High Snake Diversity Means a Healthy Environment

by Whit Gibbons, University of Georgia, Savannah River Ecology Laboratory

Could snakes serve as touchstones to healthy habitats? Some people’s immediate response might be, “Who wants snakes?”

Despite less than charitable attitudes toward some top-of-the-food-chain predators such as snakes, their absence means that all is not right with the natural world. When many tropical or warm temperate zone ecosystems are operating normally, snakes are present. When they are not around, the biodiversity is anemic.

How can snakes be indicators of a healthy environment? In natural ecosystems, the presence of top-level carnivores, the meat eaters, indicates that the herbivores, the plant eaters, are doing well. The presence of herbivores, in turn, denotes that the plant life is functioning as it should.

No snakes eat plants. All are carnivores. Because snakes vary widely in their dietary preferences, the presence of a wide assortment of snake species in most regions of the United States indicates that the food web is sufficiently diverse.

The term “balance of nature” is sometimes used in discussions involving the dependence of some species on others. But the term is overused, misused, and usually is ecologically meaningless, so I will not refer to anything having to do with the balance of nature. Food webs and food chains, however, are tangible, identifiable entities more appropriate for considering the relationships between top predators and their food sources.

A food web refers to the complexity of feeding patterns among organisms, the pathways that energy takes as it passes through the ecosystem—sun to plant to herbivore (prey) to carnivore (predator). Thus, animals eat plants and each other in a bewildering array of patterns.

A food chain is the path of energy flow through a specific part of an ecosystem. Thus, a sweet clover plant captures the sun’s energy, which is stored in the plant in the form of calories. Meanwhile, a harvest mouse eats the seeds, and the calories are passed on. The food chain is lengthened when a rat snake eats the mouse. The rat snake could fall victim to a kingsnake or hawk, but in simplest terms, the rat snake sits at the top of a food chain—plant to herbivore to carnivore.

But predators would be unable to persist without prey, which would not be around without the plants. So, the very fact that a predator is present means that lower links in the food chain are operating properly.

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Free! February Photo Contest Calendar

Valentine’s Day: it’s not just for humans. Pacific Gopher Snakes (Pituophis catenifer catenifer) need love, too. February’s photo contest winner Jim Coleman captured the moment for some of our common backyard friends on this month’s calendar. Download the February calendar to get a better look at the winner and the fascinating runner-up at http://parcplace.org/images/stories/YOS/YearoftheSnakeCalendarFebruary.pdf.

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

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

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

Year of the Snake Stamps!

New Zealand (left) and—not surprisingly—China (below) are celebrating the Chinese Year of the Snake with specially issued stamps.
Year of the Snake Planning Partners

**Partners for Amphibian and Reptile Conservation (PARC)**
www.parcplace.org

PARC is a diverse and inclusive network of like-minded citizens, professionals, and organizations dedicated to herpetofaunal conservation. We aim to connect and complement local, regional, and national efforts to achieve our mission: to conserve amphibians, reptiles and their habitats as integral parts of our ecosystem and culture through proactive and coordinated public/private partnerships.

**The Orianne Society**
 www.oriannesociety.org

The Orianne Society is a 501(c)3 nonprofit organization dedicated to the conservation of imperiled snakes, an important group of wildlife that is largely overlooked and for which conservation is underfunded. The Orianne Society has used a multifaceted approach, including a Land Management and Protection Program, a Captive Breeding and Reintroduction Program, an applied Conservation Science Program, and an Education Outreach Program all aimed towards conserving flagship snake species across the United States and abroad. The society uses science to inform its on-the-ground conservation work, to monitor species populations and to measure the impact our efforts are having on the conservation of these species and their habitats.

**The Center for Snake Conservation (CSC)**
www.snakeconservation.org

The Center for Snake Conservation is a 501(c)(3) nonprofit organization dedicated to the conservation of all snakes. The CSC’s mission is “to promote the conservation of snakes and their natural ecosystems and implement positive change in human attitudes towards snakes.” The Center for Snake Conservation implements understanding and proactive solutions to snake education, conflict/issue management and resolution, and the balance between the requirements of snakes and the needs of humans in our developing world.

**The Amphibian and Reptile Conservancy (ARC)**
http://amphibianandreptileconservancy.org/

The Amphibian and Reptile Conservancy is a not-for-profit 501(c)(3) charitable organization that supports conservation of amphibians and reptiles. Our mission is to promote amphibian and reptile conservation, as well as efforts that support the mission of Partners in Amphibian and Reptile Conservation (PARC) and their goals.

**Viper Specialist Group (VSG)**
www.oriannesociety.org/iucn-viper-specialist-group

The VSG is an International Union for Conservation of Nature (IUCN) Species Specialist Group that acts as a global voice for viper conservation. Administered by officers and regional coordinators, the VSG uses a network of viper experts from across the world to research the needs for vipers and develop status assessments and conservation action plans for viper species.

Our growing list of Collaborating Partners will be featured in the March newsletter and future issues. If you are interested in contributing to the Year of the Snake efforts, please send an email to parcyearofthesnake@gmail.com with a brief description of your organization and its efforts. Our full list of partners can be found at: http://www.parcplace.org/news-a-events/2013-year-of-the-snake/271.html.
High Snake Diversity, continued from p. 1

Some animals, including some snakes, are dietary specialists, eating primarily one or a few select prey species. For example, hognose snakes do not normally eat mice but instead are restricted to a near-exclusive diet of toads. Adult mud snakes eat primarily large salamanders, and tiny crowned snakes eat centipedes. The prey of snakes may even be predators themselves, making for a longer food chain. Thus, toads require insects, giant salamanders eat crawfish, and centipedes use their pinchers to capture small soil invertebrates for food.

In some regions, where suitable habitats are available, all the snakes mentioned above might be found within a few feet of each other. Their collective presence in the ecosystem indicates that a healthy lower-level food base exists in the form of plants and prey. So, if all the snakes characteristic of a region are around and doing fine, we can have greater confidence that a properly functioning habitat is available to support them. Of course, the environment may suffer from other problems, but having a robust food web in operation is essential.

But if the snakes are missing, we should begin to question what else might be absent. Are hognose snakes missing because no toads are to be found? Are the toads absent because of an insufficient supply of insects? Has something happened at the lower levels, resulting in a problem that is expressed at the top of the food chain? When something goes wrong at the bottom of a food chain, an environmental cascade can result that would not necessarily be apparent by simply looking at the landscape.

So, the discovery of a rich biodiversity of native snakes in a region should be viewed as a positive sign. You may not be fond of snakes, but when they are not found where they are supposed to be you may dislike the deeper-lying environmental problems even more.

Whit Gibbons is a research ecologist and environmental educator with the University of Georgia’s Savannah River Ecology Laboratory in Aiken, SC. He is an author of several books on ecology, reptiles, and amphibians.

Website: http://whitgibbons.com/
Books: http://whitgibbons.com/library.php

Submit Your Citizen Science Projects

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

Have a Question? Ask the Experts!

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

Follow all of the Year of the Snake news and happenings on Facebook (http://www.facebook.com/YearOfTheSnake2013) and Twitter (@yearofsnake2013).
Counting Snake Biodiversity – Early Successes of the Center for Snake Conservation Snake Count

Cameron A. Young – Center for Snake Conservation

Despite recent increases in knowledge about the roles snakes play in natural ecosystems, scientists and land managers lack current distributional data for snake populations. Without these data, conservation efforts for snakes are difficult, if not impossible, to apply. The Center for Snake Conservation’s Snake Count is a citizen science project being used to map and track patterns of snake distribution and abundance across North America. The Snake Count is modeled after similar and extremely successful citizen science programs such as the Christmas Bird Count and Breeding Bird Surveys. It occurs twice each year to record a snapshot of snake distribution during the snake breeding season for many species (May) and when hatchling or just-born snakes are abundant (September). The Snake Count is a great opportunity for everyday “citizens” to be directly involved in snake conservation.

One of the challenges faced by citizen science programs for snakes is that even though biodiversity is high in parts of North America, snake detection and identification can be very difficult, which may reduce confidence and overall effectiveness of the Snake Count. However, despite these challenges, citizen scientists are essential for the success of snake conservation programs throughout the world. The following are examples from the 2011 and 2012 Snake Counts which highlight the successes “citizens” brought to the Snake Count.

Rare Snakes – The Snake Count has been extremely successful in documenting some of the rarest snakes in North America. Two Texas Indigo Snakes (Drymarchon melanurus erebennus) and a Chihuahuan Hooked-nosed Snake (Gyalopion canum) turned up in Texas. Several Mole Kingsnakes (Lampropeltis calligaster rhombomaculata) have turned up throughout the southeastern US. Relatively common, but seldom seen, a Rubber Boa (Charina bottae) was documented in Washington state. An Eastern Milksnake (Lampropeltis triangulum triangulum) was found and recorded in Rhode Island. A Black Pinesnake (Pituophis melanoleucus lodingi), one of the rarest species in the region, was recorded in southeastern Alabama in an area not currently protected.

Common Snakes – Over 100 Eastern Gartersnakes (Thamnophis sirtalis sirtalis) have been recorded in 15 states throughout their range. Five of the 11 subspecies of the racer (Coluber constrictor) have been documented during the Snake Counts. Ten different species of rattlesnakes have been spotted during Snake Counts. Over 120 Northern Watersnakes (Nerodia sipedon sipedon), 60 Diamond-backed Watersnakes (Nerodia rhombifer), and 40 Brown Watersnakes (Nerodia taxispilota) were recorded in 2012 alone!
Problem Snakes – Both a Ball Python (*Python regius*) and a Burmese Python (*Python molurus bivittatus*) were recorded during the 2012 Snake Count in Florida. As we are all aware, these exotic species are of conservation concern not because of the risk of extinction but for the changes they may bring to our ecosystems.

Despite the cryptic and reclusive nature of many snake species, the Snake Count has been widely successful. However, correct identification of reported snakes remains a challenge. For example, highly experienced herpetologists disagree on the identification of a watersnake photographed in Illinois and it still does not have a positive ID. Morphological characteristics of this snake suggest that it is a Mississippi Green Watersnake (*Nerodia cyclopion*) but “in the field” experience where it was found would suggest a Diamond-backed Watersnake (*Nerodia rhombifer*). Either way, it has brought attention to snakes in a positive way, but also points out the critical need for current distribution maps for all species of snakes.

The Center for Snake Conservation’s Snake Count occurs in May and September each year and has been wildly successful since its initiation in 2011. Over 2,500 snakes have been recorded in 40 states in just three counts thus far. The goal during the Snake Count is to establish baseline data on snake biodiversity and abundance so we can implement conservation measures in areas with the highest need. Citizen science projects like the Snake Count can be extremely powerful tools for conservation efforts because they harness the power of the public to gather far more data than is possible in formal scientific studies. As the Snake Count continues to grow, we anticipate partnering and sharing data with land and resource managers across the globe to ensure snakes remain in our ecosystems.

Snake Myths

Myth: Milksnakes Drink Milk from Cows at Night

Fact: Milksnakes got their name from the folktale that they could drain a cow of milk. Such tales are completely false. While it is true the milksnakes may be found in barns where cows are kept, the snakes are likely eating rodents, which actually helps the farmer. Snakes are carnivores! Not convinced? Consider these facts: Cow udders are tender—no bovine is going to stand still while a snake chews on it. Snakes drink by immersing their mouths or heads in water and sucking in fluid by expanding the body wall. Snakes drink only a little—they could never drink the gallons of milk it would take to drain a cow.

Artwork courtesy of The Wilderness Center
At this stage of development I mostly hunted box turtles in blackberry patches. When a snake was found, I ran home and Dad was gathered to help with “the catch”. He often took me fishing—of course, I usually wandered off with the net to try and catch Bullfrogs and Painted Turtles. On one of these angling adventures, I had, in field-herping-speak, what one might refer to as a life-changing epiphany. A very large section of plywood rested flat on the ground beneath the oaks on the grassy slope above the clear freshwater where Dad boated, 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, shiny-black, and beautiful five-foot ratsnakes that lay coiled together in an earthen cell under the board. I haven’t walked past a board, log, or rock since without wondering what lies beneath!

What is your current role in snake research and conservation?

As a field herpetologist with The Orianne Society, I monitor south Georgia populations of the federally threatened Eastern Indigo Snake (*Drymarchon couperi*). Also, I assist with field studies of the Gopher Tortoise and Eastern Diamondback Rattlesnake. I author popular articles relating to snake ecology and conservation. As do many herpers and snake biologists, I enjoy photographing herps in their natural habitats.

Tell us a little about the snake diversity in the Southeastern United States.

Impressive. In fact, very darn impressive! Over 40 species of snakes are native to Georgia alone, from small, sand-swimming species that eat centipedes (Southeastern Crowned Snake) or reptile eggs (Scarlet Snake) to five-to-six foot long, cryptic-patterned vipers that are among the most highly advanced snakes on Earth (Timber Rattlesnake, Eastern Diamondback Rattlesnake). There are sandhill/pine flatwoods/swamp landscapes sites in the Coastal Plain of the southeastern United States where one may encounter two dozen different species of snakes within a rather limited area.

How does that compare with other regions?

The snake fauna of the arid southwestern U.S. and adjacent Mexico is also remarkably diverse. Of course, very few of the same snake species are common to both regions (i.e., SE US and SW US). Pound for pound, the neotropical biomes of Latin America don’t necessarily support a higher biomass of snakes than do many areas of North America,
although in some regions (e.g., Peruvian Amazon) the snake diversity (ca. 80 species) is off the charts.

What do you believe is the biggest threat facing snakes in the 21st century?

Habitat loss and degradation, with future climate change most likely exacerbating these problems.

How can the public help in the conservation of snakes?

Participate in any and all snake conservation-related activities. Work to help educate folks who are poorly informed—about the importance, beauty and diversity of snakes.

What advice would you give to young people or adults who love snakes and want to work with them?

Read and experience all that you can, travel, seek out experienced folks who are able to spend time with you and foster your interest. And, for Pete's sake, get out in the field and see some critters. Life, snakes, and nature are best appreciated in the field, not on a screen!

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**Snake Destinations – Chiricahua Mountains**

*Cameron A. Young – Center for Snake Conservation*

The holy grail of rattlesnake diversity can be found in the desert mountains and valleys in New Mexico, Arizona, and northern Mexico. Snake enthusiasts travel from all over the world to see some of the unique species that survive in the harsh desert and mountains of the regions. During the monsoon season, it is not uncommon to run into someone from as far away as Europe scouring the roads and hills for snakes. One prime destination is the Chiricahua Mountain range in Cochise County, Arizona. The Chiricahua Mountains are part of the Basin and Range Province and are mostly within the boundaries of the Coronado National Forest, so there are plenty of public lands to explore.

Over 30 species of snakes occur in the Chiricahua Mountains and surrounding valleys! Many of these are absolutely stunning, must-see snakes for any herper's lifelist. The late summer monsoon season (mid July through September) is the best time to visit the Chiricahua Mountains to see snakes. You may not sleep as you track down Red Coachwhips (*Coluber flagellum princeps*), Big Bend Patch-nosed Snakes (*Salvadora hexalepis deserticola*), and Western Black-necked Gartersnakes (*Thamnophis crytopsis*) during the day, and then stay up all night looking for Chihuahuan Hook-nosed Snakes (*Gyalopion canum*), Variable Groundsnakes (*Sonora semiannulata*), and Sonoran Lyresnakes (*Trimorphodon lambda*). In addition, everywhere you go, you may find rattlesnakes on the crawl. The area has Mohave (*Crotalus scutulatus*), Black-tailed (*Crotalus molossus*), and Western Diamond-backed Rattlesnakes (*Crotalus atrox*) as well as three of the four rattlesnake species with either state or federal protections. These include the Desert Massasauga (*Sistrurus catenatus edwardsii*), Twin-spotted Rattlesnake (*Crotalus pricei*), and Banded Rock Rattlesnake (*Crotalus lepidus klauberi*). If you head just a bit further south, you may find two additional rattlesnake species: the Tiger Rattlesnake (*Crotalus tigris*) and the federally threatened New Mexico
Ridge-nosed Rattlesnake (*Crotalus willardi obscurus*). Don’t forget to keep your eyes open for the Sonoran Coralsnake (*Micruroides euryxanthus*), as these can turn up almost anytime.

The Chiricahua Mountains are very remote, so please plan accordingly by carrying lots of water and some extra food during hikes just in case you get turned around and delayed when heading back to the car. Fees are required in some parts of the Coronado National Forest; remember to do your research before you leave home. Also, a valid Arizona hunting license is required for the “taking” of reptiles in Arizona, so be sure to pick up a license before you head out into the field.*

Once you have explored the Chiricahua Mountains, you will find yourself coming back again and again, or visiting the other mountain ranges in the region.

*For more information, see: [http://www.azgfd.gov/pdfs/h_f/regulations/ReptileAmphibian.pdf](http://www.azgfd.gov/pdfs/h_f/regulations/ReptileAmphibian.pdf).*

South Florida Rainbow Snake Expedition

The Center for Snake Conservation (CSC) led an expedition to rediscover the South Florida Rainbow Snake (*Farancia erytrogramma seminola*) in early December 2012. A large group of volunteers descended upon Fisheating Creek (FEC), Florida to search and trap for the elusive but beautiful snake. Despite spending more than 600 man hours both day and night in the creek, no rainbow snakes were found. The South Florida Rainbow Snake was last officially documented at FEC in 1952, and it was declared extinct by the U.S. Fish and Wildlife Service (USFWS) in October 2011. However, there have been numerous credible sightings over the last 30 years, leading the CSC and its partners to believe it still exists in FEC today. Partners for the CSC’s South Florida Rainbow Snake search include the USFWS, Florida Fish and Wildlife Conservation Commission, and the Center for Biological Diversity. To learn more, please visit [www.erytrogramma.snakeconservation.org](http://www.erytrogramma.snakeconservation.org).
Submit Your Snake Art, Stories, and Poetry

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

Are You an Educator or Interpretive Naturalist?

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

You Can Participate!

Upcoming Meetings & Events

Orianne Society at Southeast Wildlife Expo, February 15-17, Charleston, SC
Southeast PARC Annual Meeting, February 21-24, Hickory Knob State Park, McCormick, SC
North Carolina PARC and the North Carolina Herpetological Society, April 19-21, Joint meeting, NC Zoo, Asheboro, NC
Graduate and Professional Course - Species Monitoring and Conservation: Reptiles, May 13-24, Smithsonian Conservation Biology Institute, Front Royal, VA
2013 Spring Snake Count, May 18-27, Center for Snake Conservation. For more information please visit www.snakecount.org.

Submit your Articles for Consideration in The Year of the Snake News

We would like to hear about your research projects (local, national, and abroad), citizen science efforts, school projects, folklore, natural area conservation proposals, snake luminaries (people or animals that have been shining stars in your life), or other topics related to snakes.

Please include these components:
1) Title
2) Author name, affiliation, location
3) Text: ~400 words will fill one page, a nice size to consider. Shorter and longer articles are fine. It is an electronic newsletter, after all!
4) 1-2 photographs or graphics (with captions and photographer recognition; sometimes we can use more than 2) per page: 300+ dpi resolution, jpg or tiff.

Themes of the upcoming monthly newsletters include: the value of snakes; venomous snakes; invasive snakes; snakes of narrow habitats; aquatic snakes; conservation efforts; international snake conservation; captive breeding & reintroduction; and regulation, trade & commerce. Any snake-related topic is welcome.

Submit your potential articles or any questions pertaining to contributing via email to parcyearofthesnake@gmail.com.