

Unveiling the Secrets of Aquatic Snakes

By Andrew M. Durso



Four Queensnakes (*Regina septemvittata*) bask on a log in Orange County, North Carolina. Photo courtesy of Carl Brune.

Eastern North America is graced with numerous species of aquatic and semi-aquatic snakes, second only to southeast Asia in diversity. No fewer than eighteen aquatic snake species representing three distinct evolutionary lineages can be

found in and around wetlands from southern Canada to northern Cuba. Many professional herpetologists cut their teeth catching watersnakes in their local creeks, and watersnakes and their kin loom large in snake ecology research to this day.

Aquatic snakes are some of the most ubiquitous and abundant snakes, one reason they are often the focus of ecological research projects. We are just beginning to understand the population and community ecology of snakes, and many of the best studies have been done on aquatic snakes. We have learned much about these amazing reptiles recently. For example, we now know that some aquatic snakes can reach extremely high densities in certain habitats, over 170 snakes per hectare, or about one snake for every 600 square feet (55.7 m², about the size of a one-bedroom apartment). This may not sound like much, but consider that all snakes are carnivores, meaning that they are at least tertiary consumers in their food webs. Other tertiary consumers include species like foxes and hawks,

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Fistfuls of Black Swampsnakes (*Seminatrix pygaea*) from an isolated wetland on the Savannah River Site in South Carolina. Photo courtesy of J.D. Willson.



Get Your July Photo Contest Calendar



Swimming through the sand by day, emerging to search for invertebrate prey by night, the **Western Shovel-nosed Snake** (*Chionactis occipitalis*) is another seldom-seen species from the southwestern US. Photographer **Danny Martin** captured this specimen on the hunt in the desert dusk. Most people look for snakes on the ground, but to spot the runner-up, you would have had to look up! Download your free July calendar at <http://parcplace.org/images/stories/YOS/YearoftheSnakeCalendarJuly.pdf>.

It's not over yet!

Call for Photos for the 2013 Year of the Snake Calendar Photo Contest

Yes! We are *still* seeking close-up, digital photos of snakes, preferably in their natural habitats or within an educational or conservation context. One winner will be selected each month to be the featured photo as part of the Year of the Snake online calendar. Runner-up photos will also be included in the calendar. Additionally, all submitted images will be considered for use in the Year of the Snake monthly newsletter and website as well as other Year of the Snake-related conservation, outreach, and educational efforts. Give us your best shot! For more information and for entry details, please visit http://parcplace.org/images/stories/YOS/YOS_Photo_Contest.pdf.

Have a Question? Ask the Experts!

Submit your snake questions via email (parcyearofthesnake@gmail.com) to our panel of snake experts, and we will select questions to answer in upcoming newsletters. Please include your name and location in your email message.

2013 YEAR of the Snake

Visit www.yearofthesnake.org

PARC PARTNERS IN AMPHIBIAN AND REPTILE CONSERVATION

We seek:

- Your involvement!
- Your conservation efforts
- Your snake art, stories, & poetry
- Events to sponsor
- Ideas to make the year a success!

Contact: parcyearofthesnake@gmail.com

A Year to Highlight

- Education
- Conservation
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Monthly Newsletter

Year of the Snake products at the PARCstore www.calepress.com/parcstore

Monthly Photo Contest & Calendar

Year of the Snake outreach posters: Available at www.yearofthesnake.org!

Year of the Snake in Connecticut!



Year of the Snake partner, the **Connecticut Department of Energy and Environmental Protection (CT DEEP)** is really going to town on Year of the Snake events. Check out their colorful take on the Year of the Snake logo, the extensive calendar of events, and the All About Snakes section of **their web page**, http://www.ct.gov/deep/cwp/view.asp?a=2723&q=498864&deepNav_GID=1655. Also see Upcoming Meetings and Events on page 12, and the free monthly Year of the Snake Photo Contest Calendar for events.

facebook

Follow all of the Year of the Snake news and happenings on **Facebook** (<http://www.facebook.com/YearOfTheSnake2013>) and **Twitter** (@yearofsnake2013).



Year of the Snake Collaborating Partners



Georgia Department of Natural Resources www.gadnr.org

The mission of the Georgia Department of Natural Resources is to sustain, enhance, protect and conserve Georgia's natural, historic and cultural resources for present and future generations, while recognizing the importance of promoting the development of commerce and industry that utilize sound environmental practices.

North Carolina Wildlife Resources Commission (WRC)

www.ncwildlife.org

Since its inception in 1947, the North Carolina Wildlife Resources Commission (WRC) has been dedicated to the wise-use, conservation, and management of the state's fish and wildlife resources. The WRC consists of wildlife and fisheries biologists, wildlife enforcement officers, educators, engineers, and administrative staff in nine districts across the state.



Maryland Department of Natural Resources

www.dnr.state.md.us

The Department of Natural Resources leads Maryland in securing a sustainable future for our environment, society, and economy by preserving, protecting, restoring, and enhancing the State's natural resources.

The Wildlife Center of Virginia <http://wildlifecenter.org>

The Wildlife Center of Virginia is a non-profit hospital for native wildlife, with the mission of teaching the world to care about and to care for wildlife and the environment. Founded in 1982, the Wildlife Center has provided quality health care, often on an emergency basis, to more than 60,000 sick, injured, and orphaned wild animals. As a teaching hospital, the Center offers a variety of hands-on training opportunities in veterinary medicine and wildlife rehabilitation.



Our growing list of Collaborating Partners will be featured in future newsletter issues.

If you are interested in contributing to the Year of the Snake efforts, please send an email to parcyearofthesnake@gmail.com with a brief description of your organization and its efforts. Our full list of partners can be found at: <http://www.parcplace.org/news-a-events/2013-year-of-the-snake/271.html>.

Submit Your Citizen Science Projects

A compilation of snake citizen science (volunteer) inventory and monitoring projects has begun. These will be featured in our monthly newsletters. Send any information on these types of projects to parcyearofthesnake@gmail.com.

Submit Your Snake Art, Stories, and Poetry

Submit photos of your snake art (jpg, tiff, or pdf files) and copies of your stories and poems via email to parcyearofthesnake@gmail.com. Please include your name, location, and any comments about the submission in your email message. We will select submissions to include in upcoming newsletters.

Unveiling the Secrets of Aquatic Snakes,*continued from p. 1*

animals that need much more than 600 square feet in which to live. So how do aquatic snakes do it?

One explanation is that reptiles don't need to eat very much to survive. An average reptilian metabolism is 25 times more efficient than that of a mammal of the same size. Eating the same amount, a reptile can grow and reproduce a lot more than a mammal or bird, because they need not spend so much of their energy maintaining a constant body temperature. Another advantage is that many aquatic snakes eat a lot of amphibians, which are high-quality prey because they have few indigestible parts and are themselves extraordinarily abundant in their breeding habitats at specific times of year. Aquatic snakes have evolved various strategies to cope with the highly pulsed activity of their amphibian prey. Because snakes can turn their metabolism down even lower than most reptiles when resources are scarce, they can usually persist through lean times when amphibians are not breeding.

Different species of aquatic snakes respond to drought in vastly different ways. For example, Black Swampsnakes (*Seminatrix pygaea*) can aestivate beneath the dried mud of an empty wetland, a strategy for which they are ideally suited because of their small size.



Cottonmouth (*Agkistrodon piscivorus*) gapping defensively from its coiled posture on Snake Road in the Shawnee National Forest in Illinois. Photo courtesy of Todd Pierson.

Female swampsnakes can even reproduce in wetlands that have just refilled following intensive and prolonged drought. In contrast, population declines are usually seen in watersnakes (*Nerodia*) during dry years. The high reproductive potential of watersnakes allows them to recolonize ephemeral wetlands from more permanent ones following a drought. Cottonmouths (*Agkistrodon piscivorus*) are heavier than other aquatic snakes and rely on yet a third strategy for survival: emigration to and from seasonally productive habitats. In addition to being long-lived, Cottonmouths' venom may allow them to

Natural History Characteristics of Aquatic Snakes in North America

Common name	Genus	No. of aquatic species	Geographic range	Adult size	Primary diet	Mode of reproduction
Watersnakes	<i>Nerodia</i>	10	S. Ontario to S. Mexico, northern Cuba	15 in - 6 ft (38 cm - 1.82 m)	fishes & amphibians, varies by species	live-bearing
Crayfish Snakes	<i>Regina</i>	4*	S. Ontario to Florida & Texas	9 in - 3 ft (23 - 91 cm)	crayfishes	live-bearing
Black Swampsnake	<i>Seminatrix</i>	1	Atlantic & Gulf coastal plains from Carolinas to Alabama	7 in - 2 ft (18 - 61 cm)	amphibians & fishes	live-bearing
Mud & Rainbow Snakes	<i>Farancia</i>	2	Atlantic & Gulf coastal plains from Virginia & Illinois to Texas	2 ft - 7 ft (61 cm - 2.13 m)	giant aquatic salamanders (sirens & amphiumas)	egg-laying
Cottonmouth	<i>Agkistrodon</i>	1	Atlantic & Gulf coastal plains from Virginia & Illinois to Texas	2 ft - 6 ft (61 cm - 1.82 m)	fishes, amphibians, & other snakes	live-bearing

*Some species of *Regina* are more closely related to *Seminatrix* and others to *Nerodia*, so this genus may undergo some changes in the near future.



A Rainbow Snake (*Farancia erythrogramma*) eating an eel at the Savannah National Wildlife Refuge in Georgia. Photo courtesy of Conor Egan / USFWS.

better survive long-distance overland dispersal.

Recent studies suggest that the seasonality of amphibian prey availability may be extremely important in shaping wetland food webs. Different species of snakes in permanent wetlands such as river swamps and floodplains, where amphibians are abundant year-round, tend to partition resources; that is, each species of snake eats a different kind of prey. For example, Mudsnakes (*Farancia abacura*) eat sirens and amphiumas, Green Watersnakes (*Nerodia cyclopion* and *N. floridana*) eat fishes, and Plain-bellied Watersnakes (*Nerodia erythrogaster*) eat frogs. But what about in wetlands that dry periodically and only support a few kinds of prey? Sirens and fishes are often missing from these wetlands. Does that mean that their specialized predators are also absent? Recent findings suggest, no: in an analysis of aquatic snake diets from 23 wetlands on the US Department of Energy's Savannah River Site in South Carolina, my colleagues and I found that all the same species of aquatic snakes inhabited wetlands with and without fishes. Furthermore, the abundance of each species was similar overall between these two very different habitats. What did they eat in fishless habitats? With one exception, all were eating predominantly the larvae and pedomorphs of a single species of salamander, the Mole Salamander (*Ambystoma talpoideum*), which was one of the only prey items available. The exception: species of the genus *Regina*, which are specialized to eat only crayfish, did not display the diet flexibility of other aquatic snakes, and were rarely found in wetlands without fishes.

In a desert, it is always dry. In a forest, there are always trees. But wetlands are constantly changing, and the flexibility of aquatic snakes is part of what makes them

so successful in these dynamic habitats. Some of the most variable habitats occupied by any aquatic snake are the coastal salt marshes where Saltmarsh Snakes (*Nerodia clarkii*) live. In addition to the daily rhythm of the tides, these habitats will soon change much more drastically if the world's climate continues to warm as predicted. Rainbow Snakes (*Farancia erythrogramma*) and their eel prey have been fenced out of the headwaters of impounded rivers. Recent US Supreme Court decisions jeopardize isolated wetlands and the reptiles that comprise their unique biodiversity. One day soon, North America may lose at least one of its aquatic snake species, a fate we have so far been fortunate to avoid. In this Year of the Snake, consider the impact your lifestyle might have upon aquatic snakes.



Saltmarsh Snake (*Nerodia clarkii*) basking at dusk in a salt marsh in coastal Florida. Photo courtesy of Pierson Hill.

Further reading:

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Serpents of the Sea

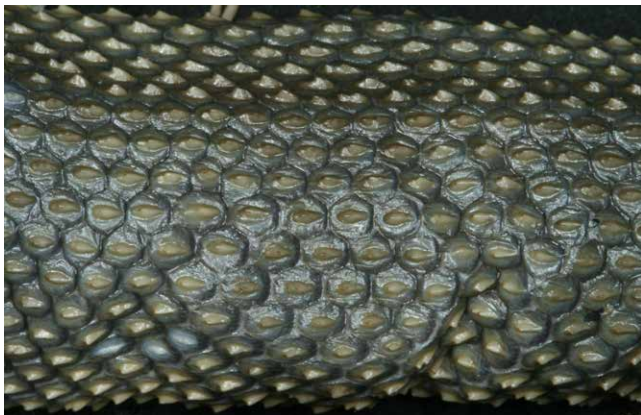
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Capture of the endemic sea krait of the island of Niue, the Katuali (*Laticauda schistorhynchus*). Photo: Gisela Kauffman.

Sea Kraits and Sea Snakes represent some of the most enigmatic of all snakes but also the most acutely threatened. Populations throughout the Indo-Pacific are crashing, catastrophically in some cases. Conservation efforts are impeded because we do not have a firm grasp on how many species there are. Current estimates are around seventy species, but considering the cryptic biodiversity, the numbers could be easily double that. Underscoring how little we know about sea snakes is our recent discovery of the remarkable Rough-Scaled Sea Snake (*Hydrophis donaldi*). Unlike most sea snakes, which are very smooth-scaled in order to minimise drag while swimming through the water, *Hydrophis donaldi* has extremely carinate scales. The more aquadynamic,



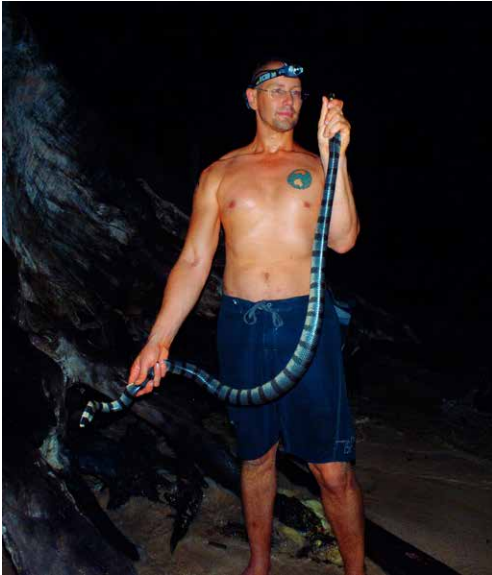
The unique scalation of the Rough-Scaled Sea Snake (*Hydrophis donaldi*) in Weipa, Australia. Photo: Kanishka Dimithra Bandara Ukuwela

the less food required. Sea snakes have extraordinary metabolisms, far higher than any other snake, due to all the energy expended in swimming. Consequently, they feed on an almost daily basis. So anything that can improve the aquadynamics will be subjected to extreme positive selection pressure. Some male sea snakes, such as the Spine-Bellied Sea Snake, have enlarged ventral raised scales in order to facilitate grasping females during mating. However, both sexes of *Hydrophis donaldi* have enlarged scales at all life-stages and over all parts of the body. We hypothesize that these enlarged scales protect them from being cut by rocks. This species occupies a unique microhabitat not favoured by other species, specialising in patches of extremely sharp rocks. Therefore, there is a trade-off between the aquadynamic loss and the occupation of a vacant niche. However, such extreme specialisation makes them particularly vulnerable, as they occupy a very restricted habitat. Therefore, dredging operations planned in Weipa, Queensland (where we have found 12 out of the 13 known specimens) may destroy a significant portion of this very specialised microhabitat.



Capture of Olive Snake (*Aipysurus laevis*) on the Great Barrier Reef, Australia. Photo: David Wachenfeld.

Our poor grasp of the basic taxonomy is also illustrated by another of our recent discoveries, that the Beaked Sea Snake, responsible for 90% of all sea snake envenomation deaths, is really two distinct species that have evolved independently to look exactly the same. Australian Beaked Sea Snakes were thought to be the same as those in Asia, until we compared the DNA of sea snake samples from both regions and confirmed that these snakes are completely unrelated. The two species occupy the same specialised habitat: the silt-filled shallows of tropical estuaries, and have evolved to look practically identical. The finding is an example



Capture of Yellow-Lipped Sea Krait (*Laticauda colubrina*) in the Andaman Islands, India. Photo: Gerald Martin

of convergent phenotypic evolution phenomenon—a situation where two species evolve separately but end up looking very similar. This is similar to the same selection processes that resulted in the nearly identical Emerald Tree Boa of South America and the Green Tree Python of Australia. Only in this case, it is two lethal snakes that look almost identical to each other.

This mixup could have been medically catastrophic, since the Commonwealth Serum Laboratory (CSL) sea snake antivenom is made using the venom from the Asian snake, based on the assumption that it was the same species. Luckily, the antivenom is not only very effective against the new Australian species but actually against all sea snakes, since they all share a very streamlined fish-specific venom.

The Beaked Sea Snake is found in coastal and inshore habitats throughout the Asian and Australian regions where it is responsible for a large majority of recorded

deaths and injuries to fishermen handling nets. The ‘beaked’ morphology of the species is likely associated with the extremely specialised niche the snakes occupy, even though both species of snakes have evolved from different ancestors and are not one another’s closest relatives. These snakes swallow extremely large prey fish, far more so than typical sea snakes. We postulate a link between the unique convergent mouth morphology and prey-size preference.

The Asian snake has retained the original species name ‘*schistosa*’. The Australian Beaked Sea Snake has been given the species name ‘*zweifeli*’. However the genus name *Enhydrina* has been dissolved due to additional genetic testing by us, which revealed that many of the genus-level divisions of sea snakes were artificial and that most species belong in the genus *Hydrophis*, which has explosively radiated, resulting in myriad morphologically diverse species.

Further evidence of just how poorly understood sea snake evolution has been is that the Sea Kraits (*Laticauda* genus) and the viviparous Sea Snakes were considered to be the result of a single colonisation of the ocean. However, genetic testing revealed that Sea Kraits (which are egg-layers) and viviparous Sea Snakes (which are live-bearers) independently invaded this habitat. However, in addition to convergences in paddle-tails and other morphological features that facilitate adept swimming and other useful adaptations, Sea Kraits and viviparous Sea Snakes have convergently evolved remarkably similar streamlined fish-specific venoms. The venoms have ended up so similar that not only have we shown that the sole Sea Snake Antivenom (made by CSL in Australia) works against all species of viviparous Sea Snakes but also neutralises the venom of Sea Kraits,



Yellow-Lipped Sea Krait (*Laticauda colubrina*) in the Andaman Islands, India. Photos: Bryan Grieg Fry

despite these snakes being separated by 15-million-years-worth of land snakes. However, the Sea Snake antivenom has no effect against the venom of any of the intervening land snakes. This provides a perfect example of the direct impact that studying basic evolution can have upon human health. In addition, as we have only scratched the surface of marine snakes in regard to what treasures lie undiscovered in the venoms, we are only starting to appreciate their tremendous potential to yield novel compounds with the potential for use in drug design and development.

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World Snake Day: Tuesday, July 16, 2013

by Heidi Hall, *The Orianne Society*



July 16th, 2013 marks the celebration of World Snake Day! World Snake Day is a time when people who appreciate and understand the value of snakes need to speak up and share this knowledge with the public. It is a time to tell everyone that snakes are in real trouble from multiple threats including habitat loss and human persecution. It is a time to tell everyone that whether you love them, hate them, or something in between, these animals deserve protection.

Snakes are the underdog of the conservation world. No matter how imperiled, these species rarely receive the same attention as more charismatic mammal and bird species.

But without snakes, our ecosystems would be in real trouble. From mighty pythons to tiny vine snakes, each species holds an important place in an ecosystem, and without them these systems would cease to function. In addition, snakes and snake venom hold clues to important medical advances, and may be the key to the cures for many human diseases.

On July 16th, tell someone that snakes have value. Help raise awareness for these mysterious and iconic species that keep our world in balance. Use World Snake Day as a chance to educate everyone that though snakes are to be respected, they are not something to be feared, and are worth saving.



On World Snake Day, give snakes a hand. Cornsnake, *Pituophis guttatus*. Photo: Mark Danaher.

Are You an Educator or Interpretive Naturalist?

We are working to create resources for teachers and naturalists! If you are willing to share, please send your unit materials, educational program information, or PowerPoint presentations to parcyearofthesnake@gmail.com. Please include your name, the name of your school/nature center or organization, and location. If you did not create the materials, please be sure to tell us where you found the materials.

Dirk Stevenson, Director of Inventory and Monitoring for The Orianna Society, has been an inspiration to field herpetologists in the Southeast, a mentor to students and a favorite subject of outdoors news reporters. In addition to his nearly two decades of monitoring Georgia populations of the Eastern Indigo Snake, Dirk has conducted field studies of Striped Newts, flatwoods salamanders, dragonflies, bark scorpions, and Timber Rattlesnakes. He has been interviewed by Georgia Public Broadcasting and ABC News, and his photographs have appeared in popular magazines and peer-reviewed journals around the world.

Water Taxi

by Dirk Stevenson, *The Orianna Society*

By way of a few muscular breast strokes and tennis shoe-pushes off the sand bottom, I enter the main channel of a great stream, the Altamaha River. Pronounced “All-ta-mahaw”—137 snaky miles of emerald water.

As far as I can see, only the slow-flowing river, fringed by massive cypress and hardwoods. Yellow-white sandbars shimmer in the sun. No sign of our fellow species, no boats, no tents, no buildings or powerlines.

Only the river, endless.

I’m at home. I melt into the cool water.

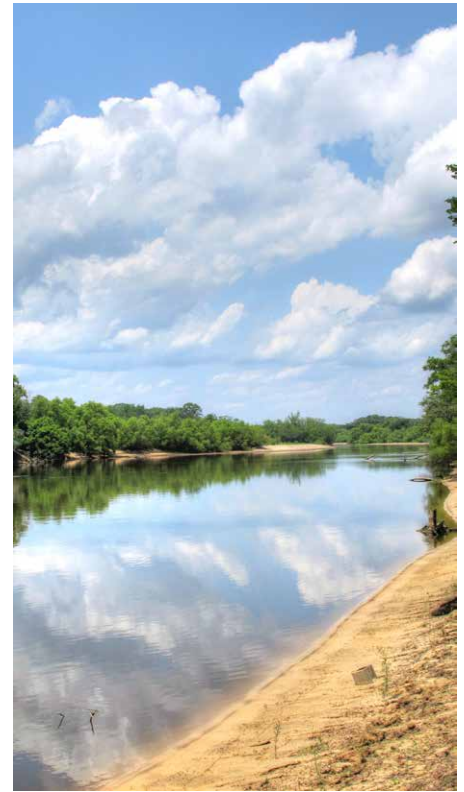
A colleague had e-mailed and requested a dozen specimens of Brown Watersnakes (*Nerodia taxispilota*) and Red-bellied Watersnakes (*Nerodia erythrogaster*) for a food habits study that will include laboratory trials. I was happy to oblige. These species, both nonvenomous, are common along the Altamaha, the fish-eating brownies favoring the moving waters of the mainstem, with the salmon-ventered redbellies partial to oxbow swamps and soggy bottoms adjacent to the river, where their frog-prey abounds. I was joined by Dr. Josh Parker of Clayton State University.

The first leaning tree, a crooked water elm—with trunk extending horizontal over the river—holds two Brown Watersnakes, or as I like to call them, “water taxis.” Peering hard to make out the scales, the dark chevrons running the body, we admire the snakes. Stretched long, their bellies hug the same branch. Anoles and skinks hustle about in the vegetation, jumping for insects. When a basking watersnake senses danger it doesn’t hiss or strike. It doesn’t tarry. In an instant the snake slips with elegance from its perch into the water below, not to be seen again. A subtle, diagnostic splash.

By sound alone, the swamp-wise naturalist knows when a watersnake has dropped from a limb (less cannonball “ker-plunk” and wave-noise, compared to the awkward flop of a basking turtle).

Immersed to our ears, swimming like crocodiles with prey in mind, Josh and I work the edge of the river. Our eyes devour each and every root-wad and “hurricane,” “leaner” and logjam. To spot basking snakes. We brave waters thick with spiny softshell turtles the size of washtubs, as well as “Appaloosas” (Flathead Catfish)—brutish leviathans often to 50 pounds, with power-vacuums for mouths. Leaping mullet remind us that “big water” like the Altamaha is kin to the sea.

“DIRK! DIRK! LOOK, IS THAT ONE SNAKE OR TWO?” Such a query is sweet music to the ears of a herpetologist. In fact, it proved to be three snakes, all massive female taxis, each over four feet long. Josh spotted the snakes curled on a spidery mass of exposed roots—a good five feet above us. Did I mention they were very big water taxis?



The Altamaha River, Georgia. Photo: Dirk Stevenson



A Red-bellied Watersnake, *Nerodia erythrogaster*. Photo: Dirk Stevenson



Dirk Stevenson with a lap-full of big watersnakes.

Shaking, we hatch a plan.

“Josh, since we can’t reach them we need to startle them. I am going to softly toss this mussel shell to make them jump. Do you think you can catch the left-most snake? I will try for the other two. Get the bags ready.” We catch two of the three—catching them in mid-air as they dive toward the river!

Later, Josh will vault himself off the bottom to grab a stout willow limb. Pulling himself skyward with one arm, he deftly snatches a sleeping brownie from an even higher limb. I had bet him supper he couldn’t do it. Josh hadn’t told me he was a former NBA all-star.

Upon grabbing snakes we briefly submerge them while feeling for a safe grip behind the head, hoping their lunges would find swim trunks—and not exposed flesh. We take extreme care not to hurt or unduly stress any of the snakes. When snake teeth hang up on our skin, we gingerly remove the offender so as not to injure his/her mouth.

We are bitten about two dozen times. I should say “nipped,” since most of these bites leave but faint superficial scratches. Interestingly, a few of my watersnake bites itch intensely for a few minutes. I am unsure whether this is due to something in the water, or in the snake’s mouth. One bite will be memorable: I espy a strapping female resting in the river close to me, with only her head above the water. Taking in her hefty form, muscled jowls and vacant eyes, you might have thought she was doing her best impression of an anaconda. I tremble just looking at her.

Awaiting courage, I watch a meter-long gar sink into the depths with the methodical control of a submarine.

I strike rapidly, catching the snake underwater a foot behind her head. She responds with repeated bite-and-chews to my wrist (yes, it hurts). Dripping adrenalin and sporting shoelaces strewn green with tadpole chow, I emerge from the river with the snake’s body looped in my right hand (a Rough Greensnake, *Ophedrys aestivus*, in my left).

An onlooker at the boat landing familiar with snake identification holsters his libation and exclaims, “Oh-ho, good-gracious son, why that ain’t no moccasin, that’s a water rattler!” (I’ve heard it before, but I don’t often hear this colloquialism, a local name for the Brown Watersnake, its origin related to the species’ superficial resemblance—with respect to its dorsal markings—to the Timber Rattlesnake).

In 18 person-hours of searching over two days, Josh and I observe 66 snakes (65 Brown Watersnakes and one Rough Greensnake). We capture around 22 “brownies,” releasing all but six soon after capture (these snakes will be liberated at their capture sites immediately following the feeding trials).

“Water taxis” favor the succulent flesh of catfishes. Camping on an Altamaha sandbar, my wife and I were



All in a day’s work: a box full of Brown Watersnakes, *Nerodia taxipilota*, the “water taxi”. Photo: Dirk Stevenson.

once awakened in the middle of the night to a violent thrashing on our stringer to find a substantial specimen attempting to fit a two-pound channel catfish into its mouth. We carried the whole mess, snake attached like a lamprey to the right flank of the cat, a short distance downstream before shaking the brownie free. Over a gritty catfish breakfast, I told my wife that such catfish prey are usually swallowed head-first so that the stout spines in the dorsal and pectoral fins “fold back” during consumption (rarely, they “unfold” after ingestion, causing serious injury to the snake).

Over the last 12 years, I have surveyed the herpetofauna of the wonderful Altamaha, documenting in detail the distribution of fauna reptilian and amphibian. Remarkably, Cottonmouths (*Agkistrodon piscivorus*) are rare along the Altamaha River mainstem and in the 170,000 acres of hardwood swamps lying in the floodplain of this magnificent alluvial stream. Only near Darien, where the river braids and spills into rich marshes and brackish estuaries, can one commonly admire the lackadaisical swim of an undisturbed “trapjaw”.

Partners in Amphibian and Reptile Conservation (PARC) Announces A Logo Contest for Our 2014 Year of the Salamander Campaign!

In 2014, Partners in Amphibian and Reptile Conservation (PARC) will launch the Year of the Salamander campaign to raise awareness about the conservation status of salamanders and their conservation needs. We are now seeking submissions for the logo for the 2014 Year of the Salamander campaign!

The logo selected will be high profile and will be used in various places, including the *State of the Salamander* document, newsletters, website, posters, and may be used on Year of the Salamander merchandise.

Logo Requirements: We ask that submitted logos bear the text “2014 Year of the Salamander” and that the text be legible when reduced to a 1” height. Also, the chosen logo will need to work equally well in color and in black and white formats.

Submission: Please send your proposed logos to yearofthesalamander@gmail.com with the subject line “YOSal LOGO.” Although we will eventually require a high resolution file of the winning logo, please send only lower resolution JPG, GIF, or TIF files for the initial submission.

Deadline: The deadline for logo submissions is **October 1st, 2013**. The winning logo will be announced by November 1st. The winning logo designer will be featured in the January 2014 *Year of the Salamander News* that will be distributed to PARC list-serve members and posted on the PARC website.

Please distribute this logo contest announcement far and wide. We look forward to seeing your artistic submissions!



Green Salamander, *Aneides aeneus*. Photo: Mark Tegges.

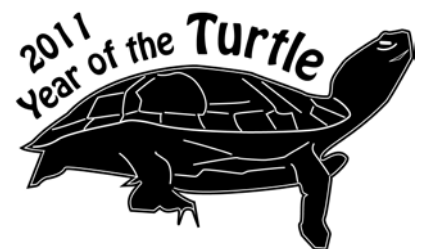
Previous years' winning logos:



Designer: Ann Hirschfeld



Designer: Todd Long



Designer: Kelly Christiansen

Snake Myths

by *Carrie Elvey*,
The Wilderness Center

Because of their unique lifestyle, snakes are prone to being the subject of myth and legend. Some of these myths have a kernel of truth, others have no discernible origin. Read on to learn the truth about these myths.

Myth: Snakes are Slimy

Facts: If you are looking for slime, check out a fish or amphibian. These animals have slime which serves as a protective barrier for their more sensitive skin. As with other reptiles, snakes have dry scaly skin—no slime here. A snake's protective scales are made from keratin, the same material as your fingernails and hair. The origin of this myth is likely the sliminess and snake-like appearance of eels. Some snakes also have iridescent coloration which may look slimy from a distance.



Artwork courtesy of The Wilderness Center

Upcoming Meetings & Events

Ice Cream Social & Reptile Show, July 6, 2 pm, Elk Neck State Park, MD. See <http://dnrweb.dnr.state.md.us/dnrasp/websurvey/dnrcform/cm.asp?page=2&lstMonth=July> for details.

Sabino Canyon Lizard Walk, July 13, Sabino Canyon Rec. Area, Tucson, AZ. Meet at 8 am at the visitors' center.

Spotted Frog Survey, July 8-12, Indian Valley, NV.

Southwest PARC Annual Meeting, July 8-10, University of New Mexico, Albuquerque, NM. [<link>](#)

Joint Meeting of Herpetologists and Ichthyologists, July 10-15. Hosted by University of New Mexico Museum of Southwestern Biology, Albuquerque Convention Center, Albuquerque, NM. See [link](#).

World Snake Day! July 16... see page 9

Year of the Snake Summer Program at Kellogg Environmental Center, Derby, CT. Presented by staff from the Beardsley Zoo. July 17, 11:00 am - 2:00 pm. See [CT DEEP Year of the Snake webpage for details <link>](#).

Snake Day at the Fernbank Museum of Natural History, July 20, Atlanta, GA. The Orianne Society will be at Fernbank for this event.

Connecticut Snakes, a hands-on, all-ages program, July 20, 1-2 pm, James L. Goodwin State Forest, Hampton, CT. See [CT DEEP Year of the Snake webpage for details <link>](#).

Live Animal Reptile Show, July 20, 2 pm, Rosaryville State Park, Upper Marlboro, MD. Learn about native snakes and turtles. Details: <http://dnrweb.dnr.state.md.us/dnrasp/websurvey/dnrcform/cm.asp?page=10&lstMonth=July>

Ssssssnakes! Free talk about the snakes of Connecticut. July 23, 11:00-noon, Andover Public Library, Andover, CT. Meet a live snake! See [CT DEEP Year of the Snake webpage for details <link>](#).

Year of the Snake Summer Program at Stratton Brook State Park, Simsbury, CT. Presented by staff from the Beardsley Zoo. July 24, 11:00 am - 2:00 pm. See [CT DEEP Year of the Snake webpage for details <link>](#).

Northeast PARC Annual Meeting, July 24-26, New Jersey School of Conservation, Branchville, NJ. [<link>](#)

Midwest PARC Annual Meeting, August 2-4, Forest Beach Migratory Preserve, Port Washington, WI. [<link>](#)

Connecticut Snakes, a hands-on, all-ages program, August 3, 1-2 pm, Chatfield Hollow State Park, Killingworth, CT. See [CT DEEP Year of the Snake webpage for details <link>](#).

Year of the Snake Summer Program at Squantz Pond, New Fairfield, CT. Presented by staff from the Beardsley Zoo. August 7, 11:00 am - 2:00 pm. See [CT DEEP Year of the Snake webpage for details <link>](#).

Sabino Canyon Lizard Walk, August 10, Sabino Canyon Rec. Area, Tucson, AZ. Meet at 8 am at the visitors' center.