are quite a bit smaller than those arriving on the shores of southern California. However, the delicate rosy-colored bell, lacy oral arms, and white tentacles of these jellies will surely set them apart from any other jellyfish in the room. ♦



Above: This photo of *Chrysaora achlyos* was taken in July 1989 off the coast of Northern Baja, Calif. The bell of this jellyfish was estimated to be three feet wide, with tentacles reaching 18 feet in length.



Aquarium Staffers

Making a Splash

PHOTOGRAPHY BY TODD STAILEY

The Tennessee Aquarium is very proud of two staff members in the education and research spotlight.

Congratulations to Bill Haley, the Aquarium's education outreach coordinator, who was named the 2007 CEEA Informal Educator of the Year. "Mr. Bill" is known for connecting kids and nature with his lively programs delivered across the Tennessee Valley. Virtually every day Bill is on the road visiting schools, libraries and other group venues within 125 miles of the Tennessee Aquarium. In the past decade, he has delivered age-appropriate environmental lessons to nearly



one quarter of a million people. The Chattanooga Environmental Education Alliance (CEEA) recognized Bill's work as, "demonstrating excellence, innovation, leadership and commitment to environmental education as evidenced by curriculum development, special projects and/or unique approaches to environmental education."

It's safe to say there are many more people thinking "green" thanks to Bill's hard work. Soon he will have another story of research and conservation to tell.

Dr. Anna George, director of the Tennessee Aquarium Research Institute, has just been awarded a grant to study freshwater diversity in the Southeast.



A Conservation Endowment Fund Grant from the Association of Zoos and Aquariums (AZA) will help pay for Dr. George to examine the genetic diversity of ten fish species in the region. Her study will cover ten stream systems in the upper Tennessee River drainage which run through parts of North Carolina, Tennessee and Virginia.

The project will begin by searching natural history museum databases to find out which tributaries in the Tennessee River drainage have the most species. Once those areas are identified, researchers will begin collecting DNA samples from the ten targeted species in the field. "DNA sequencing information is important because it tells us how much genetic diversity there is in each species, which is a key indicator of health," says George. "More diversity in the genes typically means there are more individuals in a population, and that population is also more resistant to environmental stress."

Five of the species chosen by Dr. George have been con-

Above, top: Aquarium Educator Bill Haley teaches students about keeping freshwater habitats healthy. The Aquarium's Outreach program is sponsored by Tennessee American Water.



sidered “Greatest Conservation Need” by the Tennessee Wildlife Resources Agency, meaning that while they are not yet endangered, they are declining in abundance. This project will allow researchers to recommend plans to prevent the studied fishes from becoming endangered. This work will also help biologists identify whether there is a connection between the number of species and the diversity of genes in a river. “If so,” says George, “those rivers would be our ‘hotspots of diversity’ and we would want to have more conservation action directed at them.”

The \$20,791 Conservation Endowment Fund grant award was one of 19 grants awarded this year by AZA. The study is expected to take up to one year to complete.

Visit the Tennessee Aquarium’s River Journey building to see five of the colorful fish species that will be studied: rosyside dace, flame chub, warpaint shiner, tangerine darter and gilt darter.



Dr. George has also been recognized for excellence in field conservation. The “Saving the Sturgeon” project was awarded special recognition for North American conservation at the most recent AZA national convention in Philadelphia, Penn. 💧

Left: TNARI Chief Research Scientist Dr. Anna George releases a lake sturgeon into the Tennessee River with the help of some students. Above: A flame chub.

FACILITY RENTAL

An Event to Remember

Host your next event on the banks of the Tennessee River. We offer unforgettable experiences and spectacular spaces for parties and weddings.

The Aquarium is a great place for a memorable wedding and reception. Get married under a pavilion on the riverfront and take your time with the photographer for that perfect shot while your guests take a tour of the Aquarium. Dine surrounded by plump potbelly seahorses or sip cocktails with a private viewing of our fun-loving penguins. Then meet back in the main lobby for a night of dining and dancing.

Birthday parties are simple at the aquarium because we take care of everything from the invitations to the goodie bags - all you need to do is bring the cake. Choose a Nemo, Spongebob, Penguin or Dinosaur theme and let us take care of the rest.

For more information on corporate parties or weddings, please contact Trish Burger (tbe@tnaqua.org or 423-785-3012). To schedule a birthday party, please call 423-267-3474.



Senator Baker at Penguins' Rock

Former Tennessee Senator Howard Baker was in the Scenic City recently to address the Chattanooga Area Chamber of Commerce during their annual meeting. Senator Baker praised the city for its many accomplishments, including the rebirth of the downtown and revitalization of the entire riverfront area. His remarks included high praise for the Tennessee Aquarium, saying, "The Tennessee Aquarium does unique and special things for Chattanooga. It's the crown jewel of this community." We were pleased to introduce him to the Aquarium's newest stars, our gentoo and macaroni penguins. Senator Baker has always been a passionate photographer, and he really enjoyed the chance to photograph the playful birds at *Penguins' Rock*.



Riverwatch is Now Online!

In response to requests from our members, we will be posting PDF files of *Riverwatch* online. Look for the four-color section of the magazine on the Tennessee Aquarium's website at www.tnaqua.org/membership/riverwatch.asp. The events calendar information is already available online under Events & Travel. Enjoy this new benefit as *Riverwatch* leaps into Cyberspace. 💧

Distance Learning With the Tennessee Aquarium: Reaching Out Across the Nation

The Tennessee Aquarium's education department offers a wide variety of educational programs to school children, both near and far. School groups visiting the Aquarium or IMAX® Theater often enhance their experience with our free classroom and auditorium programs. When there are schools in the surrounding counties that want us to come to them, we do so through our outreach programs. Since 1999, we have also been offering education programs to students that would otherwise be too far away to reach. Through the technology of video conferencing, we are able to conduct Distance Learning programs with schools all over the country.

Distance Learning programs bring the Tennessee Aquarium right into the students' classroom. Our enthusiastic educators are able to conduct programs in real time, interacting with the students face to face, even if they are hundreds of miles away. We offer a broad range of topics with conservation-based messages and have a large collection of live animals, which usually steal the show.

This program began in 1999 with a gracious donation from Jim and Elaine Hill. As technology advanced over the years, our equipment could no longer connect to the newer equipment many schools and organizations had begun using.

We recently received a generous grant of approximately \$11,000 from the Weldon Osborne Foundation, enabling us to update the necessary components of our video conferencing equipment. With our new LifeSize® Room™ high definition video communications system, we are not only keeping up with the times, but are doing so with better resolution! The enhanced visual quality of our camera gives the students an incredible up close and personal feel as they are zoomed in to see live animals during our programs.

For more information about the Tennessee Aquarium's Distance Learning programs, or to find out how you can support Tennessee Aquarium education programs, please visit our website at www.tnaqua.org/KidsTeachers/Distance_learning.asp. 💧



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RIVERWATCH

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VISION
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