

INDIGO

magazine

OUR GIANT SERPENT of the SOUTHEAST

The Orianne Society's Efforts to
Conserve Eastern Diamondback
Rattlesnake Populations

Also in this issue:

Travelers
of the
Snake
World

The Complexity
of Conserving
The Eastern
Indigo Snake

Backwoods
Blackwater

Canoeing Georgia's
Suwannee River

14 Our Giant Serpent of the Southeast

The Orianne Society's
Efforts to Conserve
Eastern Diamondback
Rattlesnake Populations



photo: Pete Oxford



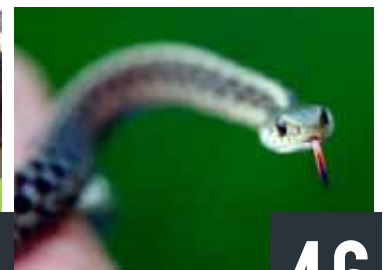
Herper
Spotlight

6



Events
Calendar

44



Field
Photos

46

Two young herp enthusiasts share their passion for snakes and snake conservation. The future is bright for the field of Herpetology.

Our events calendar has a wide selection of snake and reptile focused events from around the country. Find an event near you.

If you like us on Facebook you know that we get great photos submitted to us daily. We pulled together some of our favorites in our Field Photos. Too bad we didn't have room for more.



8 Reminiscences of a Snake Hunter

Dirk Stevenson reflects on a lifetime of snake hunting, from boyhood excursions to his work as a biologist.



31 What's the Frequency, Betty?

Using radio telemetry to track Indigos with The Orianne Society in Central Florida.



40 Backwoods, Blackwater

Canoeing the blackwater of the Suwannee River.

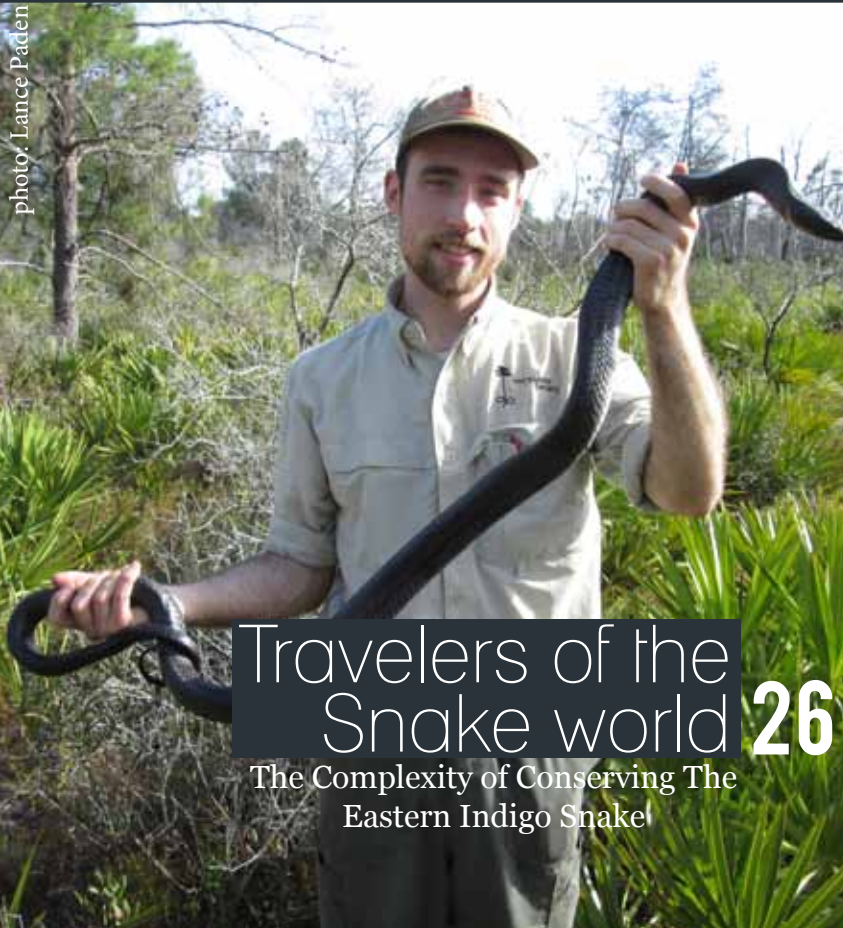


photo: Lance Paden

Travelers of the Snake world **26**
The Complexity of Conserving The Eastern Indigo Snake



THE Orianne Society

STAFF

Christopher L. Jenkins CEO
Frederick B. Antonio Director of OCIC
Wayne O. Taylor Director of Land Management
Stephen F. Spear Director of Amphibian Conservation
Heidi L. Hall Director of Communications
Dirk Stevenson Director of Inventory and Monitoring
Javan M. Bauder Assistant Conservation Scientist
Patrick Barnhart Indigo Snake Technician
Sue Bottoms Administrative Assistant
Polly Conrad Communication Specialist - Individuals and Foundations
Kevin Croom Communication Specialist - Memberships
Andy Day Seasonal Field Tech
Mike Jackson Communication Specialist
Karen McLain Accountant
Jerry Medlock Accounting Assistant
Courtney Torregrosa Vet Tech/Herp Tech

CONTRIBUTORS

Gabriel J. Diaz "What's the Frequency, Betty?"

Chris Hartmann "Backwoods, Blackwater"

ISSUE

Indigo Magazine Issue 1, Spring 2013

Indigo Magazine is the member magazine of The Orianne Society and is produced, designed and edited by the staff of The Orianne Society.

SPECIES SPOTLIGHT:

Louisiana **PINE SNAKE** *Pituophis ruthveni*



photo: Fred Antonio

The Louisiana Pine Snake is a large non-venomous constrictor of the *Colubridae* family. It is an elusive snake that spends much of its time underground in Pocket Gopher burrows (60% of the time according to one study), upon which it depends for on shelter.

The Louisiana Pine Snake faces many of the same threats that other snake species face-- mainly habitat loss, fragmentation and degradation, but also human persecution. Unfortunately, the Pine Snake has the smallest clutch size of any North American *colubrid* which contributes to low recruitment. This makes it difficult for populations to recover quickly from events that impact large swaths of local populations, thereby magnifying threats.

The path to conserving snakes, such as the Louisiana Pine Snake, is one of the hardest paths traveled. They aren't warm and fuzzy, most people don't want to cuddle them, and there are a great number of people who are apt to end their existence with a shovel, venomous or otherwise, and not think twice about it. But the bottom line is, we need these animals. Not only do they have a right to exist, but without them, some of our most cherished ecosystems would cease to function.

source: <http://www.fws.gov/southwest/clearlakees/PDF/PINESNAKE.pdf>

5.8
FEET LONG

Length of the largest reported specimen. A typical adult is four to five feet long.

3-5
SNAKES
PER CLUTCH

The smallest clutch size of any North American *colubrid*. A low fecundity magnifies threats.

34%
OF KNOWN
HISTORICAL LOCALITIES

are currently suitable to sustain viable pine snake populations, according to habitat assessments.

MESSAGE FROM DR. CHRIS JENKINS

CEO, The Orianne Society

Our greatest accomplishments are ahead and we are embarking on perhaps one of the greatest: transitioning The Orianne Society from a family foundation focused on rare snakes in the southeastern United States, to a public charity focused on the conservation of rare reptiles and amphibians around the world. Successfully navigating this transition and creating a goal driven sustainable organization that is making a real difference for conservation is the greatest legacy that I could ever hope to achieve.

We cannot turn our conservation goals into reality nor create a sustainable organization without the dedicated support of our members. It is a great honor to give back to you as a member by sending you the first edition of what will become a long-standing tradition in the conservation of reptiles and amphibians, the Indigo. The Indigo is a publication that highlights all the great research, conservation, and education work of ours and of our partners. For this first edition, we decided it was important to keep to our roots and focus the first volume on the reptile and amphibian rich southeastern United States. But stay tuned for future themes that will range from regional focused conservation efforts to topics in conservation from around the world.

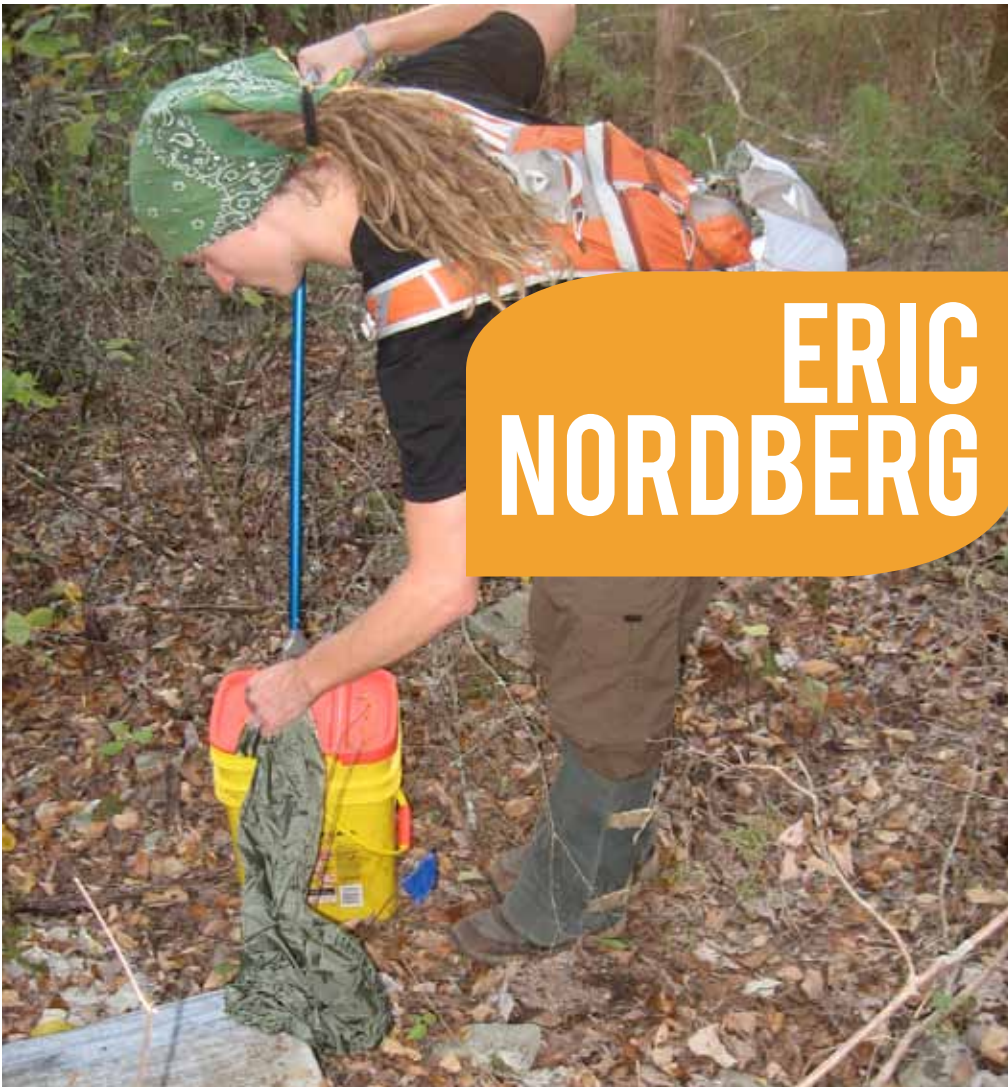
I will finish by thanking you, our members, for making everything we do possible. I hope these pages fill you with inspiration to do more for reptile and amphibian conservation as your membership has inspired us to keep going forward. If we are to achieve the lofty goal of creating a paradigm shift in conservation, where reptiles and amphibians are considered equal to all plants and animals, it will take every one of us. Use this inspiration as an opportunity to be part of this new paradigm and support reptile and amphibian conservation today.



As I sit here at my desk reviewing some of the conservation accomplishments Orianne has achieved since our inception, I realize what a special time this is. We are celebrating our five year anniversary – five years of working towards our goal of reptile and amphibian conservation. I feel we have achieved so much. We have protected some of the most critical habitat for rare reptiles in Georgia, reestablished Indigo Snakes in Alabama, designated the first series of Priority Amphibian and Reptile Conservation Areas, helped transition rattlesnake roundups to wildlife friendly festivals, and answered many questions in the ecology of rare reptiles and amphibians. I also realize that there is so much more to do.

photo: Pete Oxford

Herp SPOTLIGHTS



From an early age, Eric immersed himself in nature through hiking, camping, and enjoying the outdoors. Years later, his passion for wildlife has not diminished; in fact it has grown stronger as he now pursues a career in Biology with efforts to conserve and understand the natural world.

Eric grew up in State College, Pennsylvania, and attended Pennsylvania State University to earn his B.S. degree in Wildlife and Fisheries Science in 2010. While attending Penn State, Eric studied a multitude of topics, though his interests quickly focused on herpetology as he

took positions as a field technician and intern for field-based jobs. He spent time working as a sea turtle technician in North Carolina and the Florida Gulf. These experiences gave him a strong hands-on exposure to the conservation aspects of herpetology. There he also got involved with research projects that led to his first two journal publications. Eric then worked as a rattlesnake technician for a wildlife consulting company. While applying to graduate schools, Eric took another research technician position at the Savannah River Ecology Lab in South Carolina and assisted on a predator-prey project investigating the interactions between nesting songbirds and snakes.

In 2011, Eric entered the biology M.S. program at Middle Tennessee State University (MTSU). Here he initiated research examining the ecology of Timber Rattlesnakes (*Crotalus horridus*) in Middle Tennessee. Eric studied a population of rattlesnakes found in a small nature preserve located within five miles from a large developing city. The preserve is completely surrounded by agricultural and rural private land. Unfortunately, this is not a unique situation for the Tim-

ber Rattlesnake in Tennessee and other parts of its range as development and human encroachment drives them into islands of remaining wilderness. During the summer months, Eric uses radio telemetry to monitor these snakes to determine their movement patterns and habitat use. The rattlesnakes have been documented to navigate far from the preserve and into habitats that sometimes provide little distance between them and humans. During winter, Eric continues his studies addressing questions regarding the thermoregulatory behavior in hibernating Timber Rattlesnakes. As global climate temperatures gradually increase, Eric anticipates his research will be significant for better understanding the role that hibernation and the availability of thermally-suitable hibernacula will have on Timber Rattlesnake energetics and life history.

Eric's research will resume during 2013, however, he hopes to continue his passion for reptile conservation by pursuing a Ph.D. in reptile ecology and conservation. In the meantime, he will finish his M.S. degree at MTSU, and looks forward to continued fieldwork and opportunities to educate the public about the conservation of fascinating and often misunderstood creatures, such as the Timber Rattlesnake.

KELSIE KINCAID



My name is Kelsie Kincaid. I am twelve years old and I live in South Georgia. I've been herping since I was age three. I currently have three snakes, a Children's Python, an Albino Corn Snake and a Banded King Snake. I also have six Red-eared Sliders.

I first became interested in herping at an event called The Steve Scruggs Wildlife Program. He allowed me to hold several snakes and I instantly became hooked. Just the unknown of what I might find in the wild is exciting. I would love to go every day, if I could.

When I grow up I would like to work with reptiles and help with the species that are becoming extinct. I would like to create some herping events in the near future to show young people just how much fun it really is. I hope that one day all people will understand and discover how gentle these creatures are. I know that I love them all.

I would like to find some new species that have yet to be discovered. I will always remember The Orianne Society letting me herp with them last fall at their Places You've Never Herped event in south Georgia. It was my first encounter with a Diamondback Rattlesnake. It was the most fun time ever! I really enjoyed meeting everyone that had something in common with what I love to do. This will be a journey that I know I will continue until I'm old.

REMINISCENCES

of a SNAKE HUNTER

{Dirk Stevenson}

I became (or at least decided to become) a herpetologist when I found my first Garter Snakes and Box Turtles in the woods by the house of my Illinois boyhood. It was 1969, I was 6 years old, and when I found something exciting I ran for Dad so that he could assist with the catch. The box turtles, jaws wine-colored with blackberry juice, were always a delicious find, but it was spotting a wild snake that really got my juices flowing. Soon enough, I was regularly sojourning into the woods after school, clad in smart field-expedition attire provided by Mom—a hat, sunglasses, bug spray, and mini-notebook in separate pockets, a jar and forked stick in one hand, and a dog-eared copy of the *Golden Nature Guide to Reptiles and Amphibians* in the other.



Photo: Eitan Grunwald

ABOVE: The author with a Dwarf Caiman captured in the Peruvian Amazon. **RIGHT:** The author, his Mother, and the Okefenokee vacation alligator.



Dad often took me fishing. I usually wandered off with the net to look for Water Snakes, Bullfrogs, and Painted Turtles. On one of these fishing trips, I had a snake-hunter's epiphany. There was a large piece of plywood on the ground beneath the oaks on the grassy slope above the clear lake where Dad was casting for bream and bass. For some reason I decided to look under the board, which took most of my strength to lift. Forty years later, I can still picture the two large beautiful shiny-black Rat Snakes that lay coiled together in a depression under the board. I haven't walked past a board, log, or rock since without flipping it.

A few years ago, field work with The Orianne Society regularly took me to south Georgia, close to the Florida line. On one trip, I was overcome with emotion when I realized that I was revisiting the very place I'd been in August 1971 on a family vacation. On this trip I'd first see the Atlantic Ocean and the wilds of the famed Okefenokee Swamp. The alligator might have scaled the grassy bank to bask near our Dodge Dart while we explored the gift shop (see photo to left). I remember him being enormous, almost certainly a bull. Mom pointed him out to us and you can see that she is still pointing at him in the shot, as if shyly. I also saw giant soft-



photo: Cecil Stevenson

{A Red Milk snake found in southern Illinois.}



photo: Dirk Stevenson

shell turtles in the inky canals, and the locals told us there were Moccasins as fat as a man's arm.

From a private swamp park near Waycross, we joined a boat ride and later tread lightly on a rickety boardwalk over black water that surely hid secrets reptilian and primeval. I remember feeling light with excitement as we passed under cypress festooned with bromeliads and watched leaf-green anoles jump and flash their red dewlaps. I felt so at home. My confidence as a catcher of snakes had grown since my kindergarten years, and when I saw a gorgeous yellow Rat Snake curled tight in the ferny crotch of a live oak just a few feet above us, I was soon tiptoeing on the railing of the boardwalk, calculating my leap. My mother scolded and attempted to restrain me. Dad laughed a little.

I cut my snake-hunting teeth in southern Illinois, a fine training

camp for someone destined to work with snakes in the southeastern United States. A high-schooler with a freshly minted driver's license, I lay awake on winter nights dreaming of April warmth and snake emergence. I made detailed plans of how I would rev up my little VW Beetle for an extended snake-hunting trip to the scenic limestone bluffs and sandstone outcrops of the Shawnee National Forest, or the oxbow sloughs fringing the wild and muddy Cache River. My field sidekicks and I would work the talus slopes of the bluffs like a pack of foraging *coati mundis*, flipping many magnificent Red Milk Snakes (pictured above), Copperheads, and Speckled Kingsnakes under the lichen-splotched stones. The Gulf Coastal Plain of the Mississippi River valley actually extends northward into extreme southern Illinois, and the swamps there are home to some traditional southern plants and critters (Mud-

snakes, Green Treefrogs, Bald Cypress, Sirens) and one of the world's largest Cottonmouth populations—where, interestingly, these semi-aquatic vipers overwinter in large numbers in rocky-crevice dens with Timber Rattlesnakes, Copperheads, Rough Green Snakes, Black Ratsnakes, Racers, and Ribbon Snakes.

My first ever venomous-snake find was a Cottonmouth (pictured right). I nearly stepped on the poor duckweed-encrusted and predictably mellow fellow as he sunned on a beaver lodge. My only venomous bite in thirty-five years of chasing, catching, fondling, studying, photographing, and generally loving snakes (close to thirteen hundred venomous snake encounters so far) was also via an *Agkistrodon piscivorus* (a very minor bite, and all my fault). In 1988, with zoology and education degrees in hand, I relocated to a remote part of south Florida where I worked as an environmental educator at a wilderness camp for troubled youth. I had read everything by Archie Carr and envisioned south Florida to be a semi-tropical swamp paradise of jungle forests. Here, I experienced another naturalists' epiphany: most of our present-day habitats are no longer natural. Much of the region is now cattle lands, citrus groves, and sugarcane plantations, with more Turkey Vultures than anywhere on Earth (this was long before the days of Burmese Pythons in the Glades). Still, there were snakes.



{A Western Cottonmouth from southern Illinois.}

photo: Dirk Stevenson

Boy, were there ever snakes! The next few years were my salad days. Mostly free of responsibility, single, and broke, my lone possessions of consequence were another hand-me-down Volkswagen from Dad and enough books to slow it down. I spent virtually all of my free time exploring the wonders of south Florida, looking for snakes.

I had accepted this job and moved so far from a warm home because of the diverse, in fact fantastic, snake fauna native to the region. Por-

ing endlessly over my Peterson *Field Guide of Reptiles and Amphibians of Eastern and Central North America*, pages damp with drool, I fantasized about find-



photo: David Crowe

{The author in central Florida, just after having found his first-ever Eastern Indigo Snake.}

ing my first-ever Eastern Indigo Snakes, Rainbow Snakes, Coral Snakes, Pigmy Rattlers, Florida and Scarlet Kingsnakes, and Eastern Diamondbacks. Their scientific names were poetry: *Lampropeltis getula*, *Heterodon simus*, *Farancia erytrogramma*, *Crotalus adamanteus*. At the wilderness camp, a child in my youth group spoke excitedly of small black snakes with orange bellies (pointing to the picture of the Black Swamp Snake in the Field Guide)

that lived in a small marsh behind the shower tents. “You need a rake. We raked up a bunch of these; they stay in the mud under the water lettuce. They’re really cool!” You bet they were cool; the next morning we turned up five. A year later, then employed as a field biologist with the state of Florida, I encountered my first Indigo (pictured, bottom of opposite page). What you can’t see in the photo are the trunks of gnarly, twisted, and fire-scarred pond

pines that rimmed the margin of a beautiful sawgrass marsh only fifty yards distant where this Indigo probably hunted for frog, snake, and rat dinners. Nor does the photo convey my yelling to alert my field companion when the snake suddenly materialized in front of me, or my wobbly knees. I look at the photo now, and I think, wow, here I am twenty-two years later and I still admire each Indigo I hold, I still look on with the same won-

{An adult female Rainbow Snake captured in the Ochopee River of southern Georgia.}



photo: Dirk Stevenson



photo: Beth Stevenson

{A 7.5 foot long Eastern Indigo Snake captured by the author in southern Georgia.}

der, affection, and incredulity.

And then my career carried me to southern Georgia, where the Eastern Indigo Snakes are even bigger. I write this tongue-in-cheek; there is no scientific evidence that Eastern Indigos, the longest of North American snakes (the record length is 8.6 feet), are any bigger in Georgia than in Florida. In fact, Indigos over eight feet are actually very

rare, and the few animals of this size that have been reliably measured have come from south Florida.

I look at the photo now, and I think, wow, here I am twenty-two years later and I still admire each Indigo I hold, I still look on with the same wonder, affection, and incredulity.

da. My long-term mark-recapture study of a south Georgia Indigo

Snake population that resides on a protected public land—where large home ranges don't come into contact with paved roads or neighborhoods—indicates that Indigo Snakes inhabiting this site often live long (10-12+ years), and reach their true size maxima: males 7.0 – 7.5 feet and females 5.5 – 6.5 feet.

The snake in the photo, “Larry”, is what those in my field refer to as a “monster male.” I first

captured this guy as he lay across a Gopher Tortoise burrow apron in 1998; I recaptured him in 2003, performing a Lynn Swan-nian Super Bowl dive through dead branches to snag him as he started to slide into the earth. Perhaps Indigo scholars are invariably adrenaline junkies. Larry weighed just over 10 lbs. and was soft as a sleepy pup in the hand. He was the king of a large tortoise colony—the spoil of their burrows peppering a vast Altamaha River ridge of sugar sand—and I feel lucky to have met him.

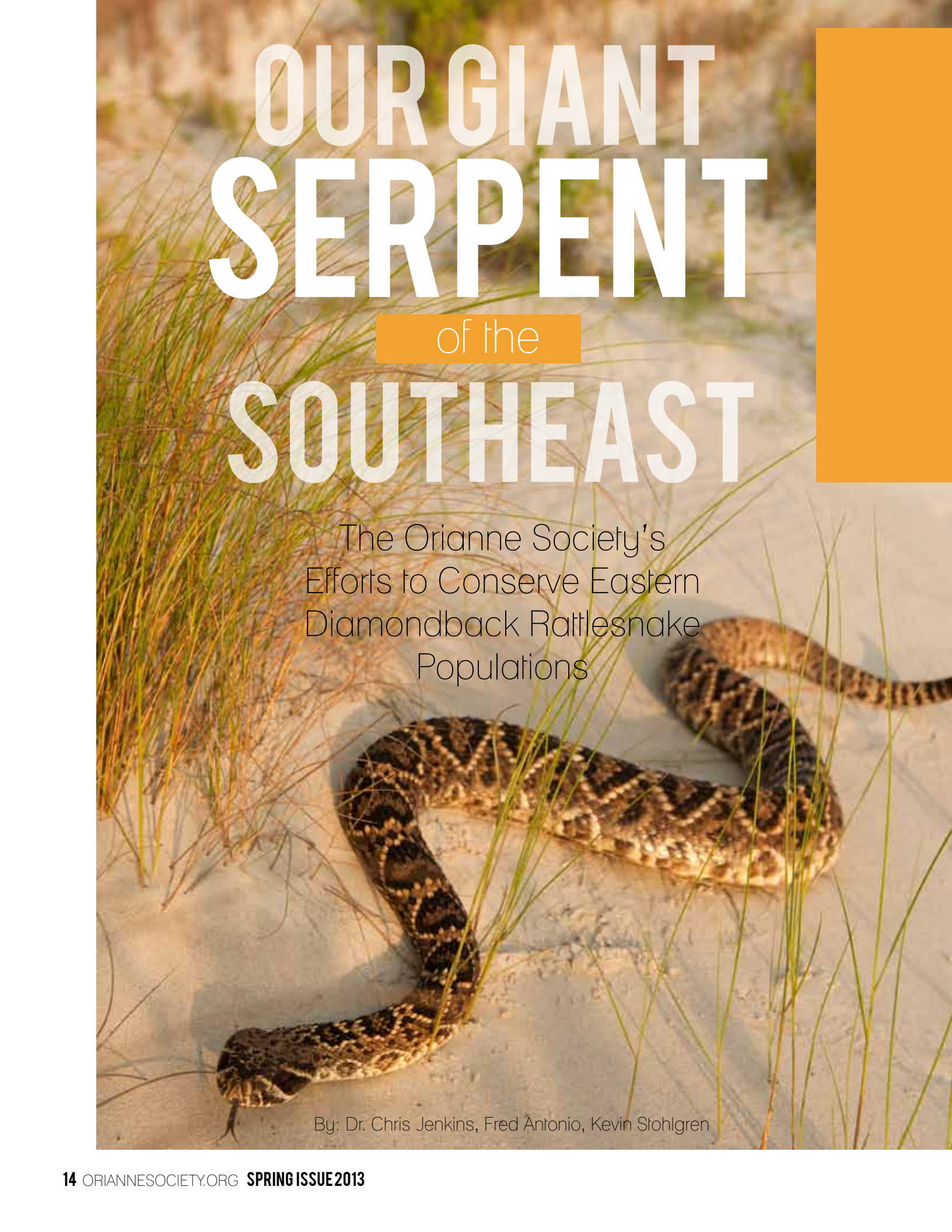
Over the last five years, I have been so fortunate to be a part of The Orianne Society and to work closely with all types of snake conservationists—volunteers, fellow herpetologists, landowners, foresters, and my dedicated colleagues—in an effort to save and conserve snakes, including the Eastern Indigo Snake. The autumn photo of a sand trail through a gorgeous south Georgia sandhill is an apt symbol for my life, and for our work. I have hiked down thousands of these trails, on walks long and short, hot and cold; many snake surveys have been arduous, slogging through deep sand that seemed to wish to swallow me, our prized quarry undetected—but no shortage of blackberry thorns and hungry ticks. Still, often the end of the day is a horizon of scenic sandhills, carpeted with golden grasses, pocked with the yellow aprons of tortoise burrows, healthy and happy Indigo Snakes resting nearby in the sunlight.



photo:Dirk Stevenson



{A Longleaf Pine Sandhill in southern Georgia—home to the imperiled Eastern Indigo Snake and gopher tortoise.}



OUR GIANT SERPENT of the SOUTHEAST

The Orianne Society's
Efforts to Conserve Eastern
Diamondback Rattlesnake
Populations

By: Dr. Chris Jenkins, Fred Antonio, Kevin Stohlgren



OVER THE LAST 15 YEARS, I HAVE HANDLED EASILY OVER 2,500 RATTLESNAKES,

but all those years of studying rattlesnakes in the deserts and prairies of the Great Basin and North Rockies could not prepare me for my first Eastern Diamondback Rattlesnake. We had recently purchased a 1,000 acre property in South Georgia for snake conservation and I was walking a sand ridge, snake hunting. I dropped off the ridge to hunt a small patch of oaks that I knew contained a couple of Gopher Tortoise burrows. Creeping into the patch I saw something I will never forget, my first Eastern Diamondback in the wild, coiled a few feet from a burrow in the shade of a small turkey oak. I took a moment to watch this amazing animal before deciding to make my move to capture him. As soon as I slid my snake hook under and through the thick curve of its body, I realized I had made a mistake. I was holding the end of the hook and trying to lift the snake off the ground, but the snake would not move. I had never experienced anything like that with a snake; the weight of the snake combined with the length of the hook would not allow me to effortlessly lift the Diamondback into the air as I had done countless times with other rattlesnake species. In my head,

I was remembering back to my days in physics class, when all of a sudden the snake exploded into action moving quickly back towards the tortoise burrow. Despite my inability to lift the snake on my previous attempt, I managed to move the snake away from the burrow and get it into a bucket. At this point I realized it was a large snake, the largest rattlesnake I had ever handled, but I still did not truly appreciate the true size of the snake I had found.

Later that day, a group of school children were visiting and I decided I would tube the snake and give them all the opportunity to touch its skin. It took 10 minutes to coax the Diamondback into the tube and in the process, I realized his head was the size of my fist and that he was so large and strong that I needed to hold the snake and tube with two hands to ensure he did not escape. Since that first experience, I have handled many Eastern Diamondback Rattlesnakes and have developed multiple projects to study and conserve their populations in the wild. As I write this article I look across my desk and see Sully, my large Diamondback pet, who is always there to inspire me to continue trying to conserve these amazing snakes and to continue finding new adventures.”

**- Dr. Chris Jenkins, CEO,
The Orianne Society**

photo: Pete Oxford



During his 46 year tenure (1929-1975) at the Reptile Institute in Silver Springs, Florida, Ross Allen offered a reward of \$500 to anyone who could bring in a live 8 foot Eastern Diamondback. He retired without having to pay out.

The Eastern Diamondback Rattlesnake, *Crotalus adamanteus*, is an archetypical species known from the Pleistocene of Florida and has had a long affiliation with human cultures in the southeast. In Florida, prehistoric kitchen middens (mounds of domestic waste from past societies) have contained their remains and they have long been the subject of cultural art and lore. Of the approximately 50 species of rattlesnakes, the Eastern Diamondback is the largest and most massive of the rattlesnakes, attaining a maximum length of 8 feet (2.4m) and weigh-

ing close to 20 pounds (9.0kg). A surprise encounter with an Eastern Diamondback is always an exciting and impressive event leading to exaggerations of size, like those 10' rattlers stretching from one side of the road to the other.

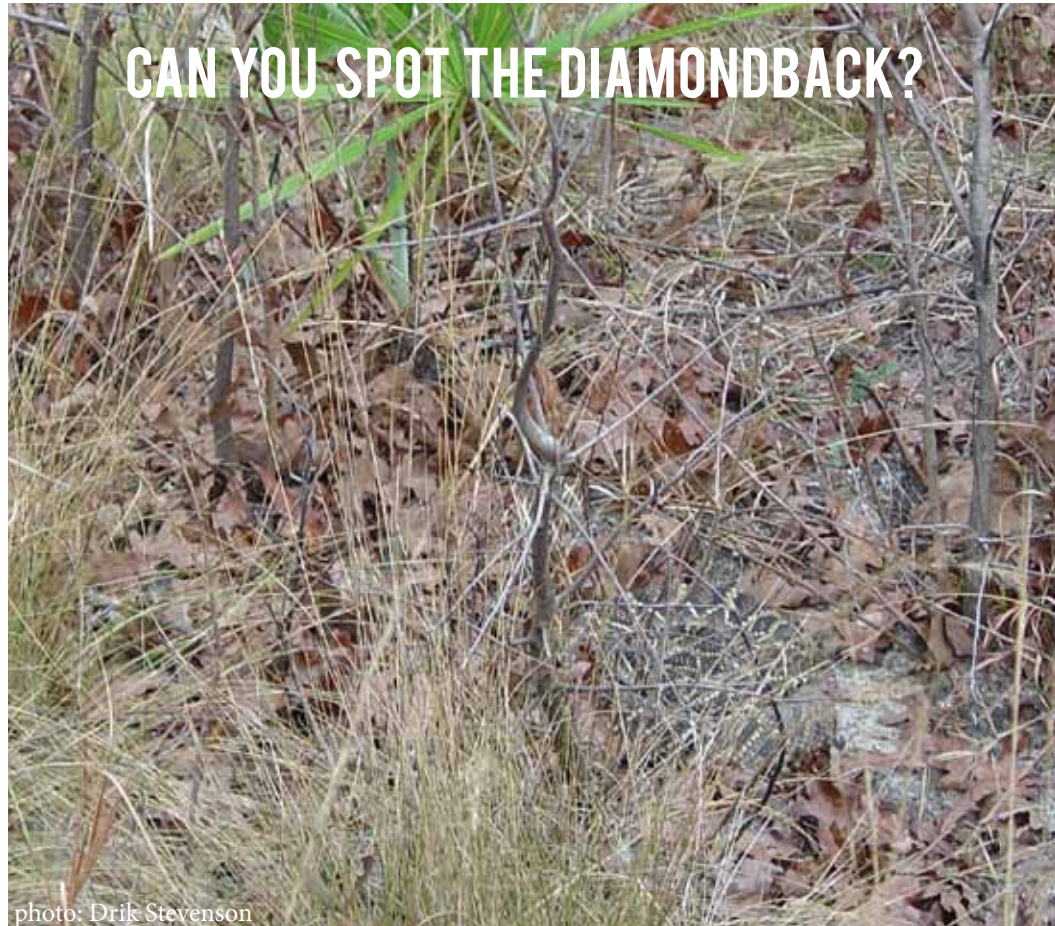
The rattle apparatus of the Eastern Diamondback is well developed and may be the most massive of modern day *Crotalus*. Born with one button at the tip of the tail, a new segment is added each time the snake sheds. A young snake during its first year may shed 3 to 5 times, then typically twice a year thereafter. Thus the snake's age

cannot be determined by counting the number of segments on a rattle. Also, the rattle is a relatively fragile apparatus that can be broken during its normal activities. It is rare to find an adult rattlesnake with a complete set of rattles.

The development of a rattle apparatus is an unusual enhancement on par with any unique evolutionary feature in the animal kingdom. Rattling is thought to have evolved to warn and ward off large North American Pleistocene mammals (i.e. bison, elephants, rhinos, horses, camels) to avoid being stepped on or

trampled. This defensive strategy became a distinct liability when these megafauna became extinct approximately 10,000 years ago and ancient American Indians were attracted to the sound as a food source. It then became advantageous not to rattle when approached by a human. Today this discriminatory behavior is seen when Eastern Diamondbacks initially stay still, not rattling, when approached by a person. Their first response, if undisturbed, is to depend on their cryptic pattern and coloration to avoid detection. But disturb them, and they will rise up in an imposing defensive position, ready to strike and defend themselves!

The Eastern Diamondback is a sit-and-wait ambush predator, routinely spending its days tightly coiled along a small mammal trail. From these ambush sites they use both visual (eyes) and infra-red reception (facial pits) for detecting prey movement. Once a prey animal is within range, they strike the target area (usually the neck and shoulder region), inject venom, and release the prey item. Chemosensory searching by olfaction (smell/nostrials) and vomeronasal (tongue flicking/Jacobson's organ in the roof of the mouth) tracking enables rattlesnakes to trail and find their prey. Interestingly, it is actually the trail of their own venom that the rattlesnakes follow as they track down their dying prey. Venomous snakes have the ability to gauge the amount of venom delivered in a strike, from little to



"Their first response, if undisturbed, is to depend on their cryptic pattern and coloration to avoid detection."

none in a quick defensive strike, to a large yield as when attempting to capture prey. The prevailing theory on why venomous snakes and venomous fish have evolved such highly toxic venoms is the less distance a prey animal travels following envenomation, the higher the probability that it will be found and consumed.

The Eastern Diamondback's diet is predominately mammals, including Cotton Mouse (*Peromyscus gossypinus*), Cotton Rat (*Sigmodon hispidus*), Florida Wood rat (*Neotoma floridana*), Gray Squirrel (*Sciurus carolinensis*), Marsh Rabbit (*Sylvilagus*

palustris) and Eastern Cottontail Rabbit (*Sylvilagus floridanus*). Eastern Diamondbacks provide a great service in helping keep these rodent populations in balance. Eastern Diamondbacks have a late summer (August, September) and early spring (March, April) breeding season. Males will often combat each other over territory and breeding rites with resident females. Ritualized male combat in Eastern Diamondbacks determines social dominance and is comprised of a series of acts, including raising the anterior 30% to 40% of their bodies from the ground, intertwining the combatant's anterior bodies around

each other, toppling, and pushing each other to the ground as a form of physical domination. This wrestling match can last from a few minutes to hours until the subordinate flees. This is a stereotyped and ritualized series of behaviors seen in many species of snakes and normally results in little physical harm.

The gestation period for female Eastern Diamondbacks is approximately 5 months. Most births occur in August and early September and litter size averages 12 young. At birth, neonate (newborn) Eastern Diamondbacks are capable of delivering a venomous bite, but the bite of larger individuals is more dangerous due to a larger venom yield. Female Eastern Diamondbacks are capable of reproducing annually if prey resources are abundant, but reproducing every 2 to 3 years is more common. Following parturition (birth), neonates often stay with the female until their first shed, about 2 weeks following birth. This “neonatal aggregation” with Mom in attendance affords protection for the young during this vulnerable period.

The majority of the Eastern Diamondback’s range is within the Longleaf pine ecosystem of the Southeastern Coastal Plain. Historically, this region was covered by an endless sea of savanna-like grasslands with low densities of longleaf pine trees. These extensive grassland forests were intersected by blackwater creeks and floodplain swamps. The Longleaf pine ecosystem is adapted to fre-

quent fires, and in some cases, fires may have burned across this landscape every couple of years. These frequent fires allowed many of the grasses and forbs to reproduce, which in turn produced food for the small mammals that Eastern Diamondbacks prey upon. The fires also kept the landscape relatively open, allowing Gopher Tortoise (*Gopherus polyphemus*) populations to flourish, resulting in many burrows across the land-

scape that Eastern Diamondbacks could use for refugia and places to overwinter. Fire is so important to the Longleaf Pine ecosystem that it is often referred to as “the fire forest”. Sadly, the Longleaf Pine ecosystem has changed and only a small percentage remains. Europeans entered the landscape over 200 years ago, changing the future of Eastern Diamondbacks and their habitat forever. Today the southeastern Coastal Plain is

Rattlesnake venom:

The venom of rattlesnakes is a complex mixture of proteins that have enzymatic activities causing local tissue injury, systemic vascular damage, hemolysis (destruction of red blood cells), fibrinolysis (dissolution of fibrin) and neuromuscular dysfunction. Due to these multiple sites of action, it is not prudent to label or treat rattlesnake envenomation as being strictly “hemotoxic” as both cardiotoxic and neurotoxic manifestations may occur. The venom of Eastern Diamondback Rattlesnakes contains an impressive spectrum of toxins that bind with specific receptor sites and results in a multi-organ poisoning. Their complex venom combined with a large venom yield (200-850mg dry weight) makes the Eastern Diamondback one of the most dangerous snakes in North America.

Snake venoms continue to be of importance in biomedical research. The venom of Eastern Diamondbacks has dramatic variation in different parts of the snake’s range. Eastern Diamondbacks in Georgia may have different toxins and proportions of toxins than those found in southern Florida. A well-studied example is a myotoxin which is present in more northern populations but absent in southern populations. This venom component causes tonic hyperextension of the hind limbs in rodents and rabbits which inhibits the prey’s ability to travel distances once envenomated. Prospecting snake venom for medical and pharmaceutical application remains a rich and beneficial area of scientific research.

characterized by fragmentation with extensive areas of agricultural, rural residential, and urban development, including an extensive network of roads. Most of the remaining forests are in production forestry where the natural grasses and forbs have been removed and off-site pines (primarily loblolly and slash pines) are planted at high densities and harvested frequently. The decline of the seemingly endless Southeastern Coastal Plain has caused Eastern Diamondback populations to decline significantly.

Recently, Eastern Diamondbacks have been the focus of attention for wildlife conservation and management organizations following a petition to the U.S. Fish and Wildlife Service to list them as a threatened species under the United States Endangered Species Act. In general, most everyone agrees that the snake has declined over the last 200 years, but little attention has been paid to its status except in a few states on the edge of its range. Eastern Diamondbacks historically occurred almost continuously from southeast Louisiana to southeast North Carolina but today their distribution is much more fragmented. Eastern Diamondbacks are no longer thought to occur in Louisiana, are restricted primarily to protected land in Mississippi and North Carolina, and have declined throughout the remainder of their range. Currently there are no laws against collecting or killing Eastern Diamondbacks in Louisiana, Alabama, Florida, Georgia, and South Carolina (with the exception of some state lands). In Mississippi, 4 Eastern Diamondbacks can be taken each year with a hunting license and in North Carolina, Eastern Diamond-

"The decline of the seemingly endless Southeastern Coastal Plain has caused Eastern Diamondback populations to decline significantly."

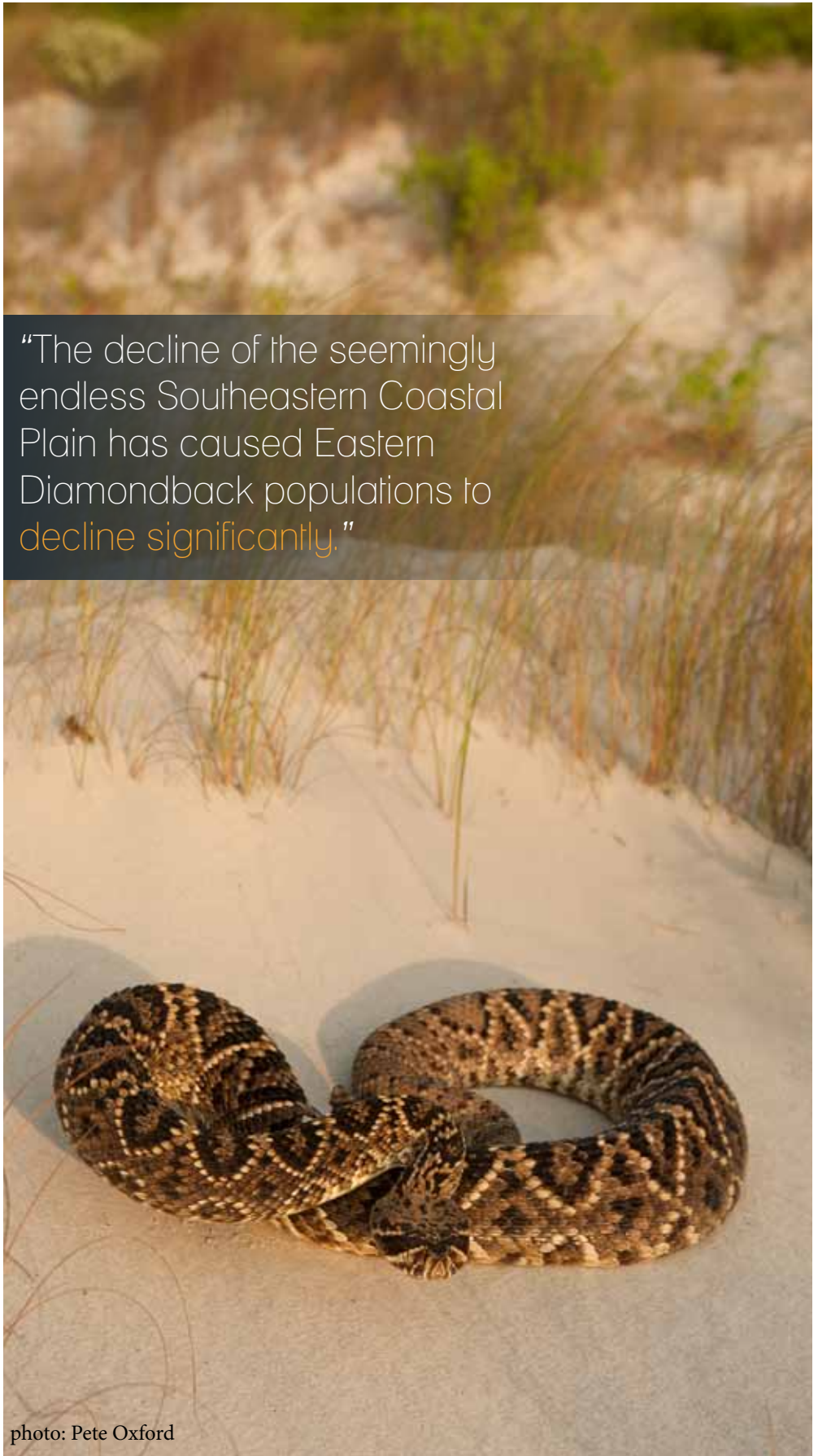


photo: Pete Oxford

backs are considered an endangered species, thus it is unlawful to take or possess one. With the current petition for endangered species status many states are reviewing the status of Eastern Diamondback populations and there could be some changes to the existing regulations very soon.

The Orianne Society is involved in many projects to study and conserve Eastern Diamondback populations in the wild. As an organization that houses the International Union for the Conservation of Nature's Viper Specialist Group, we see North America's greatest rattlesnake as an important species for us to conserve as well as a flagship for viper conservation around the world. Some of the programs and projects The Orianne Society implements for Eastern Diamondback Conservation include:

CONSERVATION PLANNING.

The Orianne Society is currently leading a team in the development of a Conservation Action Plan (CAP) for Eastern Diamondback Rattlesnakes. A CAP is a comprehensive guide to managing a declining species. We are working with state agencies, research biologists, and public and private land managers to develop this plan. The Eastern Diamondback CAP contains background information on the species ecology as well as an assessment of its status throughout its range, and a detailed assessment of the

Radio Telemetry:

One of the field techniques researchers use to study the ecology of snakes is called radio telemetry. Radio telemetry allows a researcher to track a snake and get important insights about their daily lives. In order to conduct radio telemetry, a transmitter must be fixed to the study animal. Because snakes have long, limbless bodies, transmitters are typically surgically implanted into the body cavity. Transmitters come in various sizes, but one of the more common sizes is comparable to an AA battery. Each transmitter emits an intermittent beep at a unique radio frequency. Using a receiver and antenna, the researcher can dial in the frequency of the snake's transmitter, which will begin to pick up the beep given off by the transmitter. By pointing the antenna in different directions, the researcher can listen to the strength of the beep and determine which direction the snake is in. The researcher can follow the beep until they reach the snake's location. Data collected from radio telemetry studies can be used to generate a lot of useful information about a snake's ecology including home range size, movement and activity patterns, what shelters they use, and what habitats they utilize. Some transmitters are even temperature sensitive and the pulse rate of the transmitter can be used to calculate the body temperature of the snake. This is useful in studying the thermal ecology of a snake.

key threats to the species. It also contains conservation strategies that can be used as a blueprint by wildlife managers and biologists to protect Eastern Diamondbacks throughout their range. These strategies are targeted at identified threats, and range from habitat management guidelines, to changes in legislation. These legislation recommendations may be used to afford the species protection from being killed, or to designate it as a game species so that bag limits can be set to limit the number of animals that can be killed.

The CAP will also address future research needs. Despite being one

of the most iconic predators of the southeastern United States, we still lack a great deal of basic knowledge of the ecology of Eastern Diamondbacks. Some of the gaps in our understanding of this species include the effects of habitat loss and fragmentations, the effects of translocating (moving) individuals, the effects of roads, population viability, genetic structure, and sustainable harvest levels. Identifying and filling in the gaps in our knowledge of this species is essential to be able to develop appropriate conservation strategies. Lastly, the CAP will contain a timeline and indicators of success for each

of the management recommendations to ensure that they are carried out in a timely manner and that any failures can be reassessed and adjusted as needed.

FIELD RESEARCH.

The Orianne Society is working on a variety of field projects including a state-wide inventory and monitoring of Eastern Diamondback populations in the Ocmulgee region of South Georgia. We are also in the process of completing a project investigating the impacts of habitat fragmentation on populations in coastal Georgia. You may not know that Eastern Diamondbacks inhabit coastal areas, including many of the barrier islands, throughout their range. They can even swim the tidal creeks to move between islands and the mainland. While Eastern Diamondback populations are declining throughout much of their range, they may remain abundant in undisturbed coastal habitats. Despite this, little research has been conducted on Eastern Diamondbacks on the coast, and we know little about their ecology in this region. The coast is also a popular tourist destination, and therefore sees a great deal of development activities which presents a threat to persistence of Eastern Diamondback populations.

We are currently working on Georgia's Barrier Islands to determine how human development influences where Eastern Diamondbacks occur, and where they don't. But Eastern Dia-

mondbacks, like most snakes, are tricky research subjects. They occur in rugged habitats and are well camouflaged, which makes them incredibly tough to find and therefore research. We are using a modeling approach that only requires presence and absence data.

We conduct visual encounter surveys and record whether or not we saw an Eastern Diamondback. These data will then be analyzed to determine how landscape patterns and configurations influence where Eastern Diamondbacks

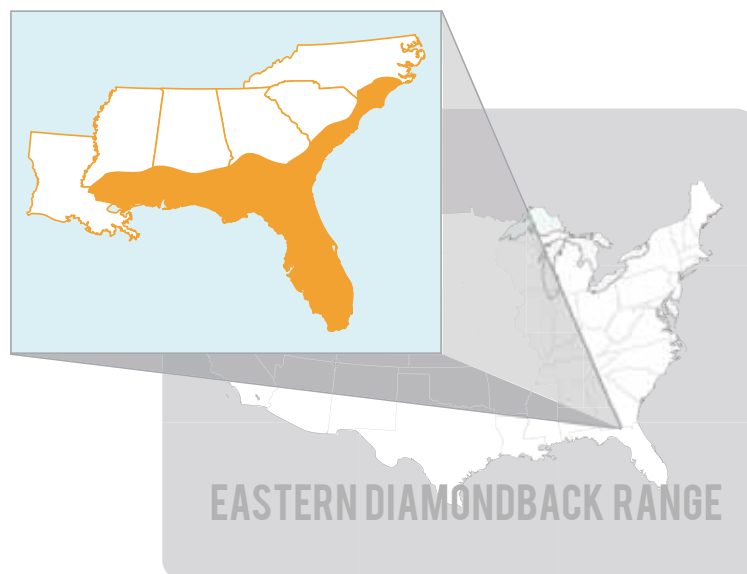
are found. These data can then be used to make habitat management recommendations in the face of continued coastal development. We should soon have a much better understanding of the ecology of these snakes in this region, which can be used to help protect this declining species.

LAND PROTECTION.

The Orianne Indigo Snake Preserve (OISP) lies in Telfair County, Georgia. This property is dedicated to the protection of the federally threatened Eastern Indigo Snake (*Drymarchon couperi*), but also has a population of Eastern Diamondbacks. While Eastern Diamondbacks are one of the top predators in the

southeastern United States, they are also prey for Eastern Indigo Snakes. Because of their important role as both predator and prey, we are monitoring the population that occurs on the OISP.

In order to monitor the popula-



tion on the OISP, all Eastern Diamondbacks that are encountered are captured so that they can be marked. These snakes are captured using specialized tools, including snake hooks and tongs. Capturing a venomous snake is a potentially dangerous task, and therefore should only be done by someone who has been properly trained, to ensure that no harm will come to the snake, or the person capturing it. Captured snakes are then brought back to the laboratory where we use clear plastic tubes to restrain the snake so we can record morphological data, including body length, mass, and sex, and then insert a passive integrated transponder, or PIT, tag. These PIT tags are the

Did you know?

The labial pits of pitvipers are infra-red receptors that can differentiate temperature differences up to 1/3,000 of a degree Celsius. These receptors are visual organs, using the trigeminal nerve to send imaging information to the brain, much like the eye uses the optic nerve for similar purposes. The adaptive advantage is that a rattlesnake, at night, deep in a burrow, in the total absence of light, can "see" their prey!

Snakes are the best rodent predators on the planet. Although raptors (birds of prey) and mammalian carnivores consume their fair share, they have to wait for rodents to come out of their burrows in order to catch them. Snakes can actually pursue rodents down their burrows and into their underground retreats and catch them where they hide!

Although it is widely recognized that snakes are instrumental in keeping rodent populations in check, snakes themselves provide food for many other animals. Although adult Eastern Diamondbacks have few potential enemies besides humans, young Eastern Diamondbacks are documented as being on the menu of Indigo Snakes, Common Kingsnakes, Black Racers, Coral Snakes, owls, hawks, caracaras, wood storks, raccoons, skunks, fox, coyote, bobcat and even black bear! This is a great example of the dramatic predatory interactions and species interdependence found in our natural wildlife communities.

same that are used by veterinarians in cats and dogs to identify the animals should they be separated from their owner. Each PIT tag contains a unique set of numbers and letters that provides an ID for that individual. Whenever we capture a snake, we can scan it to see if it has been captured before. If it has, we can then look through our data and see when and where it was captured, and even how much the individual has grown. Eventually we will be able to use these data to estimate the size of the Eastern Diamondback population on the OISP. To date, we have captured and marked 16 Eastern Diamondbacks on the OISP, 8 males, 7 females, and one of undetermined sex.

CAPTIVE CONSERVATION.

The Orianne Center for Indigo Conservation (OCIC) Eastern Diamondback Rattlesnake program began in response to nui-

sance calls from the public who did not want to harm rattlesnakes but who were also not thrilled to have them in their yard! As normal protocol, the staff of the OCIC responds to local venomous snake calls as a public service and to act in the best interest of the snake. Not only can we remove the snake from harm's way, but we also use the opportunity to educate people about snakes. It is recognized that a vast majority of

venomous bites occur when people intentionally engage venomous snakes, usually in the process of attempting to kill them. So, for the best interest of the snake and the public, the staff of the OCIC is eager to act as a community resource for these requests.

In addition to receiving nuisance and salvage (rattlesnakes found during the process of development) Eastern Diamondbacks,

the OCIC also maintains albino Eastern Diamondbacks in the collection. These genetically recessive individuals which lack black pigment are more correctly referred to as “amelanistic partial albino”, as yellow and red pigments are still produced by chromatophores in the skin. This genetic line originated from a male “albino” brought into a Georgia rattlesnake roundup in 1988. This specimen was purchased by the Knoxville Zoo and crossed with a female collected in Okatie, South Carolina. Siblings produced from this cross were transferred to Central Florida Zoo where the line was developed further. Fred Antonio, Director of the OCIC, began producing albino Eastern Diamondbacks at home in 2004, and since that time has produced 144 neonates. The OCIC is currently working with this line, as they are stunning “attention-getters” at outreach programs where we can then engage the public on snake conserva-

tion issues. These white specimens are also an excellent example of the liability of non-adaptive coloration and make it possible to show the successful camouflage of a melanistic snake as opposed to that of amelanistic snakes. The OCIC currently houses 23 Eastern Diamondbacks that are used for Education Outreach including being displayed at the Claxton, Georgia Rattlesnake and Wildlife Festival that recently transitioned from being a Rattlesnake Roundup.



photo: Heidi Hall

OCIC Director Fred Antonio at the Claxton Rattlesnake and Wildlife festival in Claxton, GA. The successful transition of the Claxton event from a “roundup” to a no kill wildlife festival can be a model for preserving traditions and protecting wildlife.

RATTLESNAKE ROUNDUPS.

Rattlesnake roundups continue to be controversial events, which exploit rattlesnakes. Characterized by organized hunts, inhumane treatment of animals, and the portrayal of venomous snakes as “bad animals” that deserve killing, these annual events spread misinformation to the public, negatively impact wild populations, and lack any kind of conservation ethic. Members of the Association of Zoos and Aquariums (AZA) have long been critical of rattlesnake roundups as have many conservation organizations and members of the scientific community. During the 1999 AZA Board of Directors meeting, they unanimously approved a statement condemning rattlesnake roundups: *“The AZA condemns the cruel and ecologically destructive practice of rattlesnake roundups and encourages its member institutions to actively oppose such activity through public education and the support of relative legislation.”* Although rattlesnake roundups continue as unregulated harvests in Texas and Oklahoma, Georgia has made great strides in turning these traditional “kill events” into wildlife-friendly festivals where no snakes are harmed. Following the year 2000, a rattlesnake roundup that was held for 27 years in Fitzgerald, Georgia, sponsoring Jaycees announced that the event would no longer be held and it would be replaced by a festival to honor the Burmese wild chicken, Fitzgerald’s free-ranging unofficial mascot. This change of venue was encouraged by Georgia Department of Natural Resources (GDNR) as was last year’s conversion of the Claxton, Georgia Rattlesnake Roundup to the “Claxton Rattlesnake and Wildlife Festival”. Sponsored by the Evans County Wildlife Club, it was the first time in 45 years that no rattlesnakes were killed and all rattlesnakes, 130 of them, went home with their owners following a weekend of festivities. The Orianne Society participated by bringing live rattlesnakes from The OCIC

and by presenting conservation education talks throughout the weekend.

This year, in support of the Evans County Wildlife Club, The Orianne Society will again contribute to this event by exhibiting 20 rattlesnakes that are maintained in the OCIC collection specifically for this purpose. The Evans County Wildlife Club and Georgia DNR are to be commended for creating a proactive program that ended the annual butchering of our native wildlife.

CANDIDATE CONSERVATION AGREEMENTS.

The Orianne Society is working with Tall Timbers Research Station and multiple private plantations in the Red Hills region of Southwest Georgia and Northwest Florida to develop a Candidate Conservation Agreement (CCA). Eastern Diamondback populations are doing relatively well in the Red Hills region due to a long history of land management for quail that includes frequent prescribed fire. Developing a CCA between the U.S. Fish and Wildlife Service and private landowners will recognize all of the habitat restoration and management work land owners have already done and ensure that they continue to manage habitats in a way that will benefit Eastern Diamondbacks. If the landowners agree to continue managing habitats and Eastern Diamondbacks were to become listed under the Endangered Species Act, the landowners would be protected from further restrictions. CCAs are great ways to get proactive conservation accomplished for candidate species.



Eastern Diamondback Rattlesnakes are one of the world's largest and most amazing vipers.

An icon of one of North America's most majestic, yet now decimated ecosystems – the Longleaf Pine ecosystem. Despite their secretive nature, this wonderful, but threatened animal still evokes fear in many people resulting in many Eastern Diamondbacks being killed every year. So is there a future for Eastern Diamondback Rattlesnakes; is there room for people to coexist and live side by side with this amazing animal? We think so. While Eastern Diamondbacks will never again exist uninterrupted from Louisiana to North Carolina, there are many wild places left in the Southeastern Coastal Plain. With a new interest in the conservation and management of this species, soon we will see the Eastern Diamondbacks protected across its range including in these wild places and that many organizations will continue to protect, restore, and manage the areas this species inhabits. With the dedication of many and the partnerships that are currently sprouting to rally for this species, we see a long future for Eastern Diamondbacks, a future where our children's children can walk among the pines and see a majestic Eastern Diamondback, a beautiful predator, coiled at the base of a towering Longleaf Pine waiting for his next meal.



TRAVELERS of the snake WORLD



The author and Orianne Society Assistant Conservation Scientist, Javan Bauder, with an Eastern Indigo Snake.

photo: Lance Padon

By: Javan Bauder

Conserving Eastern Indigo Snakes often feels like conserving a much larger animal, like a bear, panther, or elk. This is because Indigo Snakes are the travelers of the snake world. Indigo Snakes have the largest reported home range sizes of any snake species, up to 3,700 acres in southern Georgia and 1,300 acres in Florida. Indigo Snakes in southern Georgia may move almost five miles between overwintering habitat on dry Longleaf Pine sandhills to summer foraging habitat. On a pound-per-pound basis,

“Indigo Snakes are particularly susceptible to road mortality because of their large body size, extensive movement distances, and tendency to move among multiple habitat types throughout the year.”

that is equivalent to a human walking almost 200 miles! During our own research on Indigo Snakes in central Florida, we have seen Indigo Snakes move over half a mile in a single day. Clearly, Indigo Snakes require large expanses of habitats in order to persist, which creates some conservation challenges in today's modern world. Like many wide-ranging species, the Indigo Snake has suffered from habitat loss and fragmentation. Habitat fragmentation occurs when large patches of habitat are divided into smaller, more isolated patches. Fragmentation may occur through very dramatic means, like the creation of a new housing development, or through more subtle means, like the creation of a two-lane highway. Indigo Snakes are particularly susceptible to road mortality because of their large body size, extensive movement distances,

and tendency to move among multiple habitat types throughout the year. Although over-collecting and incidental mortality from rattlesnake roundups were also contributing factors leading to the listing of the Eastern Indigo Snake on the Endangered Species List in 1978, human-caused changes to the landscape represent the greatest threat to Indigo Snakes across their range.

The threat of human-caused landscape change is particularly important for Indigo Snakes in peninsular Florida. Although parts

Fortunately, this Indigo had a well supervised road crossing.

of peninsular provide important strongholds for Eastern Indigo Snakes, Florida has seen extensive changes to its landscapes. As a result Snakes are negatively affected when habitats are lost through development, but what about when natural habitats are modified or altered but not completely destroyed? For example, how do Indigo Snakes respond to cattle ranches or citrus groves?

What happens to Eastern Indigo Snakes in rural areas where houses and roads occur at low densities? What about small parcels of natural habitat scattered

throughout a rural or suburban landscape? Can these landscapes still support Indigo Snake populations? These questions are all part of a larger question that is very relevant to Indigo Snake conservation in Florida: how do human-altered habitats affect Indigo Snake populations' viability? This is a question that The Ori- anne Society is working to answer.

Human-altered habitats are widespread throughout Florida, cattle ranches, citrus groves, sugar cane fields, rural neighborhoods, and suburban



photo: Lance Paden

developments. Although people often think of Indigo Snakes as occurring in large tracts of natural habitat, Indigo Snakes in Florida are commonly reported from various human-altered habitats. However, ensuring that Indigo Snakes persist in an area requires more than a few sightings but rather what is referred to in conservation biology as a viable population. Several factors are required to support a viable population. There must be abundant food and shelter throughout a large enough area to support numerous individuals. The number of new individuals entering the population, either through birth or immigration, must exceed the number of individuals that die or emigrate. The population must be large enough to ensure that chance events, like a wildfire or disease, will not wipe it out. The population must be connected with other populations so that new genetic material can be exchanged to prevent the negative effects of inbreeding. Can human-altered habitats meet all of these requirements?

If so, Indigo Snakes may be better off in Florida than we think.

However, studying how entire populations respond to different landscapes is incredibly difficult to do in the field and requires more time than researchers have available. Fortunately, there is an approach that can allow us to quickly answer questions about

pect of this model is that, in order to predict the number of Indigo Snakes, it will simulate the life cycle of individual snakes. These virtual snakes will move, survive, and reproduce according to a set of preprogrammed rules designed to simulate the real movements, survival rates, and reproductive output of Indigo Snakes in central Florida. New snakes will be born into this virtual environment and added to the virtual population. At the end of the model run we will compare the number of remaining virtual snakes to the number we started the model with. A simulated population that had more deaths than births will have declined, while a simulated population with more births than deaths will have increased. This model has many exciting applications. We will be able to identify habitats and landscapes in Highlands County, Florida that support viable populations and determine where populations are most at risk of extinction. We can also overlay viable populations onto existing conservation lands to identify priority areas in need of protection. This model could even be applied to future landscape development scenarios to determine



There is something special about an Eastern Indigo in the wild. Ask anyone who has seen one.

photo: Lance Paden

population persistence: population viability modeling. The Orianne Society is building a population viability model (or PVA) for Indigo Snakes in Highlands County Florida that will allow us to predict the number of Indigo Snakes that remain in the county after some time period (typically 100 years). The interesting as-

lands County, Florida that support viable populations and determine where populations are most at risk of extinction. We can also overlay viable populations onto existing conservation lands to identify priority areas in need of protection. This model could even be applied to future landscape development scenarios to determine

how Indigo Snakes might persist in the face of increased development. Given the appropriate input data, this model could be applied to Indigo Snake populations anywhere in Florida or Georgia.

The second approach The Orianne Society is taking to determine how human-altered habitats affect Indigo Snake populations is by studying how those landscapes affect the connectivity of those populations. Maintaining population connectivity is primarily important in allowing different populations to exchange genetic material to prevent the negative effects of inbreeding. This component of our research is focused on a larger region of central Florida. Genetic connectivity is determined by first extracting DNA from an Indigo Snake tissue sample, which can be a scale clip or piece of shed skin, and using computer software to estimate relatedness based on the similarity of DNA sequences between two individuals. The field of landscape genetics provides several tools with which relatedness can be compared to features of the landscape such as rivers, roads, development, agriculture, or types of natural habitats, to determine if those features facilitate or restrict connectivity. For example, rivers may facilitate connectivity because river floodplains are often undeveloped and could allow Indigo Snakes to disperse long distances, while large highways might restrict gene flow by acting as barriers to Indigo Snake dispersal. If we can iden-



photo: Daniel Parker

The author and a team of volunteers collect data on an Eastern Indigo Snake, during a field blitz organized by The Orianne Society.

tify habitats that facilitate connectivity among populations we could identify potential corridors among different populations. Answering these population and regional level questions requires quite a bit of data collected on individual Indigo Snakes in their natural environment. In order to create models that accurately simulate Indigo Snake movements we need to have a good idea of what those movements are in the wild, how they differ by season or gender, and how they change depending on the type of habitat. Understanding how different landscape types affect genetic connectivity requires tissue samples from those different landscape types. In order to collect this information, The Orianne Society is studying Indigo Snakes in the field in central Florida. For the past two years,

we have used radio telemetry to monitor the movements of Indigo Snakes in southern Highlands County, Florida. Although our individual movement data will help us answer questions of how individual snakes respond to different human-altered habitats, the primary purpose of our telemetry data is to help us build an accurate population viability model. To date, we have captured 68 Indigo Snakes across our study area. Each snake is measured, weighed, sexed, marked with a unique microchip (PIT tag), and scale-clipped. The scale clips will be used to extract DNA for use in the landscape genetics study. Snakes that are large enough receive a surgically implanted radio transmitter at the University of Florida's Small Animal Hospital.

Finding enough Indigo Snakes

has not been easy, particularly as we expand our study area according to the goals of the landscape genetics study. Indigo Snakes are often difficult to find in peninsular Florida, even in places where their populations are secure. Part of this difficulty stems from the tendency of Indigo Snakes in peninsular Florida to use a variety of shelter sites and habitats throughout the year. This generalist pattern of habitat use is probably due to Florida's mild climate, particularly in the winter. Mild winters in Florida make Indigo Snakes less dependent upon Gopher Tortoise burrows than they are in southern Georgia and northern Florida, where they depend on tortoise burrows for overwintering sites. This weaker association makes winter surveys around tortoise burrows, a proven technique in south Georgia, less reliable in Florida. That being said, winter surveys around tortoise burrows, as well as driving roads through suitable habitat, have yielded some success in finding Indigo Snakes. Interestingly, our telemetered Indigo Snakes have helped themselves add new snakes to the study. From October 2012 through January 2013, nine of the fifteen Indigo Snakes captured during this time were all at or near telemetered snakes. Indigo Snake breeding occurs during this time and most of these captures were of females found

near telemetered males or males found near telemetered females. On Christmas Eve, we found one of our telemetered males mating with a new female! Apparently the telemetered snakes were leading us directly to new snakes! However, the vast majority of our captures were opportunistic encounters with our field technicians, other biologists, or volunteers. Volunteers have played an increasingly important role in our

Answering these population and regional level questions requires quite a bit of data collected on individual Indigo Snakes in their natural environment.

Florida research since its inception. A small group of volunteers, who are authorized to work under our U.S. Fish and Wildlife Service permit, have helped search for Indigo Snakes to add to our telemetry study in Highlands County. This group recently came together for an "Indigo Snake Blitz" in early January 2013 where the participants spent three days intensively searching for Indigo Snakes throughout Highlands County. The Blitz was a success as we captured three Indigo Snakes and found three new shed skins. Other people have also made contributions to our study. We caught one of our telemetered Indigo Snakes because a local resident

called about an Indigo Snake under their back porch and our field technician was able to go and catch it. Another local resident called us to report a road-killed Indigo Snake that yielded a tissue sample from an important gap in our genetics sampling. As we ramp up our genetics sampling and expand beyond Highlands County, we are encouraging people to call us if they see a road-killed Indigo Snake or shed skin. Our Florida field technicians are able to respond to those calls and collect the necessary tissue. Finally, anyone can submit an Indigo Snake sighting with a photograph to The Orianne Society at info@oriannesociety.org. In order to confirm a report as a verified Indigo Snake sighting a photograph must be included. These verified sightings will be added to our Orianne Society Indigo Snake database and will also be forwarded to the Florida Fish and Wildlife Conservation Commission (FFWCC).

Recording these verified sightings is important in documenting the status of the Indigo Snake across space and time, which The Orianne Society was able to do in collaboration with FFWCC and Georgia Department of Natural Resources in a recent scientific publication documenting the current status and distribution of the Indigo Snake. Many of the observations used in that publication were submitted by volunteers who submitted verified sightings of Indigo Snakes.

WHAT'S THE FREQUENCY, BETTY?

USING RADIO TELEMETRY TO TRACK EASTERN INDIGO SNAKES IN CENTRAL FLORIDA.

By: Gabriel Diaz

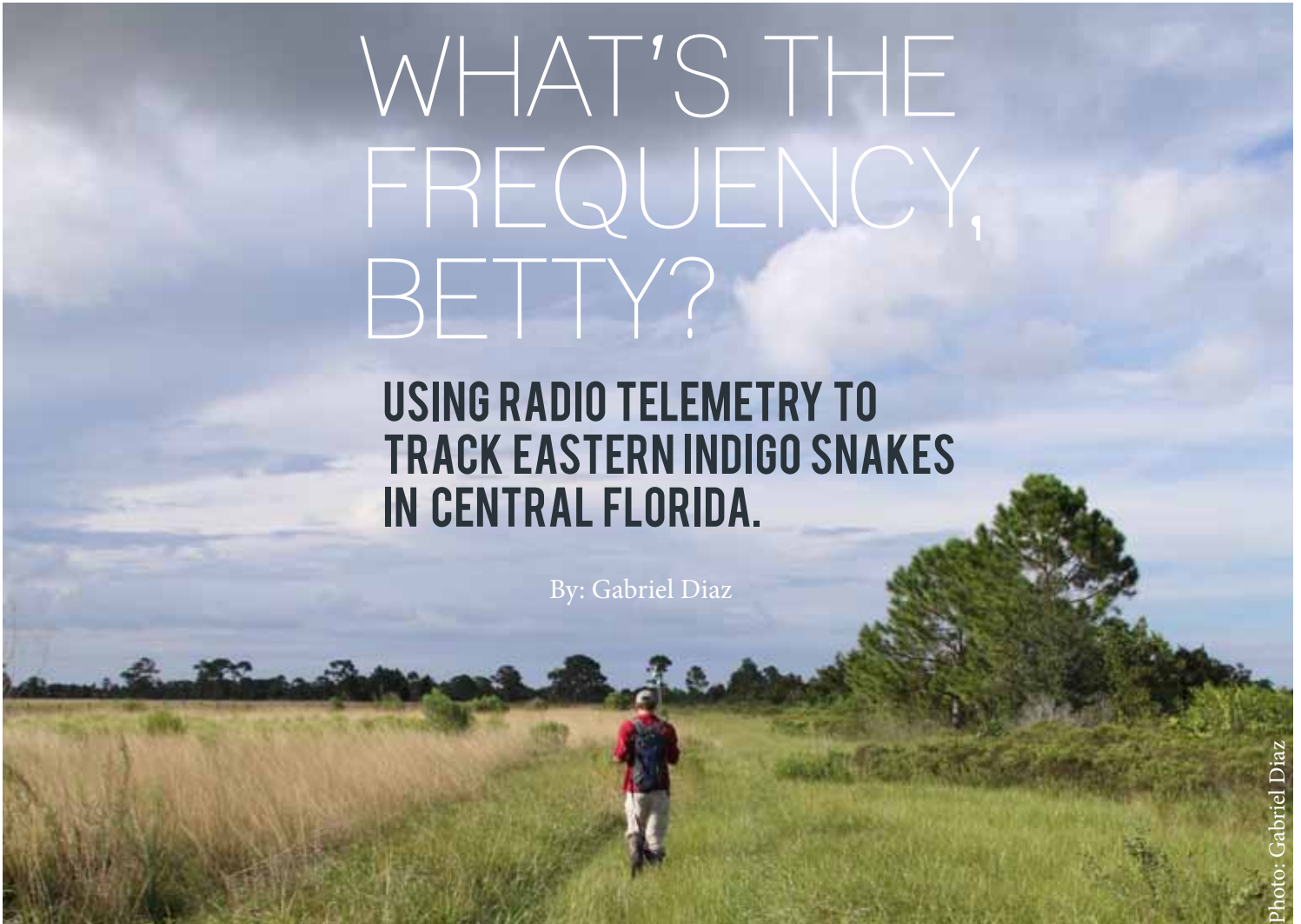


Photo: Gabriel Diaz

A dozen mosquitoes have taken up station in the motel room. Bloodstains like pencil marks streak the walls from previous guests' attempts at playing exterminator. The night air is heavy, almost wet, though it's not raining now. This is southwest central Florida – Lake Placid, more precisely - at the end of summer. Just a few miles away is the Archbold Biological Station, an ecological research institution that serves as a base for The Orianne Society's conservation efforts on one of the South's rarely seen treasures: The Eastern Indigo Snake.

You don't forget your first sighting of an Indigo: On a trail cloudy with bugs some summers ago in the Everglades, a friend and I got a quick look at several feet of purplish blackness darting decisively from one side of the path to the other, pausing at the base of a tree to find its burrow – allowing us enough time to confirm it was an Indigo, and not a big racer. The encounter made all the mosquitoes we unwittingly inhaled that day worthwhile.

Indigo snake territory used to cover most of the Gulf States, from Mississippi to Georgia, most of Florida, and even out -->



Tracking Indigos means following the signal wherever it may lead. Here the author and Lance Paden slosh through brackish water on the trail of a PIT tagged Indigo.

to South Carolina. Its scientific name, *Drymarchon couperi*, suggests it is the “forest ruler,” but now they are only found in Florida and southeastern Georgia. This colubrid is federally listed as threatened in Florida, with most populations occurring throughout the peninsula. The Indigo is good at adapting to various environments in the state, from scrub land and pine flatwoods, to mangrove swamps, to sandhill areas; living in animal burrows, stump holes, or leaf piles. But with habitat fragmentation, road kills, and even illegal collection for the pet trade due to its beauty and docility, the Eastern Indigo has an uncertain future.

In the morning I meet with Lance Paden, resident Indigo field researcher at Archbold. Paden is a recent graduate of the University of North Carolina, landing a seasonal post here with The Orianne Society just out of school. Young, affable, with a contagious love for the outdoors and reptiles, he spends his



Indigos are easy going by nature; they might make puffing noises and flatten themselves to look big and intimidating, but it's mostly a show. They rarely bite people.



days using radio telemetry to find tagged snakes. The Orianne Society surgically inserts passive integrated transponder (PIT) tags, about the size of a grain of rice, in all found Indigos before releasing them back into the areas where they were picked up. I had asked to ride along with Paden

today to find out more about the research and conservation for this rare snake.

The Orianne Society is a young nonprofit, founded in 2008

specifically for the conservation of Indigos. The company is named after Orianne, whose father provided the startup funds for the Society after the young girl held her first Indigo; she told her father he needed to do something

to stop these snakes from going into extinction. Thus the Eastern Indigo Snake Initiative was created. The Society works with other species as well, but its flagship conservation model is the Indigo. It aims to study the species' habitat needs and movements within an individual snake's range – which is surprisingly broad – to help with Orianne's reintroduction efforts. And in Florida, that means sloughing through the wetlands while chasing a radio signal that will, hopefully, lead to spotting a reptile that can be very hard to find – with or without telemetry. I'm introduced to Betty Ford, a temporary resident at the station. She was recently recaptured to get outfitted with

a new PIT tag, and we'll be releasing her this morning on station land. Archbold preserves 5200 acres of Florida scrub land. Paden carefully pulls Betty out of her tank. She's sleepy and a little ornery, but cooperative. Indigos are easygoing by nature; they might make puffing noises and flatten themselves to look big and intimidating, but it's mostly a show. They rarely bite people. Paden points out where the radio transmitter was inserted in Betty as he loads her into a tub. It doesn't look like the surgery was too intrusive, and the snake certainly doesn't seem to notice it. We pile into the truck and head to the southern border of Archbold land. Past a gate, we quickly find a Gopher Tortoise burrow for Betty. Out in the sun, the color of her gunmetal scales is almost magical in its sparkling iridescence. I see now the reddish orange wash on her labial scales, and the deep blackness of her eyes that seem to shelter an ancient knowledge.

Betty is released into the burrow, and she immediately takes up shelter inside. Paden tells me we'll come back later in the afternoon, to see if she's moved out from the burrow. He jots down some notes and we head out again.

We head into the Reserve, another 3650 acres of land recently acquired by Archbold to help protect this distinctive habitat.

Paden jumps out and attaches an



omni-directional antenna to the roof of the truck, and turns the radio on. The telemetry gear has a range of 800 meters, but we're getting a beep right away. That would be Sigma, a male Indigo. We drive deeper into the reserve and the beeps get louder. Paden parks the truck and tells me we're hoofing it from here. He switches the radio to a directional antenna in the bed of the truck, a long handheld wand with several rods attached to it. Paden hops onto the bedrail and points the contraption in different directions until he finds the strongest signal. We take off and are soon in ankle-deep water, trudging through brush and a muddy bottom. It's been a while since I've

been on terrain like this, but I manage to keep up with Paden's mountain goat surefootedness. The signal leads us to the base of a tree. Sigma is underground, maybe in an unseen burrow, or a stump hole. Paden uses the radio pulse rate to determine if a snake is on or under the surface. "I time fifty beats of the transmitter," he explains, "and the cooler the snake is, the longer it takes for fifty beats." Out of the sun, a

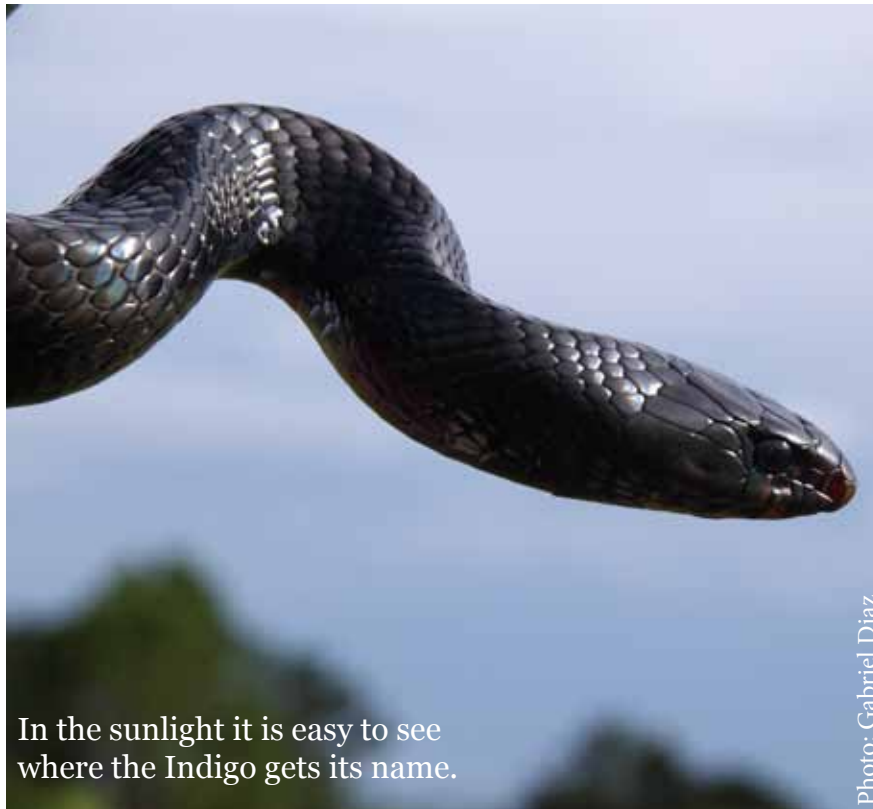
snake's body temperature will remain low. Paden says that if he's getting a signal and he's on hard-packed ground, but he can't find the snake, "You gotta think about it," and really look around; once, he found the transmitter, but no serpent. Then he found the snake skeleton nearby. One

thermometer in the ground for a surface reading, and then holds it up in the shade, then finally out in the sunlight. These readings help make sense of the pulse rate information. When he's done, we slosh our way back to the truck.

There's not much wild land out here. Amidst cattle ranches and citrus groves, Indigos make their way around their home ranges. Paden was surprised to find that some Indigos have a range of a square mile or more. One such snake is Galileo, a big male with a big home.

Galileo has us splashing through some wet farmland, the beeps from the handheld radio getting louder. His signal's close, which means he's close, but the water on the leaves and over most of the ground is bouncing the signal around so Paden can't get a solid

fix. The beeping is loud enough that we figure the scurrying snake has to be right by our feet, and Paden is on his track as Galileo approaches a fence line – and goes under it. The Orianne Society does not have permission to be on that property yet, and Paden knows all the boundaries by heart. The chase is over, and Paden writes in his notebook and takes temperature readings as a brief shower adds sparingly



In the sunlight it is easy to see where the Indigo gets its name.

Photo: Gabriel Diaz

of the Society's wards had become a meal for another critter.

Based on the signal, Paden can tell Sigma is most likely underneath that big mound of leaf litter at our feet. He doesn't need any physical data from the Indigo, so leaves the snake alone and takes some notes after getting some temperature readings. While I admire a Five-lined Skink on a nearby tree trunk, Paden sticks a



to the wetness surrounding us.

The next couple of hours go by easily. Julius, an Indigo named after Mr. Caesar, is found in hog country on other private land. Paden and Javan Bauder, a research ecologist with Orianne that helps organize their Florida projects, secure permission from landowners before chasing a snake through their property. Paden says most are agreeable and sympathetic, though some refuse permission for their own reasons. He tells me that a few would rather not be reminded that snakes exist on their land.

Coasting through a maze of jeep trails, we see a small pig cross the

road a hundred yards ahead, then a 300-pound razorback trounces through the brush after it. Paden and I just look at each other. "That was a big one!" he says.

We push on and find the area where Julius was last found. A short walk and he is located right where Paden left him: an underground area next to a tree. He comes out into the field at least three times a week, and knows his charges well. I keep scanning the woods; our sighting of the big pig some minutes ago has me hyper-aware. I'm used to large alligators and crawling reptiles, not oversized mammals that might come crashing through

the woods at any time. But the only other wild pig we see is on our drive out, and it vanishes like a ghost when we get close.

Paden has had other animal encounters before. While following an Indigo out on a ranch, some of the residents thought it was lunchtime when they saw a human walking out to them. "I got chased by a herd of cattle once," Paden laughs., "about two hundred of them!" He said they must have figured it was feeding time, and went after him when he disappointed them. The cows eventually learned to ignore him after succeeding visits.



The author cradles a regal and very healthy Eastern Indigo in a nice exhibit of the snake's iridescent underbelly.

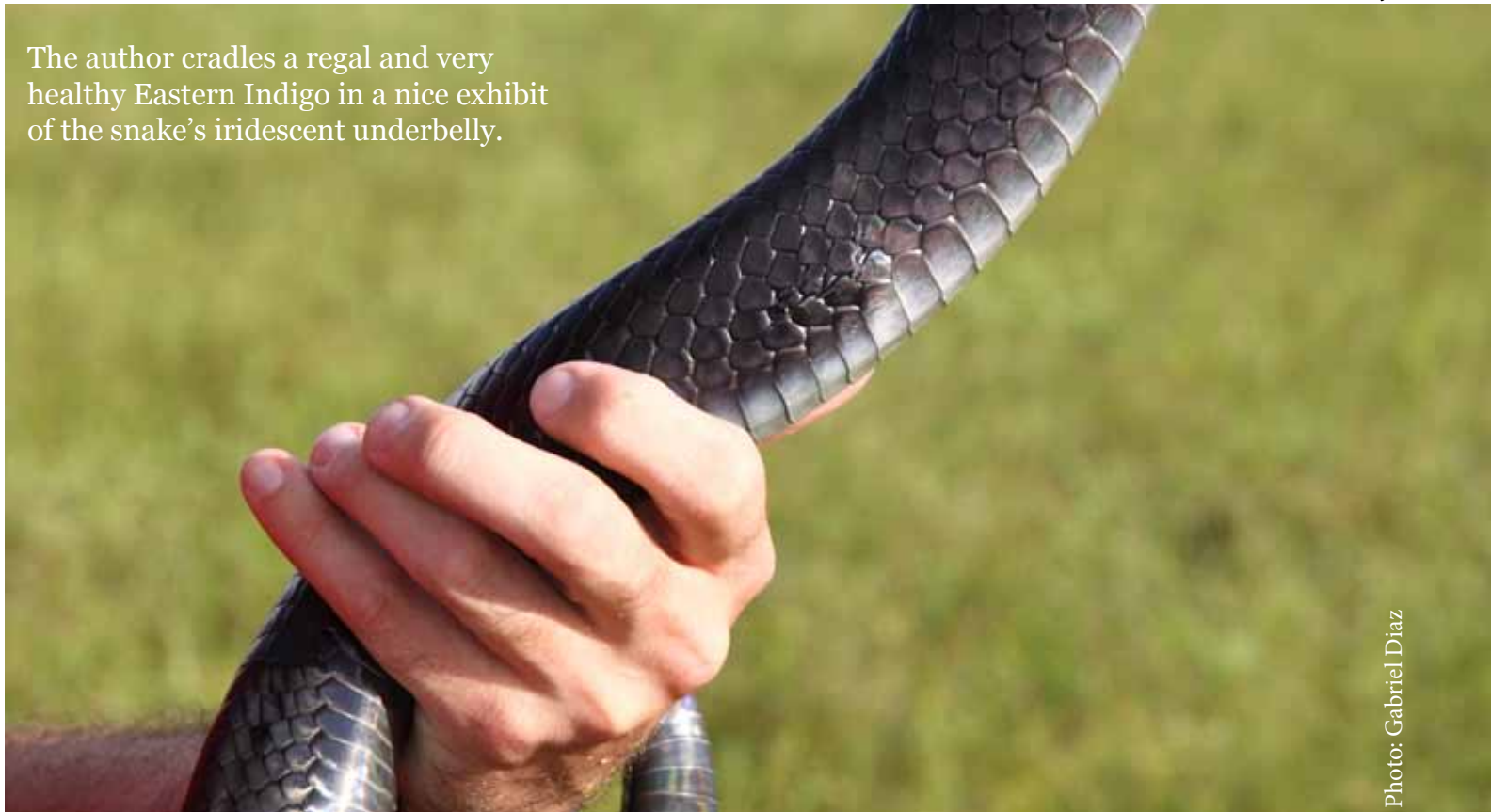


Photo: Gabriel Diaz

Gabriel J. Diaz is a writer and photographer living in south Florida, where he makes the Everglades his home away from home.

backwoods **BLACKWATER**

By Chris Hartmann



ABOVE: The placid Suwannee River in mid-afternoon.

RIGHT: The canoe that the author used to traverse 40 miles of the Suwannee River, which originates in the Okefenokee Swamp, emerging in Fargo, Ga and running south to the Gulf of Mexico.



“We were about to embark on a 40-mile expedition down one of America’s most ancient rivers.”

AS WE MOVED OUR SUPPLIES FROM OUR TRUCK INTO THE CANOE, IT WAS OBVIOUS THAT NOT ALL OF IT WOULD FIT.

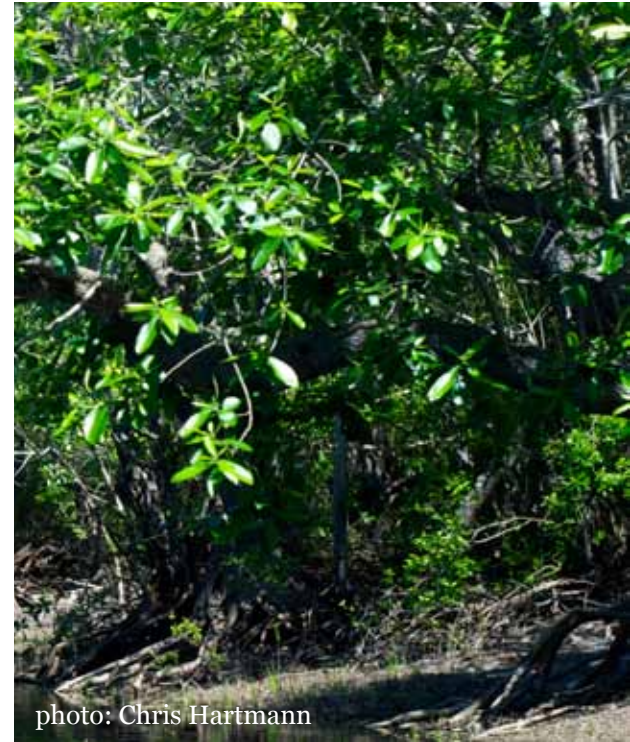


photo: Chris Hartmann



photo: Chris Hartmann

Both Chad and I were accustomed to camping with our truck, which could haul much more than the canoe. We tried our best to get the most important items into the canoe- the things we could not live without such as chairs, a fan for the tent, and a few inflatable mattresses. After stacking the canoe so full of equipment it bobbed dangerously low in the water, we were finally able to make some sacrifices and curtail all of our luxuries. We knew now that this would be a real adventure- not one of those prepackaged “adventures” that came with three meals and a shower every day. We were about to embark on a 40-mile expedition down one of America’s most ancient rivers. We were going to canoe the northern Suwannee River.

We set off from the sill located at the Stephen C. Foster State Park in Georgia. This is a dam-like structure erected to prevent the water levels in the Okefenokee Swamp that feeds the Suwannee from dipping too low. This area is also home to some of the largest gators that I have ever seen. A twelve-foot gator splashing into the dark waters while rounding the river bend became a common sight that was both exhilarating and humbling.

During the first few days of the trip we tried to gain our confidence with the canoe. We bounced from bank to bank until we were finally able to get a grasp of controlling our vessel.

This made for an up-close and perhaps too personal encounter with several large spiders residing in the low hanging branches as we collided with them. Monstrous argiope and huntsman spiders were scraped off the twigs or pulled from their webs as the tower of luggage stacked in our canoe passed through the branches.

Over the next couple of days, we had much more control of the canoe and were able to navigate the narrow channels of tributaries choked with duckweed and shaded by the thick canopy stretching completely across the

canals. The air was thick with mosquitoes but the urge to explore what appeared to be a Jurassic Park movie set was strong enough for us to endure them. Here we dipped a small seine net into the waters and pulled out a beautiful juvenile lesser siren covered with golden-yellow speckles and an impressively sized two-toed amphiuma that slipped out of sight as suddenly as it had appeared.

That night we broke out our flashlights and headlamps to shine the eyes of the gators and see just how many were there. We pushed off at dusk and focused the glow of our flashlights into a tight powerful beam. It did not take long for the telltale red blaze of gator eyes to appear in large numbers. They dotted the black water like stars in the night sky. The beasts were much more tolerant of us than they were during the day and they allowed us to approach surprisingly close. Some of the largest ones would duck under the water as we neared them and produce a powerful push with their tails that would nearly tip the canoe as they swam beneath us.

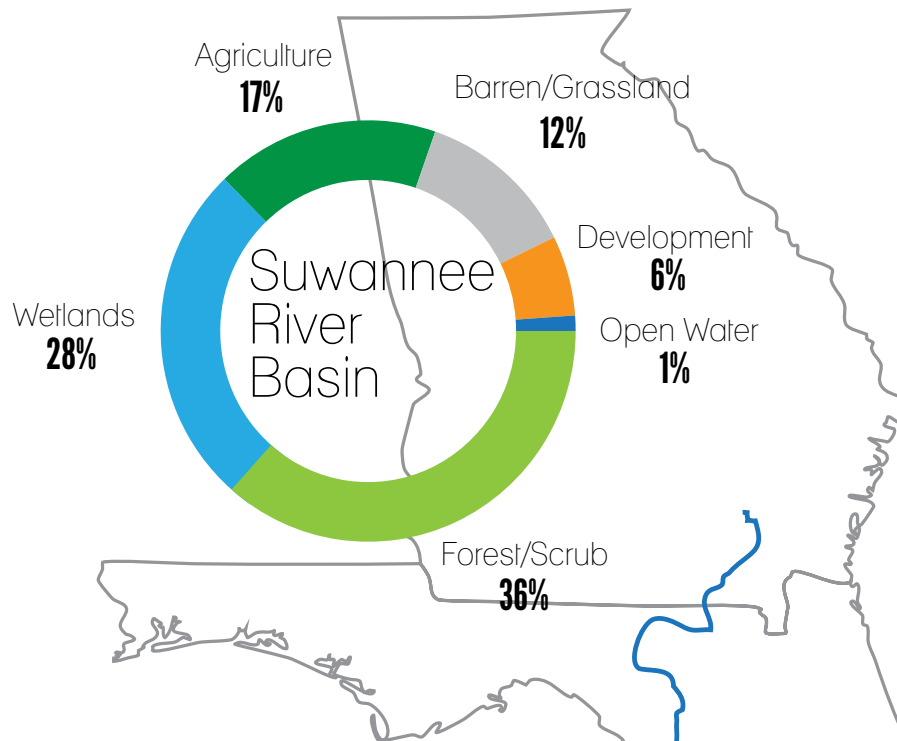
The end of our trip was getting closer and we needed to reach our exit point on the river by the end of the day to keep our schedule. It was during our lunch break on the last day on the river that we discovered we had been

reading the maps incorrectly and were much farther upstream than we had thought. This meant we had to cover twice the distance in a quarter of the time from our

“It did not take long for the telltale red blaze of gator eyes to appear in large numbers.”

previous pace or else we would be stuck on the river another night with little remaining food. By this time, however, we had become expert paddlers and were able to steer the canoe through the shockingly shallow waters that exposed cypress knees and previously submerged trees. There was one stretch so shallow that Chad and I had to exit the canoe and push it through ankle deep waters. The high water mark loomed above our heads printed onto the wide cypress trunks. The shallow waters acted as a filter and grabbed debris from the flow. There were protruding logs covered in aluminum cans, discarded fishing lines, plastic bags, and putrid tangled carcasses of fish that were entwined in the mess. It was clear that the river was suffering.

As we exited the river in the late evening we were ragged and sunburnt. Loading the canoe and gear back onto the truck was one of the most difficult things I have ever done. It was not the physical exhaustion but the thought that by the next time I would have time for a trip like this, the Suwannee would no longer be a wild place. I feared it would become a polluted relic of what once was and the severe drought would only continue to choke the river until it vanished. I can only hope that enough people feel the same connection to this river as do I so we can save it for our future generations.



http://gulfsi.usgs.gov/suwannee/map/images/Suw_lu_web_lg.gif

ABOUT THE AUTHOR:

Chris Hartmann, pictured here, is a young adventurer and photographer whose true love lies with venomous snakes. He is currently working to turn this passion into a career by studying Natural Resource Conservation and Wildlife Ecology at the University of Florida.



photo: Chris Hartmann

MARCH

SPANISH MOSS FESTIVAL

March 2-3
Helena, GA
Little Ocmulgee State Park & Lodge
229.868.7474
<http://www.gastateparks.org/LittleOcmulgee>

CROCODILIAN BIOLOGY AND CAPTIVE MANAGEMENT

March 8-15
St. Augustine, FL
<http://www.aza.org/professional-training/>

ALL-OHIO REPTILE SHOW

March 9
Columbus, OH
Moose Lodge, 1500 Demorest Road
614.457.4433,
www.allohioreptileshows.webs.com

46TH ANNUAL CLAXTON RATTLESNAKE AND WILDLIFE FESTIVAL

March 9-10
Claxton, GA
At the Evans County Wildlife Club Festival Grounds, Claxton, GA <http://www.claxtonevanschamber.com/events/rattlesnakefestival.html>

KENTUCKY REPTILE EXPO

March 9
Bowling Green, KY
Knically Conference Center
606.547.6643
www.kentuckyreptileexpo.com

MICHIGAN REPTILE SHOW

March 9
Taylor, MI 248.629.4304
www.michiganreptileshow.com

ST. LOUIS REPTILE SHOW

March 10
St. Louis, MO
Holiday Inn Southwest 913.400.2876
www.stlreptileshow.com

WILDLIFE DISCOVERY CENTER, REPTILE RAMPAGE

March 10
Lake Forest, IL
City of Lake Forest Recreation Center Gym
www.wildlifediscoverycenter.org

CINCINNATI REPTILE SHOW

March 10
Mason, OH
Kings Island Resort & Conference Center, 513.910.0900
www.cincinnati-reptileshow.com

INDIANA REPTILE BREEDER EXPO

March 17
Richmond, IN
Wayne County Fairgrounds
812.923.7339
www.irbexpo.com

4TH BOX TURTLE CONSERVATION WORKSHOP

March 22-23
North Carolina Zoological Park, Asheville, NC
<http://www.boxturtleconservation.org/registration.html>

EAST COAST REPTILE SUPER EXPO

March 22-24
Reading, PA 610.529.3614
www.eastcoastreptilesuperexpo.com

KALAMAZOO REPTILE & EXOTIC ANIMAL EXPO

March 23
Kalamazoo, MI Expo Center
269.779.9851
www.kalamazooreptileshow.com

GEORGIA REPTILE EXPERIENCE

March 30
Macon, GA
Macon Centreplex, 200 Coliseum Drive
<http://www.gareptilesociety.org/experience>

APRIL

TEXAS REPTILE EXPO

April 6-7
San Antonio, TX
Norris Conference Center at Wonderland Mall 501.562.7311
www.TexasReptileExpos.com

ASSOCIATION OF ZOOS AND AQUARIUMS 2013 MID-YEAR MEETING

April 7-12
Charleston, SC
South Carolina Aquarium, Charleston, SC
www.aza.org/midyearmeeting

REPTICON ATLANTA

April 13-14
Lawrenceville, GA
Gwinnett County Fairground
863.268.4273
www.repticon.com

PITTSBURGH REPTILE SHOW & SALE

April 14
Cheswick PA
Harmar House 724.516.0441
www.pghreptileshow.com

JOINT MEETING OF NORTH CAROLINA PARC AND THE NORTH CAROLINA HERPETOLOGICAL SOCIETY

April 19-21
NC Zoo, Asheboro, NC 336.879.7000
<http://www.nczoo.org/>

EAST COAST REPTILES SUPER EXPO

April 20
Oaks, PA
Greater Philadelphia Expo Center
610.529.3614
www.eastcoastreptilesuperexpos.com

THE ORIANNE SOCIETY AT FERNBANK MUSEUM OF NATURAL HISTORY

April 21
Atlanta, GA
767 Clifton Road NE, Atlanta, GA
404.929.6300
<http://fernbankmuseum.org/>

THE ALABAMA WILDLIFE CENTER HOSTS THE ORIANNE SOCIETY

April 28
Pelham, AL
Oak Mountain State Park
205.663.7930
<http://www.awrc.org>

MAY

CALGARY REPTILE EXPO

May 4-5
Calgary, Alberta, Canada
Genesis Center, 7556 Falcon Ridge
Blvd. N.E. 403.285.0998
www.calgaryreptileexpo.com

SEATTLE METRO REPTILE EXPO

May 11
Renton, WA
Renton Community Center
503.412.8181
www.NWReptileExpos.com

REPTICON ORLANDO

May 11-12
Orlando, FL
Central Florida Fairgrounds
863.268.4273
www.repticon.com

GRADUATE AND PROFESSIONAL COURSE - SPECIES MONITORING AND CONSERVATION: REPTILES

May 13-24
Front Royal, VA
Smithsonian Conservation Biology
Institute

REPTICON SARASOTA

May 18-19
Sarasota, FL
Sahib Shrine 863.268.4273
www.repticon.com

WORLD CROCODILE CONFERENCE

May 20-23
Colombo, Sri Lanka
www.csgrilanka.com

INDIANA REPTILE BREEDERS EXPO

May 26
Richmond, IN
Wayne County Fairgrounds
812.923.7339
www.irbexpo.com

JUNE

REPTICON CENTRAL GEORGIA

June 1-2
Perry, GA
Georgia National Fairgrounds
863.268.4273
www.repticon.com

WEST TEXAS HERPATHON

June 7-9
Sanderson, TX
<http://snakedays.com/>

REPTICON TAMPA

June 8-9
Tampa, FL
Florida State Fairgrounds
863.268.4273
www.repticon.com

REPTICON CHATTANOOGA

June 15-16
East Ridge, TN
Camp Jordan Arena 863.268.4273
www.repticon.com

EAST COAST REPTILES SUPER EXPO

June 22
Oaks, PA
Greater Philadelphia Expo Center
610.529.3614
www.eastcoastreptilesuperexpos.com

PITTSBURGH REPTILE SHOW & SALE

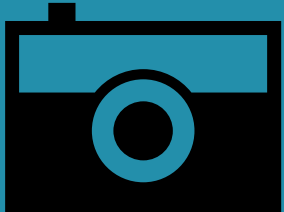
June 23
Cheswick PA
Harmar House 724.516.0441
www.pghreptileshow.com

REPTICON CHICAGOLAND

June 29-30
St Charles, IL
Kane County Fairgrounds
863.268.4273
www.repticon.com



= The Orianne Society
will be participating



FIELD PHOTOS



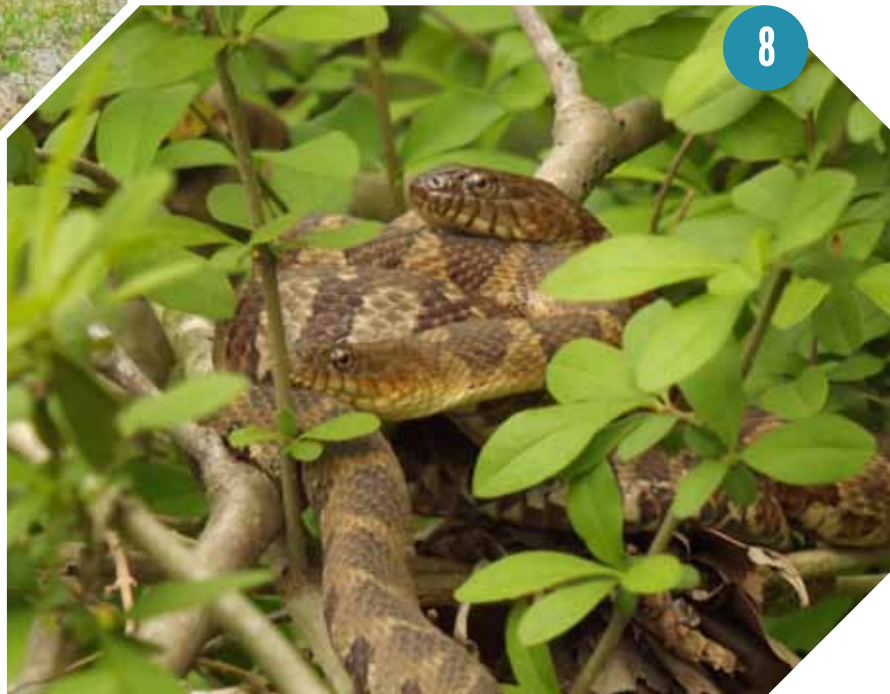
5



7



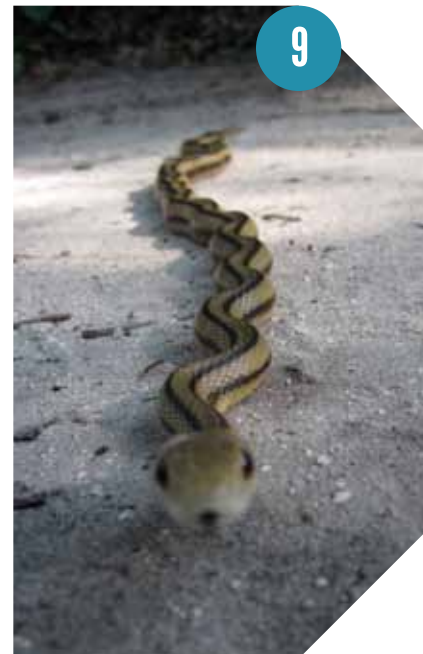
8



1. **BRITTANY BROWN**
Eastern Diamondback Rattlesnake
2. **NOAH FIELDS**
Cornsnake
3. **GREG GRAZIANI**
Eastern Coral Snake
4. **MATT MOORE**
Rough Green Snake
5. **BILL LOVE**
Southern Black Racer

6. **ZEBULON HOOVER**
Pigmy Rattlesnake
7. **ALLISON VOLEK SHELTON**
Garter Snake
8. **ZACH TRUELOCK**
Common Watersnake
9. **ELLEN GRAY**
Yellow Rat Snake

9



6



ON BEING A MEMBER: ROB COLE



Rob meeting a new friend.

“

I owe it to Opal, the Eastern Indigo I bought from a pet shop in the 1970s

”

The Eastern Indigo is the United States' marquee snake – a magnificent reptile with the size, temperament, and visual appeal to make it America's darling among snakes, if a snake could ever achieve such designation. It comes as no surprise that over-collection was one of the factors contributing to the decline of Eastern Indigos across their range; as a youth I purchased a pre-Act Eastern Indigo from a local Illinois pet shop. Yep, I contributed to their decline through that early 1970's purchase.

That Eastern Indigo was the first of many snakes I would keep over the following decades. While it was the first snake I was able to keep, it was not my first venture into the world of reptiles and amphibians. Ever since I was about five, my parents would send me down to west central Kentucky each summer. As a youth, there was not a lot to do apart from hunt, fish, and go field herping. At first, I'd simply look around the house for lizards – mostly fence lizards and various skinks, but I'd also encounter snakes. My grandmother would caution, "Don't go down by that barn, Robbie, there's Copper-

heads down there”, referring to an old barn that had started to lean with age and had dropped sheets of rusted tin around its perimeter. Of course, once I started flipping tin and old car hoods, it didn’t take long to find that Copperhead my grandmother warned me of – what a rush for a ten year-old. I bagged it and brought it up to the house. Suffice it to say that my grandmother was not pleased.

Have any of you ever met the unfriendly end of a switch?

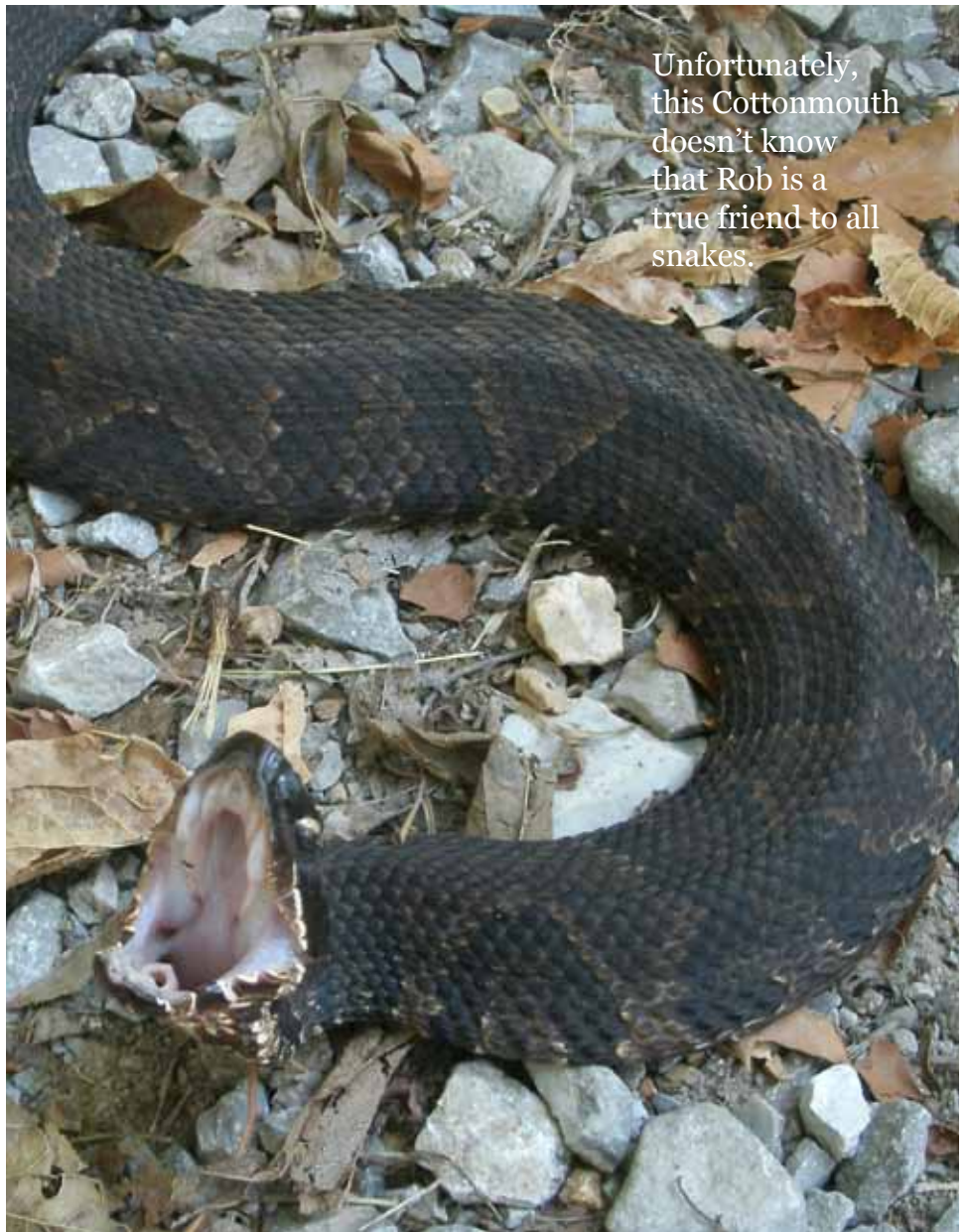
Importantly, it has been decades since I have field collected – not because I fear the switch, but because I recognize the impacts of field collecting on wild populations and the lack of necessity for field collecting given widespread availability of captive born snakes. My only captures are on film. My burning interest in snakes began in the fields, woods, and bluffs of western Kentucky and that fire has never been extinguished.

Personally and professionally, I am a conservation ally and environmental advocate. Although I pursued a degree in wildlife biology, I do not work in the field. I’m presently an assistant city manager in a community of over 50,000 residents where, among other duties, I oversee the community’s sustainability initiatives. I also serve as the environmental policy chair for the Chicago Chapter of the Surfrider Foundation. I choose environmentally-oriented memberships carefully.

I chose to become an Orianne Society member because I value the important work they are doing, and because I owe it to Opal, the Eastern Indigo I bought from a pet shop in the 1970s not knowing at the time the impact that decision was having on the long-term viability of Eastern Indigos in the place they belong – wild and free in the southeastern United States.

A debt of gratitude is owed to those working hard each day to aid in Eastern Indigo conservation and recovery, and my hat is tipped to each of you.

Unfortunately, this Cottonmouth doesn’t know that Rob is a true friend to all snakes.



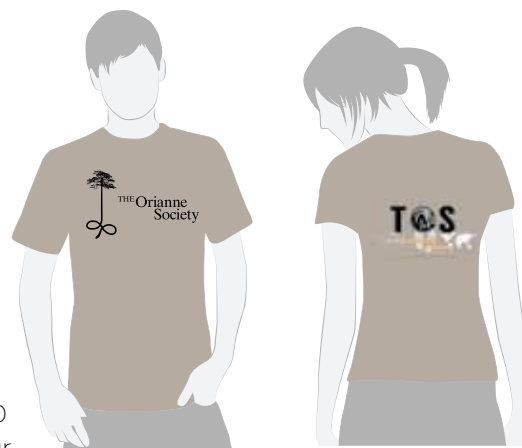
note: Rob Cole was the very first member to join The Orianne Society. It is members like Rob who make our work possible. Thank you. Together we can save snakes and their habitats.

Saving imperiled
SNAKE SPECIES
with a
comprehensive
approach to
CONSERVATION
is only possible
with
YOUR HELP

From captive propagation to land preservation to leading scientific research, The Orianne Society leaves no stone unturned in our mission to save the Eastern Indigo Snake and other imperiled snake species around the world. We can employ this aggressive approach only with the support of our members-- who not only supply much-needed financial support, but also inspire us everyday with their commitment to snake conservation. If you are not yet a member consider joining today. If you are already a member here are some other ways you can be a part of saving these amazing animals -->

Gift Membership

A membership to The Orianne Society makes a great gift for anyone who is passionate about snake conservation and their ecosystems. Select our membership plus t-shirt package and not only will the recipient get the usual member benefits, but will also be able to promote snake conservation with this handsome Orianne Society T-shirt.



Member and T-shirt package starts at \$65 dollars. Visit: www.oriannesociety.org/give-gift

Adopt an Indigo

Our Adopt an Animal program supports an Eastern Indigo for an entire year and comes with other benefits, such as an adoption certificate and automatic Orianne Society Membership. But the biggest benefit is knowing you raised an Indigo that will be released into the wild so that this species remains the Emperor of the Forest for many generations to come.

Visit: www.oriannesociety.org/adopt-indigo

provide one year of



**SUPPORT FOR THE
EMPEROR OF THE FOREST**

Connect with Us



Yes, social media may be responsible for the the expotential growth in silly cat videos, but it can also be a force for good. The Orianne Society's social media is a great way to connect with our work and other like-minded snake conservationists, and to spread the word about the important role snakes play in our ecosystems. Connect with us on Facebook or Twitter to get the latest snake conservation news, share photos of your latest herp adventure, or add your voice to the conversation.

Visit: www.facebook.com/oriannesociety

A Southern Hognose snake (Heterodon simus) is shown on a sandy surface. The snake has a pattern of dark, irregular bands and spots on its back and sides, with a lighter, yellowish-orange underbelly. Its head is raised, and its mouth is slightly open, revealing a pinkish interior. The background is a uniform, light-colored sand.

.....

Southern **HOGNOSE**

Heterodon simus

.....

INDIGO
magazine

photo: TJ Hilliard