Looking After Lizards: The States’ Role

In the United States, the State Fish and Wildlife Conservation Agencies are charged with managing all fish and wildlife, including lizards. They play a vital role in managing lizard populations in the wild, including for various human uses, such as for pets, or for scientific study, and in protecting rare and threatened lizards in the United States. In 2005, all State Fish and Wildlife Agencies completed State Wildlife Action Plans to help assess the status of their wildlife and to develop specific actions to help keep common species common (see www.teaming.com/state-wildlife-action-plans-swaps to learn more about your state’s goals). In these, they identified “species of greatest conservation need” and in several states, lizard species were part of this list. As a result of these plans and State Wildlife Grant funding, and with many partners, lizards are receiving more conservation attention than ever before in many of these agencies.

In this newsletter issue we feature some of the research, conservation, and management work that is being done across the United States, highlighting State Fish and Wildlife Agency projects. We hope the stories of this ongoing work inspire you to learn more about the native lizards in your neighborhood, and the lizard and other wildlife conservation efforts in your state.

—Priya Nanjappa, PARC State Agencies Coordinator

A Love Affair with Horny Toads – Use of Citizen Scientists to Detect Past and Current Trends in Horned Lizard Populations in Texas

Since 1997, Texas Parks and Wildlife Department has recruited citizen scientists to assist in assessing the status of and trends in horned lizard populations across the state. In the first 15 years of Texas Horned Lizard Watch over 230 volunteers submitted data forms from 180 of 254 counties in the state. These data were

continued on p. 4

Look for Issue No. 4 of Year of the Lizard News in July!

“Precisely the least, the softest, lightest, a lizard’s rustling, a breath, a flash, a moment - a little makes the way of the best happiness.”
Friedrich Nietzsche (German classical scholar, philosopher and critic of culture, 1844-1900)
Get Your May Photo Contest Calendar

Though it could just as easily have been named the Stained Glass Skink, the May Photo Contest Calendar winner, a denizen of Omani deserts, is a Desert Sandfish photographed by Todd Pierson. Get a closer look at this beautiful little lizard and our runner-up when you download your monthly calendar from http://parcplace.org/images/stories/YOT/YearoftheLizardCalendarMay.pdf.

Call for Photos for the 2012 Year of the Lizard Calendar Photo Contest

We are seeking close-up, digital photos of lizards, 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 Lizard 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 Lizard monthly newsletter and website as well as other Year of the Lizard related conservation, outreach, and educational efforts. Give us your best shot! For more information and for entry details, please visit http://www.parcplace.org/images/stories/YOT/YOLphotocontest.pdf.

Ask the Experts

Anthony Yeung, Director of our partner group Hong Kong Herpetology Foundation, asked:

What is the most endangered lizard species in the world?

Eric Pianka, University of Texas at Austin, answers:

Probably some of the Guatemalan Abronia (Arboreal Alligator Lizards).

Three highly vulnerable Guatemalan species are A. frosti, A. meledona, and A. campbelli (Campbell, pers. comm.). Because of their small population sizes and limited geographic ranges in areas grossly overpopulated with humans, many Abronia are literally “dead man walking” species that will go extinct during our lifetimes (Campbell and Frost 1993). Sadly, some species of Abronia likely went extinct in southern Guatemala and adjacent El Salvador due to habitat destruction even before they were officially described by biologists (Campbell and Frost 1993).


See Dr. Pianka’s work featured in NOVA’s Lizard Kings: www.pbs.org/wgbh/nova/nature/lizard-kings.html

Conservation efforts for Guatemalan Abronia were highlighted in the March issue of Year of the Lizard News in the Project Abronia segment of the article on the Alliance for the Conservation of Endangered Species in Guatemala. See http://projectabronia.com/ for a video documentary on Arboreal Alligator Lizards of Mexico.

Ask the Experts!

Submit your lizard questions via email (yearofthelizard@gmail.com) to our panel of lizard experts, and we will select questions to answer in upcoming newsletters. Please include your name and location in your email message.
May Year of the Lizard Collaborating Partners

The Year of the Lizard Planning Team is pleased to welcome the following organizations to our growing list of collaborating partners:

Societas Herpetologica Slovenica – Society for the study of Amphibians and Reptiles Slovenia is a non-profit organization with the general aims of study and protection of amphibians and reptiles in Slovenia as well as education and popularization of these animal groups in the professional and general public. Regarding lizards, our research activities include field reptile surveys to determine species distributional ranges for the future Atlas of reptiles of Slovenia. Our members also give support to students involved in individual studies on the ecology of lizards. We organize and give lectures for general public, carry out workshops for school children of different age and participate as mentors on school or student field camps.  www.herpetolosko-drustvo.si

Hong Kong Society of Herpetology Foundation was established in 2007. It is the first and the only registered charitable organization (IR File No: 91/9058) in Hong Kong related to Amphibians and Reptiles. Being a charitable organization, they aim to carry out the following missions: To prevent cruelty to reptiles and amphibians through education; To increase the public's knowledge of amphibians and reptiles through our website and various activities, such as exhibitions, seminars; To promote the conservation of local species of reptiles and amphibians and their natural habitats so that the public can appreciate the ecological value of the local species; To promote public awareness of the crisis of endangered species; To carry out research and study on local amphibians and reptiles whilst emphasizing the importance of preservation of these animals and the environment; and To do all such other lawful things as are incidental or conducive to the attainment of the above objectives.

Website (Chinese):  www.hkherp.org
Website (English but some pages are under construction):  www.hkherp.org.hk/en/
Facebook:  www.facebook.com/hkherp

Herpetology Laboratory' Bangladesh (hl'b) is a sister concern of the Society for Research and Development (SRD). hl'b is a non-profit organization. Our work is performed by a cluster of dedicated volunteers, mainly young people. All lab members are self-funding - working from passion and self-motivation. They are dedicated to improving herpetological knowledge and conservation. The lab is also working to improve research capacity on some colleges in less developed areas of Bangladesh. hl'b was established to increase research capacity, improve conservation knowledge and develop rural talent in herpetology among underprivileged young people.  www.herplabbd.org

If your organization is interested in joining the list of Year of the Lizard Collaborating Partners and would like to assist in Year of the Lizard efforts throughout 2012, please send an email to yearofthelizard@gmail.com with a brief description of your organization and its efforts.

Follow all of the Year of the Lizard news and happenings on Facebook (http://www.facebook.com/yearofthelizard2012) and Twitter (http://twitter.com/YearOfTheLizard).
primarily on the Texas Horned Lizard (*Phrynosoma cornutum*). Volunteers have confirmed reports that horned lizards are much reduced in their distribution in the state, but they also have documented previously unknown remnant populations and produced statistically significant findings regarding correlations with distribution of the imported red fire ant (*Solenopsis invicta*). A description of the volunteer program, including an analysis of its first ten years, was recently published in Reptiles and Amphibians (Linam 2011).

One discovery in the first several years of Texas Horned Lizard Watch was that Texans weren't simply content to fill out data forms when it came to their beloved “horny toads.” Many volunteers took time to write notes or send emails sharing stories about childhood memories of horned lizards, their own perceptions of decline, and even sometimes personal confessions about their role in the demise of a few horned lizards. This “story-telling” prompted TPWD to launch an ancillary program in 2002 called Hometown Horned Toads, an essay contest designed to engage school students in gathering local histories about horned lizards in their communities.

Over five years, 458 essays representing 1732 interviews were submitted to Hometown Horned Toads. Interviewees shared their opinions regarding causes of decline, with open-ended questions consistently producing urbanization/human population growth, pesticides/ant pesticides, and invasion of red imported fire ant/decline in harvester ants (*Pogonomyrmex* spp.) as the top responses (Figure 1).

Interviewees were also consistent regarding decade of decline, with a strong tendency for respondents in the eastern half of the state to report declines in the 1960s through 1980s—periods of rapid population growth, road expansion, and invasion by imported red fire ants. Respondents from the western part of the state (i.e., the Rolling Plains, High Plains, and Trans-Pecos—regions where horned lizards can consistently be found) reported later perceived dates of decline (Figure 2), with students sometimes linking those perceptions to changes in agricultural practices or declining participation in outdoor activities.

Though no longer offered as a contest, research materials for Hometown Horned Toads are still offered on the TPWD website ([www.tpwd.state.tx.us/hht/](http://www.tpwd.state.tx.us/hht/)). In addition, classrooms are encouraged to expand the monitoring activities associated with Texas Horned Lizard Watch.

—Lee Ann Linam, Wildlife Diversity Program, Texas Parks and Wildlife Department

Using Trail Cameras to Observe Banded Gila Monsters (Heloderma suspectum cinctum) in Nevada

The Nevada Department of Wildlife lists Gila Monsters as state protected and has designated them as Species of Conservation Priority in Nevada’s Wildlife Action Plan. Data on Gila Monster populations are needed in order to ensure populations are not declining and to avoid federally listing this species under the Endangered Species Act. Gila Monsters are not commonly observed in Nevada and, aside from a University of Nevada, Reno study in 2003, Gila Monster data are largely lacking in this state. As such, preliminary observational studies have been implemented by Nevada Department of Wildlife in order to begin to learn more about this elusive protected reptile in the Nevada portion of its range.

A study site was chosen based on the presence of suitable substrate to observe Gila Monster tracks in the sand. The area consists of rocky sandstone outcrops adjacent to sandy soils dominated by Creosote Bush. The site is occupied by typical prey species for Gila Monsters, including quail, mourning dove, and kangaroo rats. The rocky areas likely serve as ideal shelters and overwinter sites, while the adjacent sandy areas serve as prime foraging ground containing plenty of quail nests with eggs and kangaroo rat nests with nestlings. The sandy soil and unique footprints left by Gila Monsters provide an opportunity to indirectly observe Gila Monster activity at this site.

Biologists conducted trackway surveys throughout April, May, and June of 2011. Ten sets of tracks were observed in May and June, as well as two Gila Monsters (one adult gravid female and one subadult). It was noted that some trackways terminated at certain burrows. Two trail cameras were then set up in order to detect Gila Monster activity patterns and use of two burrows. The cameras were focused on burrows of known Gila Monster use (tracks were noted entering and/or exiting the burrows). By identifying individual Gila Monsters by their unique banding patterns, photos captured by the trail cameras documented a male and female Gila Monster co-occupying one burrow (see previous page), suggesting this burrow may serve as a communal site for Gila

Series of trail camera photos illustrating two adult Gila Monsters (one male and one female) using the same burrow. (a) A female enters the burrow on 6 June 2011 at 1817. (b) A male enters on 7 June 2011 at 1643. (c) The same male exits 7 June 2011 at 1735. (d) The same male enters again on 8 June 2011 at 1749. Photos captured by trail camera set up by Polly Conrad.
Monsters. Late afternoon and early evening hours (1630-1830) are the times noted in the month of June in which the Gila Monsters are entering and/or exiting this burrow. These preliminary observations are sufficient evidence of Gila Monster use at this study site, and show that trail cameras can successfully be used to capture photos of Gila Monsters and aid in our understanding of Gila Monster activity patterns and burrow use in Nevada. For more rigorous scientific data on Gila Monster activity patterns, home range, and habitat use, a telemetry project has been recommended to the Nevada Department of Wildlife.

—Polly Conrad, Nevada Department of Wildlife

Mistaken Lizards in Alabama

Aside from the ongoing management of maintaining and enhancing Alabama’s natural communities on public lands to benefit native herpetofauna (i.e., prescription fire, exotic species removal, etc.), there are currently no lizard-focused conservation projects being performed by Alabama DCNR this year. However, our Department biologists regularly write articles for outreach, particularly when the public inquires about Alabama’s native wildlife. Some of the more regular inquiries we receive pertain to misconceptions about reptiles. One such topic dealt with the confusion in distinguishing glass lizards (genus *Ophisaurus*) from snakes. In our October 2007 issue of Outdoor Alabama, we put together a Glass Lizard article to help address this misidentification issue and to provide additional information about these unique lizards.

Check out the Glass Lizard Identification article here:


—Eric Soehren, Alabama Department of Conservation and Natural Resources

Washington Lizards Under Threat

The Northern Sagebrush Lizard (*Sceloporus graciosus*) and the Side-blotched Lizard (*Uta stansburiana*; above) reach the northern extent of their distributions in Washington State. Within the state, they occur in the driest portions of the Columbia Basin in shrub-steppe habitats (see photos, p. 7). Both species are ground-dwelling, active visual predators and gregarious. When not basking in the sun, they are preying on insects or socializing. This requires that the lizards have unobstructed ground where they can see both prey and one another.

Side-blotched Lizards can be abundant where they occur in Washington but are restricted to low elevations (≤ 460 m/1,500 ft; Nussbaum et al. 1983). These same areas are those that have been most frequently converted to agriculture. Northern Sagebrush Lizards are more widely distributed but occurrences are limited to active inland sand dunes and associated sandy soils. Side-blotched Lizards may also occur on sand dunes, but are not limited to this habitat type. Inland sand dunes are under threat in Washington; the total extent of inland sand dune systems has declined from approximately 448,177 acres (181,371 hectares) in the early 1970s to 106,953 acres (43,282 hectares) by 2006, a loss of 76% (Fig. 5) (Hallock et al.)

*An Eastern Glass Lizard* (*Ophisaurus ventralis*), one of the species of glass lizards found in Alabama. Photo © Laurie J Vitt.
While most (65%) of this loss reflects agricultural conversion, development, and flooding behind reservoirs, a third of the loss (35%) resulted from stabilization of sand dune habitat by exotic species, primarily Cheatgrass (*Bromus tectorum*).

Cheatgrass is a common exotic in shrub-steppe habitats as well. It can be so invasive on dunes and in shrub-steppe habitats that it dominates the entire understory and excludes most other native grasses and forbs (Fig. 6). On sand dunes, overgrowth of Cheatgrass seals the dune and prevents sand movement, effectively ending the life of the dune. This degradation of habitat quality is a major threat to these two lizard species in Washington because it limits their ability to see prey, move rapidly and interact with conspecifics. At this time, no management solution exists for this problem. While neither species is under threat of extinction in Washington, substantial concern exists for their persistence in many areas.

References cited:

—Lisa Hallock, Washington Department of Fish and Wildlife
Investigations of the Lizard Eating Snake Community in the Mescalero Sands Region of Southeast New Mexico

From telemetry studies of the Sand Dune Lizard, *Sceloporus arenicolus*, it is known that the snake commonly referred to as the Coachwhip, *Masticophis flagellum*, is a major predator of the species. The importance of the snake community as predators on Sand Dune Lizards has not been investigated other than through incidental sightings associated with other natural history investigations of the species. By establishing trapping arrays designed to capture snakes in undisturbed lands, and on lands fragmented by oil and gas exploration and extraction, we hope to add to our knowledge of the threats and natural history of the Sand Dune Lizards in the Mescalero Sands ecosystem.

We established drift fence trapping arrays to investigate the lizard-eating snake community at fragmented and non-fragmented sites, and routinely monitored them in 2009–2011. We obtained snake fecal samples when possible to help determine their prey sources. Trapping efforts across years were similar; however during 2011 there was a significant reduction in the number of snakes collected, likely because of the severe drought conditions in SE New Mexico. We collected lizard-eating snakes representing a total of 9 species (742 individuals) that provided 177 useful fecal samples.

Fecal samples from the snakes were sorted and all the lizard parts were identified to species when possible. Microscope slide mounts prepared from the scales of known species were used as comparative material to determine the identification of the lizard in the samples. All species of snakes examined are known to include lizards as part of their diet and are potential predators of the Sand Dune Lizard. A total of 7 lizard species were identified, however only the Coachwhip and the New Mexico Milksnake, *Lampropeltis triangulum*, contained identifiable parts of the Sand Dune Lizard.

Additional data on this lizard-eating snake community will be collected during 2012 and 2013. We hope to provide an analysis of the differences between the fragmented and non-fragmented sites at the conclusion of this study.

—Charles W. Painter, New Mexico Department of Game and Fish
The Common Five-lined Skink (*Plestiodon fasciatus*) is Connecticut’s only native lizard. This animal has the bright blue tail typical of juvenile skinks. Photo by Paul Fusco/DEEP Wildlife.

2012 has been proclaimed the Year of the Lizard by Partners in Amphibian and Reptile Conservation (PARC) to raise awareness for lizard conservation. The Connecticut Department of Energy and Environmental Protection (DEEP), a member of PARC since 1999, is participating in this outreach effort by shining a spotlight on Connecticut’s only native lizard, the Five-lined Skink, *Plestiodon fasciatus*.

Also found in Vermont and historically in Massachusetts, the Five-lined Skink is at its northeastern range limit in southwestern New England. The Five-lined Skink’s range corresponds closely with the eastern deciduous forest. The skink is so uncommon in Connecticut that it is considered a threatened species on our state’s Threatened and Endangered Species List. “Skink populations are found in four widely separated areas in western Connecticut,” said Jenny Dickson, DEEP Wildlife Division Supervising Wildlife Biologist. “They occur in steep, rocky areas with open ledges, patchy tree and shrub cover, and an abundance of rotten logs and loose rock slabs.”

If you are ever fortunate enough to observe one of these smooth, shiny lizards, look at the rows of tiny scales around the center of the body and the color of its tail. Young skinks have a bright blue tail and five white or yellowish stripes on a blackish body. As skinks grow older and larger, the pattern becomes less conspicuous; the stripes darken, the body lightens, and the tail turns gray. Males are territorial during the breeding season, and develop orange-red coloration on the head and jaws as a display of aggression. Five-lined Skinks measure from 5 to 8.5 inches long, including the tail.

Although Five-lined Skinks spend much of their time under rocks and other shelter, they will bask in sunny spots on logs or rocks. Rock climbers at several sites in Connecticut often see them running along cliffs. Skinks feed on various insects (crickets, flies, grasshoppers, grubs, beetles, ants) and spiders.

“When grasped by a predator, both adult and juvenile skinks will readily lose most of their tails,” added Dickson. “There are cleavage points along the tail vertebrae that facilitate the breakage, much like perforations on a piece of paper that make tearing the paper easier.” The detached tail thrashes on the ground to distract the predator, generally allowing the lizard to escape. The Five-lined Skink will grow a new tail that is somewhat shorter than the original and grayish in coloration.

Wild skinks should NOT be kept as pets. Those sold in pet stores should NOT be released to the wild as they can introduce diseases to wild and genetically distinct populations.

One of the best ways to learn more about the Year of the Lizard and the Five-lined Skink is to subscribe to DEEP’s Connecticut Wildlife magazine (www.ct.gov/deep/wildlifemagazine). You also can visit PARC’s Web site at www.yearofthelizard.org, as well as the wildlife section of the DEEP’s Web site (www.ct.gov/deep/yearofthelizard).
Horned lizards (*Phrynosoma* spp.), popularly known as “horny toads,” are highly specialized reptiles with distinctive morphologies, physiologies, and behaviors unlike those of most other lizards. The 13 horned lizard species that are native to western North America have little overlap in range and differ substantially in habitat associations, but a variety of specialized traits characterize the genus. These lizards have short, squat bodies armored with spines, prey preferentially on native ants, and move at speeds that seem languid in comparison with other lizards.

Four of the eight horned lizard species found in the US are declining, and the reasons for their decline are only partially understood. Invasive species pose a direct threat to horned lizards, as do the loss and fragmentation of habitat through the development of land for roads, settlements, infrastructure, and agriculture. In the intermountain West, extractive energy operations are a rising pressure on resident flora and fauna. The rapid development of oil and natural gas fields has had a detrimental effect on sagebrush bird species and will impact more species as development intensity increases. Given that horned lizard declines have been caused by land conversions elsewhere, these broad-scale developments are likely to affect lizard populations in Wyoming.

I am currently exploring how specialized traits influence population distribution and dynamics of the Greater Short-horned Lizard (*Phrynosoma hernandesi*). A substantial component of my research deals specifically with which factors most affect lizard response to disturbance. To investigate the possible range of responses to disturbance within this species I am comparing degrees of specialization between different populations, as well as between individuals within populations. The central question of my work is: How does specialization affect horned lizard distribution, abundance, and sensitivity to disturbance at a variety of scales? In particular, I address three aspects of this broad question:

1. Which factors are most limiting to horned lizard distribution and abundance?
2. How and why do specialist traits vary between different populations and different individuals?; and
3. Do the factors that most strongly determine horned lizard responses to disturbance differ from the limiting factors across natural landscape variation?

I am testing hypotheses related to each of these questions in sites around Wyoming that are characterized by varying degrees of disturbance. In addition to field surveys, I am using remote sensing techniques to quantify a variety of habitat characteristics in these sites.

Submit Your Lizard Art, Stories, and Poetry

Submit photos of your lizard art (jpg, tiff, or pdf files) and copies of your stories and poems via email to yearofthelizard@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 upcoming newsletters.
Lizard Malaria in Oregon

David Scholnick, Associate Professor of Biology at Pacific University in Oregon, researches malaria in lizards. The disease is best known for its transmission to humans from infected mosquitoes and its rampant occurrence in tropical regions, but it has been discovered in the Western Fence Lizard, *Sceloporus occidentalis*, which is common in Oregon. Lizard malaria is caused by *Plasmodium mexicanum*, and it is believed to be transmitted to lizards by a bloodsucking sand fly, or possibly a mosquito or mite. This is not the same *Plasmodium* species that infects humans.

Scholnick and his team of students have found a latitudinal gradient in lizard malaria infection rates among Oregon populations of the Western Fence Lizard (see map). In the summer months, they trek from Pacific University in Forest Grove to southern Oregon where there is a higher incidence of infection. The goal of their research is to understand the appearance of malaria in lizard populations and investigate its impact on individuals. Scholnick has observed that when populations of lizards carry malaria, the disease can be very prevalent, with as many as 30 percent of the lizards being infected. It is possible that the infection rate and distribution of the disease in Oregon may be influenced by future climate change. Increases in precipitation and temperature could likely facilitate the spread of the disease from warmer locations to more temperate areas around the planet, and not only among lizards but possibly among human populations as well.

Upon collecting lizards around Oregon, Scholnick and his team determine which lizards have the disease by examining a small blood sample for the parasite. The infected lizards are then taken back to Pacific University where they are examined for several potential effects of the disease, including changes in performance. The infected lizards are put on a treadmill so that the team can determine how malarial infection can affect metabolism, exercise, and recovery. Although it seems odd, the results might translate into help for humans suffering from malaria. If
we can understand how the disease affects the biology and environment for lizards, we can hopefully better understand the impact on humans. By studying lizard biology in the lab it is possible to determine how the anemia, which is associated with malarial infections in both lizards and humans, affects stamina and ability to exercise. By attaching a mask to measure airflow as the lizard exhales, Scholnick has found that an infected lizard uses 40% more energy to run than an uninfected lizard, and it takes more than two hours of rest for the infected lizards to fully recover from just seconds of running. In addition to the stress test, Scholnick and his students are looking at malarial effects on thermoregulation and metabolic physiology. The experiments have shown that lizards do in fact experience the same effects as humans: fever, anemia, acidosis, and other symptoms. The goal of David Scholnick’s research is not to cure malaria, but rather to better understand how malaria is influencing the biology and success of Oregon lizards. Ultimately, this research may provide insights into how wild populations of animals are able to cope with a disease that continues to have such an important role in human health.

I thank Dr. David Scholnick for providing information for this article. For more information, David’s website is: [www.pacificu.edu/as/biology/faculty/DavidScholnick.cfm](http://www.pacificu.edu/as/biology/faculty/DavidScholnick.cfm)

There is also great video clip from the discovery channel here: [http://watch.discoverychannel.ca/clip351857#clip351857](http://watch.discoverychannel.ca/clip351857#clip351857)


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**State Lizard Match-up**

Photos courtesy of Simone Des Roches and Stephen Spear

Did you know that twenty-six states in the U.S. have designated an official state reptile? Of these, there are only four states that have given this honor to a lizard. If your state has no state reptile, that would be a great class project--pick your favorite native lizard!

Can you use the ecological descriptions below to match the lizards with the state they represent?

___Oklahoma – this state’s lizard is quite nimble; they can jump between rocks and often run on their hind limbs.

___Texas – this state’s lizard is heavily armored with spiny scales, so predators won’t mess with it.

___New Mexico – this state’s lizard is very active and speedy and has an extremely long, slender tail.

___Wyoming – this state’s lizard can squirt blood out of their eyes to deter predators!

1. ___________Whiptail

2. Greater Short-horned Lizard

3. ____________Horned Lizard

4. Eastern (Common) Collared Lizard
Lizards in the News

Biologists have discovered the new ‘Bumblebee’ Gecko in Papua New Guinea. See the USGS press release at: www.usgs.gov/newsroom/article.asp?ID=3172#.T5VyUqvJFyK

This year, the Connecticut Department of Energy and Environmental Protection (DEEP) is out to protect the state’s only native lizard species, the Five-lined Skink. Read more from the Yale Daily News:


In less than a second, a sandfish lizard can dig its way into the sand and disappear. Blink and you miss it. Miles O’Brien and Ann Kellan share how the sandfish’s slithering moves are inspiring new robotics that could one day help search-and-rescue crews find survivors in piles of rubble left from disasters. Find out more and watch a neat video at: www.physorg.com/news/2012-03-sandfish-lizard-slithers-science-spotlight.html

Adam Halliday of Indian Express shares that a new species of gecko, first found on a wall at Junagadh’s Vagheshwari Mata Temple has earned Gujarat the distinction of having a lizard named after it. Read the story at: www.indianexpress.com/news/new-lizard-species-found-in-junagadh-named-after-gujarat/913970/

The Quang Ninh newspaper reports a seizure of 6,000 kg (13,228 lbs), including 1,554 kg (3,426 lbs) of monitor lizards (Varanus spp.). Find out more from: http://envietnam.org/E_News/E_452/E_452.html

Paul Fernandes from Times of India reports that wildlife activists have sprung to the rescue of monitor lizards, as they are being heavily poached in the wild for their blood and skins. The full story available at:

http://articles.timesofindia.indiatimes.com/2012-03-03/goa/31118817_1skins-wildlife-activists-lizard

In many cultures, lizards have a symbolic meaning. Bold Sky shares that in Hinduism, lizards have been frequently mentioned in the myths and legends as a vehicle of Gods and Goddesses. www.boldsky.com/yoga-spirituality/faith-mysticism/2012/spiritual-significance-lizards-hinduism-130312.html

Russian scientists are training geckos, who undergo a tough selection process, to go into space in a research satellite, Interfax reported. Read the full story at: www.themoscowtimes.com/news/article/lizards-being-trained-for-space-mission/454691.html

According to the United States Geological Survey, a species of lizard is now extinct in the Hawaiian Islands, making it the latest native vertebrate species to disappear from the archipelago. Read more at: www.kitv.com/USGS-Skink-Now-Extinct-In-Hawaii/-/8906042/9657796/-/9jw8kh/-/index.html

Singapore News reports a creature—feared to be a crocodile—spotted by residents in the north eastern part of Singapore has been confirmed to be a monitor lizard. The full story available at: www.channelnewsasia.com/stories/singaporelocalnews/view/1184316/1/

A newly discovered species of skink crawls on a rock in Ratanakkiri province, Cambodia. Find out more from Dani McDonald of the Phnom Penh Post at: www.phnompenhpost.com/index.php/2012022354688/National-news/unknown-lizard-earoned.html

Dunes-Sagebrush Lizard Making Waves


Greenwire: Tiny lizard a big headache for Obama admin in Southwest oil fields. www.eenews.net/public/Greenwire/2012/03/23/1


© Odessa American
When asked about the value of world biodiversity conservation, a potential bank of yet undiscovered applications to human health is often cited. Although that may seem to be a vague and dim futuristic notion, tangible benefits already have been realized for human medicinal advances from plants and animals. With ever-growing technological advances, laboratory scientists now can both define the structure and re-create chemicals found in animals to examine their utility for new human applications. Venoms have proven to be a source of several novel chemical peptides with human therapeutic applications. Have there been any medicinal leads from lizards? Yes!

1. Diabetes and more

The Gila Monster, *Heloderma suspectum*, is a rarely seen lizard species from the southwestern deserts of the United States and northern Mexico. The Gila Monster’s venom is about as potent as a Diamond-backed Rattlesnake’s, yet its effect on humans is very different. Biomedical research on Gila Monster venom has opened new avenues for Type 2 diabetes treatment.

In a breakthrough investigation in the 1980s, endocrinologist John Eng from the Bronx Veteran’s Administrative VA Hospital in New York found a hormone in the venom of Gila Monsters that acted on the human pancreas to decrease blood sugar. Simply stated, in Gila Monster venom, he found a peptide (which he named Exendin 4) that was similar to a human hormone (called Glucagon-like peptide 1, or GLP-1) that stimulates the pancreas to create insulin. Up to that time, the problem with using the human hormone to treat diabetes was that it was rapidly destroyed in the human body by our own enzymes. However, the Gila Monster hormone was found to be immune to destruction by human enzymes, making it functionally superior to the human hormone. The Gila hormone lasts longer in the human body, giving it time to act on the pancreas to release insulin and thereby help regulate blood sugar in diabetics. Another benefit was that the Gila Monster peptide caused the pancreas to release insulin only when blood sugar was elevated, so the danger of insulin-induced hypoglycemia (common in diabetics) would be greatly reduced. It also served to reduce appetite in diabetic patients, and to facilitate weight loss. From Dr. Eng’s foundation work and patent, in the 1990s, Amylin Pharmaceuticals partnered with Eli Lilly to manufacture the synthetic chemical exanatide, which was later given the commercial name Byetta. In 2005, the US Food and Drug Administration (FDA) approved its use as a prescription medication for Type 2 Diabetes, for use by those diabetics who have trouble controlling their condition by with other medications. Since 2006, Byetta sales have exceeded one billion dollars. The discovery of exendin-4 from Gila Monster venom has opened up a new class of pharmaceuticals, called incretins, that may revolutionize diabetes treatment. Type-2 diabetes affects millions of people worldwide, so the application of this novel medicine has been huge.

Additional bio-active chemical peptides have been found in the venom of both Gila Monsters and their relative the Mexican Beaded Lizard, *Heloderma horridum*. One snippet of the exendin-4 peptide, called Gilatide, has been shown to improve memory, and is being explored as a tool in treating Alzheimer’s. Some have been found to relax artery smooth muscle, and regulate water and electrolyte secretion between the small and large intestines. One chemical peptide, helodermin, inhibits the growth of lung cancer. Currently, this is a rich avenue of biomedical research, with pharmaceutical applications no doubt to follow.

2. High blood pressure

Anguimorphs are a group of lizards including the Monitor, Alligator, and Legless Lizards. In 2010, Dr. Bryan Fry of the University of Melbourne, Australia, and his international collaborators published their research investigating venoms from 25 anguimorph lizard species: they discovered five entirely new classes of toxins. Three of these venoms have biomedical properties for potential drug development to lower blood pressure. The excitement about the medical applications of these toxins is
due to their new ways that they interact with the human blood pressure system. Dr. Fry is now working now to develop pharmaceuticals from these chemicals to contribute to novel heart disease treatments.

3. Geckos are not a cure-all!

Gecko products are being used today in many Asian cultures as traditional remedies for asthma, tuberculosis, impotence, cancer, and AIDS. Unfortunately, these claims are not supported by scientific evidence. The costs of this practice is high for both humans and lizards: scams are affecting people’s pocketbooks; known treatments are not being applied in some cases, worsening people’s health; regulations are being violated as a result of illegal gecko collection, rearing, and trade; there is a rising risk of extinction of rare wild-caught animals, and; there is an environmental cost of to removing a keystone species that is central to natural food webs.

On November 17, 2011, the World Health Organization (WHO) posted the following notice on its Facebook page:

“We’d like to remind you that gecko is NOT a cure for HIV/AIDS, or cancer. The rumour that says otherwise is a HOAX.

To date, there is NO scientific evidence that gecko can cure HIV/AIDS or cancer. NOR is there information on safety & hygiene consequences from exposure to geckos.

We understand there are people out there who are willing to pay big money for these animals but this is simply because they are being manipulated by others. This is NOT cool.

Please help us to spread the word.”

I sincerely thank Dr. Daniel Beck, Central Washington University, Ellensburg, Washington (www.cwu.edu/~biology/faculty/currentFaculty/beck/) and Dr. Bryan Grieg Fry, University of Melbourne, Australia (http://venomdoc.com) for their comments that improved this article.

New “State of the Union” Regulatory Summary Report

Now available online: AFWA’s State of the Union: Legal Authority Over the Use of Native Amphibians and Reptiles in the United States

Native amphibians and reptiles (herpetofauna) provide a resource that can be used in a unique way relative to other vertebrates managed by State Fish and Wildlife Agencies in the public trust. Herpetofauna are harvested for human food consumption, for their skins, as pets, for bait, and for hobbyist collection, as well as for research or educational purposes, and each state regulates these uses differently. The Association of Fish and Wildlife Agencies’ Amphibian and Reptile Subcommittee, in partnership with the Association’s Law Enforcement Committee, created this document to summarize these existing laws and regulations. Current as of February 2012, it will be updated annually, and will be used to guide the development of Association committee-reviewed recommendations for model regulatory approaches for the use of amphibians and reptiles.

The purpose and intended use of this report is to:

1. Determine the current “State of the Union” with respect to:
   • Laws and regulations in place for native amphibians and reptiles,
   • Legal and regulatory approaches for specific uses, and other special protections or policies
2. Identify commonalities among states, and unique or particular approaches that could inform the development of recommendations for model approaches
3. Provide a quick-reference and resource for state agency biological, law enforcement, or management personnel as part of their own state’s regulatory processes
4. Facilitate communication and collaboration among states to address challenges in regulating amphibian and reptile use and in enforcing existing laws

Find the State of the Union online at: www.fishwildlife.org/files/SOU_FULL-lo-res.pdf

For questions regarding this report, please contact Priya Nanjappa (pnnanjappa@fishwildlife.org).
Exploring the Effects of Climate Change on Lizard Distributions in Southwestern Wyoming

By Denim Jochimsen, PhD candidate at the University of Idaho

Landscape alteration is considered the single greatest threat to the preservation of biodiversity (Sanderson et al. 2002; Foley et al. 2005). One way that human activities have altered natural habitats is via climate change (IPCC 2001). Although temperatures have fluctuated in the past, the current rate of warming surpasses those on record. In the face of such rapid change, populations will be forced to either adapt or move in order to persist. For instance, scientists have already reported range shifts in a variety of organisms as they attempt to track preferred temperatures (Parmesan 2006).

Consequently, it is critical that we consider future climate scenarios when trying to predict species distributions and identify where to best direct conservation actions (Araújo et al. 2004; Kleinbauer et al. 2010). Some studies take a simplified approach to do this—they measure climatic variables where individuals occur and then identify similar areas on maps generated via forecasted climate data. Although such models can be useful, they fail to consider the variety of other factors that could influence why a species occurs where it does. For instance, research suggests that history, demography, dispersal capabilities, and ecological interactions are all important predictors of species occurrence (Geber 2011). Therefore, taking a more integrative approach when studying climate impacts could increase the accuracy of predictions. I plan to do just this with my dissertation research. I hope to identify which factors influence the occurrence of three lizard species in southwestern Wyoming, and then use this information to predict how their ranges may change in the future.

You may be asking yourself: why lizards and why southwestern Wyoming? Research suggests that lizards may be particularly vulnerable to climate change (Huey et al. 2009; Sinervo 2011). They are ectothermic (they lack the ability to maintain a constant internal body temperature) and their physiological functions are temperature dependent. It is actually quite easy for a lizard to overheat, and they need to seek refuge in order to avoid it. Furthermore, lizards partition niche space (species may vary activity with regards to time or space or they may consume different prey items) (Schoener 1975; Pianka 1986), which offers the potential to explore species interactions. I am conducting this research within and around the Flaming Gorge Recreation Area, Wyoming. This scenic area is characterized by sagebrush-steppes interspersed with rocky outcrops. Several reptile species native to the region are considered of greatest conservation need, and in general, studies on these organisms are rather limited.

The rocky habitats are home to three lizard and several snake species. Interestingly, the lizards occur in three different combinations in the study area. Sagebrush Lizards (Sceloporus graciosus) are commonly observed darting among the sagebrush (as their name implies), but at some sites, where they are the only lizard species present, they will bask on rocks. Some rock outcrops also have Plateau Fence Lizards (Sceloporus tristichus), which is the largest lizard species in the area. They tend to be saxicolous (rock-dwelling) and they can be spotted from quite a distance when they sit perched atop large boulders. Finally, there are a limited number of sites where Tree Lizards (Urosaurus ornatus) occur. They are slender bodied and quite compact and can hide in the
narrowest of cracks. This species is also saxicolous, but they seem to prefer taller rock formations that are cliff-like, rather than boulders, perching at great heights.

This field season, I will continue to gather data to address two questions: 1) Do these lizard species use their environment differently? 2) How do lizard species change their niche use in the presence of competitors? I will conduct surveys within eight 1-ha plots identified last field season that vary with respect to the lizard assemblage present. Each time I observe a lizard, I will record data associated with fine-scale habitat use, including that of the thermal environment. I will also capture a subset of these lizards to record their active body temperature, and collect a tail clip for genetic analyses and to measure diet (via stable isotope analysis). These data will help me identify why lizards occur where they do, and will ultimately be used to generate predictive models of their ranges. This research can therefore be used to guide management of these reptiles and help ensure their persistence.

Acknowledgments

I am especially thankful for an amazing undergraduate researcher, Andy Gygli, who contributed to study design, shared insightful ideas, and worked tirelessly in the field for the entirety of my first field season in Wyoming. I appreciate the guidance and support of my PhD advisor (Dr. Luke Harmon) and committee members at the University of Idaho (Dr. Olle Pellmyr, Dr. Bree Rosenblum and Dr. Lisette Waits) and from my lab group. The Wyoming Game and Fish Department has been extremely supportive of this research, especially Robb Keith. They provided a place to stay and conduct “lab” work, as well as assistance in the field. Funding was provided through the University of Idaho Student Grant Program and the Graduate and Professional Student Association.

References


Measuring Lizards with Pictures: A Field Ecology Tool for Everyone

Everyone from academics to neophyte herpetologists loves catching lizards. Indeed catching lizards is both a rewarding experience and sometimes a necessary process for research. However, handling wild lizards may exert extra stress on the animals and typically requires time-intensive methods such as noosing or pit-fall trapping. Below we outline a recent method we have used to measure lizards from a distance using nothing more than a ruler, a camera, and easy-to-use, free ImageJ software (rsbweb.nih.gov/ij/). We believe this new technique (Lambert et al. 2012) can be used in certain field ecology studies and can also have applications in citizen science projects or as a tool for teaching young students about wildlife biology. Although there are obvious limitations to not actually handling an animal (e.g., not marking, weighing, or sexing) this photographic technique can easily be applied in various situations. For example, photographic measurements can be made on common taxa such as fence lizards (Sceloporus spp.) or wall lizards (Podarcis spp.) as a way of teaching students how to take and analyze data on wildlife. Furthermore, for species like Desert Iguanas (Dipsosaurus dorsalis), which are challenging to catch, this method could be used to gather data either by trained scientists or citizen scientists during their weekly hikes.

Here we outline this photographic technique and hope that its simplicity allows it to be applied to a variety of situations.

1. When you see a lizard, stop and mark where you are standing with some small object.
2. Take a picture of the lizard. We recommended being fully zoomed-in and centering the lizard in the frame of the picture.
3. When the lizard has run away, place a ruler where the lizard was previously perched and in line with how the lizard was lying
4. Go back to where you took the first picture. This is why you marked where you were standing!
5. With the camera settings exactly how they were for the previous photograph, take a picture of the ruler. Make sure to center the ruler as you did the lizard.
6. Back at home, open the ruler picture in ImageJ
7. Using the “Straight Line” tool, draw a line over a part of the ruler that can be read. We usually draw a line over a 1-cm interval.
8. Use “Set Scale” and set this line as “Global” making sure to indicate the value (e.g., 1 cm) on the ruler you measured.
9. Next, open the picture of the lizard and use the “Freehand Line” or “Segmented Line” tool to measure the lizard. Usually we measure lizard length as snout-to-vent length (SVL); however, it is usually impossible to see the cloaca from a photograph. Instead, we measure snout-to-hind limb length (SHL) which is the distance from the tip of the snout to just in front of the hind limb. Our work shows that SHL is a very good estimation of SVL.
10. Click on “Analyze” and “Measure” and now you have a picture of a lizard and a measurement of its length!

Measuring lizards this way makes field biology accessible to many people. Biology courses could
An Interview with Polly Conrad

Polly Conrad attended Truman State University where she spent her time catching lizards, other reptiles, amphibians and small mammals, including bats. Her graduate work focused on non-game wildlife management and habitat restoration of small mammal communities. Polly also volunteered in the Truman State Herpetology Lab, where she helped care for amphibian and reptile specimens used in educational shows. After acquiring her Master’s degree in 2003, Polly went on to work for the State of Nevada for 8 years, first as a Staff Research Associate at the University of Nevada, Las Vegas, then as the Reptile Biologist for the Nevada Department of Wildlife from 2005–2012. Over the last 8 years, Polly has been able to study and gain an appreciation for the lizards and other reptiles that inhabit the harsh conditions of the Mojave and Great Basin Deserts. Polly is currently the Co-Chair for the Partners in Amphibian and Reptile Conservation’s Joint National Steering Committee, where she plans to continue to work towards the conservation of herpetofauna and their habitats.

How did you become interested in lizards, and at what age?

My love for the outdoors began at my grandparents’ log cabin located in southeast Missouri along the St. Francis River. Starting at the age of 5, I spent part of my summers every year at the log cabin where most days I would spend catching lizards, frogs and butterflies. The frequency with which my cousin, Libby, and I spent time catching frogs and lizards landed us the nicknames “frogger” and “toad,” coined by my Grandfather.

What is your current role in lizard research and conservation?

Currently, I serve as PARC’s Joint National Steering Committee Co-Chair, where I’m planning to develop, facilitate, and implement lizard conservation efforts on the ground as well as in the outreach and education arena on a national level. Most recently, as Reptile Biologist for the Nevada Department of Wildlife until March 2012, I was engaged in three lizard projects. The first project assessed the phylogeography and habitat use of Short-horned Lizards (genus Phrynosoma) in Nevada, in order to gain a better understanding of where short-horned lizards occurred in Nevada, which habitat types they preferred. We also looked at how the populations of pygmy Short-horned Lizards (P. douglasi) and Great Short-horned Lizards (P. hernandesi) were related. Next, I assisted the University of Nevada, Reno, with a Common Chuckwalla (Sauramalus ater) telemetry project. The goal of this work was to determine home range sizes and densities of chuckwalla populations located in areas of high commercial collection rates and compare them to chuckwalla populations where commercial collection was prohibited. Last, I studied habitat associations and activity patterns of Gila Monsters (Heloderma suspectum) in Nevada and successfully detected communal burrow use via trail cameras (see other article in this issue).

What is your favorite lizard or group of lizards?

Horny toads! These are not actually toads at all, but are horned lizards. They are just so cool looking, plus some of them can squirt blood from their eyes; you’ve got to appreciate a lizard that can do that! Although, I grew up catching skinks, so they too, have always been close to my heart.

What is your defining moment or favorite memory of working with lizards?

The first time I saw and filmed a subadult Gila Monster in Nevada was a total adrenaline rush. I documented the Gila Monster walking from burrow to burrow, stopping perpendicular to each one, as though it was listening or ‘smelling’ for kangaroo rat nestlings. With no apparent success, the Gila monster stopped under a dense thicket of Joshua trees to cool off and I was off to look for other monsters.

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

While habitat loss, conversion, and fragmentation are likely the biggest threats, these topics are very well discussed. I think one of the biggest potential threats to lizards that is not often talked about, is the lack of regulations pertaining to the uses and collection of native lizards as well as the lack of consistency of lizard use regulations among the states. This is a particularly dangerous threat because most states are not tracking any lizard uses or any potential impact to lizard populations from commercial, personal, or educational uses. As a result, we may not notice any impacts until lizard populations are in deep trouble (for example, the San Esteban Chuckwalla—due to hunting and the introduction of feral animals). This is also a controversial issue, as it is often perceived as simply taking away the public’s right to use this resource. I think wildlife administrators should strive to find the balance between allowing the public to use wildlife resources, but also conserving, appropriately managing, and tracking allowable uses for all wildlife, including lizards. The idea is sustainable use, just as is implemented for most game species, not eliminating use. Education and outreach to inform the public of the importance of implementing sustainable use practices and regulations for lizard use is needed to advance this issue.

How can the public help in the conservation of lizards?

There are so many ways everyone can help to conserve lizards or their habitats! You can join free organizations, like Partners in Amphibian and Reptile Conservation, and help out with many lizard conservation efforts. You can volunteer for your local fish and wildlife agency to help collect lizard occurrence data. Join your local Herpetological Society and get outdoors to explore lizard habitats. Or, you can simply donate to a lizard conservation program or purchase lizard merchandise from PARC’s Year of the Lizard store. Proceeds from Year of the Lizard sales will directly support lizard conservation efforts.

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

There are so many different ways to work with, or for the benefit of, lizards and other wildlife. Find the option that works best for you. As someone who works with lizards, I see the need for much more than just biologists. Effective lizard conservation needs teachers and educators, naturalists, law enforcement officers, responsible private and public land managers, environmental lawyers, photographers, designers, accountants, writers, and the list could go on. Chances are, no matter what you do, you have something to offer lizard conservation efforts, even if it’s just enthusiasm!

Submit Your Citizen Science Projects

A compilation of lizard 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 yearofthelizard@gmail.com.
Featured Lizard Families

By Lawrence L. C. Jones (Larry the Lizard Guy)

Each month, two lizard families are featured in this newsletter; each of the six issues will showcase two of the twelve families native to the United States of America. In the last issue of Year of the Lizard News (March), I featured two of the most speciose lizard families (Phrynosomatidae and Scincidae), while in this issue I feature two of the smallest families: Gila Monsters and Beaded Lizards, and night lizards. Although the families are small, they have some of the most interesting species. Gila Monsters are the largest lizards in the United States, while some night lizards are the smallest.

Family Helodermatidae, Gila Monsters and Beaded Lizards

There are only two species in the Helodermatidae, Gila (pronounced HEE-luh) Monster (Heloderma suspectum), and Beaded Lizard (H. horridum). These species are well known because they are large, showy, venomous, and researched. Much of the information we have on helodermatids is summarized in a fantastic book by Dan Beck (2005. Biology of Gila Monsters and Beaded Lizards. University of California Press. 211 p.), so I am only scratching the surface on these amazing animals. If you want to know more about these critters, this book is a must-have. Dr. Beck also wrote the species account for Lizards of the American Southwest (Jones and Lovich, eds., 2009). I won’t go into too much detail here, but those references do.

The Gila Monster is the only member of the family found in the United States. It is primarily a desert-dwelling species that ranges from extreme southeastern California to extreme southwestern New Mexico and Sonora, Mexico. In Arizona it is found in three of the four deserts (Sonoran, Mojave, and Chihuahuan). It is also found in southeastern Nevada and extreme southwestern Utah, in the Mojave Desert. It is probably named after the Gila River, a good location to find Gila Monsters, and together they are responsible for my license plate and email (“Gilaman”).

Gila Monsters are impressive lizards—they reach about 14 inches snout-vent length (360 mm) and 22 inches total length (570 mm), and can weigh nearly two pounds (900 g). Gila Monsters are thick-bodied, have short legs and tail, and a large, muscular head. The name “Heloderma” comes from the Greek roots for “studded or beaded skin,” hence the common name of H. horridum. The beaded appearance is due to osteoderms, which are small bones in the scales. In the literature, Gila Monsters have been split into two subspecies, but these are not universally accepted, and studies have shown the patterns are less than consistent. The two “subspecies” are H. s. cinctum (banded) and H. s. suspectum (reticulated). The banded pattern consists of broad orange to pink bands with intervening large spots of this light color on a black background. The reticulated pattern has a more complex arrangement of light and black scale colors. Juveniles tend to have the banded pattern.

Gila Monsters are always a treat to see in the wild. Although they may be locally abundant, they are infrequently seen, as they tend to be cryptic and spend much of their existence underground. The key to seeing a Gila Monster in the wild is to spend enough time in the right habitat at the right time of year under the right conditions. Unlike most lizards, they do not bask in the sun on a rock as part of a morning ritual. Instead, you have to intercept them...
when they are on the prowl looking for food or a mate. The best time of year to see one during the day is in the spring when they come out of brumation/hibernation. Typically, April and May are the best months when temperatures are mid-80s F. In much of Arizona, New Mexico, and adjacent Mexico, there is a summer rainy season (the monsoon), and occasionally other areas get summer rains, as well. Areas that are too dry (like most of the California deserts) cannot sustain Gilas. Summer days that are humid, overcast, and not too hot (again, low to mid-80s) are ideal for Gila Monsters (and rattlesnakes). Otherwise, during the hot times of the year, Gilas are mostly nocturnal, often seen crossing roads at night.

The right place to see a Gila varies by location, but in general they are found in areas with some sort of shelter structures, such as boulders, tortoise burrows, and woodrat middens. In southern Arizona, I tend to find most in rocky foothill situations. During the Southwest PARC meeting in Tucson, Arizona, a tried and true method to find Gila Monsters was successful. All you need are 20 herpetologists who really want to see a Gila Monster, and you set them out into the right place at the right time under the right conditions—that tactic yielded three Gilas in one day, much to the delight of the participants (and I was able to save face and not have to deal with an angry mob).

Until recently, helodermatids were thought to be the world’s only venomous lizards, although it is now known that monitor lizards (Varanidae) and some iguanas (Iguanidae) are also venomous. However, only the Gila Monster and Beaded Lizard have an advanced venom delivery system. The venom of these animals is quite toxic, although bites are rarely, if ever, fatal. However, I have heard the bite can be fatal if one has a gun…alluding to the extreme pain associated with a bite. Gila Monsters are inoffensive, but will defend themselves if provoked and handled. Essentially, the only people bitten by Gila Monsters are the same type usually bitten by rattlesnakes—young male yahoos with more testosterone and ethanol in their system than common sense. When a Gila Monster bites a young yahoo, it is difficult to remove the lizard because of its powerful jaws and sharp teeth; the longer they bite, the more venom is introduced into the victim. Gila Monsters don’t use their venom to procure prey (e.g., eggs and nestling birds and mammals), so it is likely the venom is purely defensive. However, Gila Monster venom is not just a nasty experience, as it does more good than harm in the big picture. The venom contains an important medical compound that is being developed for the treatment of Type II diabetes (see “Lizards and Wonder Drugs”, p 14, this issue).
Gila Monsters are threatened by poaching for the black-market pet trade and the usual problems associated with a burgeoning human population in arid regions. Gilas are protected in every state they occur in, including Mexico.

Beaded Lizards are found along the Pacific Coast of Mexico and into Guatemala. There are several species recognized: Heloderma horridum exasperatum (Escorpión del Río Fuerte, Río Fuerte Beaded Lizard), H. h. horridum (Escorpión Mexicano, Mexican Beaded Lizard), H. h. alvarezi (Escorpión Negro, Black Beaded Lizard), and H. h. charlesbogerti (Escorpión, Motagua Valley Beaded Lizard). If you think Gila Monsters are impressive lizards, you should see a large adult Beaded Lizard. In nature, adults can reach about 19 inches (480 mm) snout-vent length and 34 inches (860 mm); they can be even larger in captivity. Beck (2005, ibid) reports a maximum total length of 39 inches (521 mm) and nearly a whopping 10 pounds (4.5 kg). At first glance, Gila Monsters and Beaded Lizards appear very similar, but the latter are more elongate with longer tails, in keeping with their more arboreal tendencies. Gila Monsters have black tongues, while Beaded Lizards have pink tongues. All helodermatids have forked tongues, a feature also found in snakes and monitor lizards. The color of Beaded Lizards is variable, ranging from black or lightly spotted (H. h. alvarezi) to more heavily spotted or reticulated (H. h. horridum and H. h. exasperatum). The Motagua Valley Beaded Lizard, the species in Guatemala, has a very interesting pattern that is dark on the forebody, spotted on the hindbody, and has a tail with paired light rings.

I am fortunate to live in Tucson, which is not only a mecca for reptiles, but is within striking distance of Alamos, Sonora, Mexico, another mecca for reptiles. This beautiful little town at the south end of the state of Sonora is known as a biodiversity hotspot because it is where the tropics meet the desert/thornscrub biota. Ecotourists seek out the area for the rich cultural history and the tropical flora and fauna (parrots, Boa Constrictors, outrageously vivid butterflies, etc.). It is also the one area where Gila Monsters (a desert/thornscrub species) and Beaded Lizard (a tropical deciduous forest species) co-occur. One can leave Tucson in the morning, set up camp or check into a hotel in the afternoon, then look for herps at dusk. On my first trip to Alamos during the monsoon (summer rainy season), we saw a Beaded Lizard within about an hour of setting out to look for herps, a second an hour later, and a third later in the trip.

The International Reptile Conservation Foundation has a program known as “Project Heloderma” (www.ircf.org/project-heloderma—see the article in the March issue of Year of the Lizard News). Its goal is to conserve the Motagua Valley (Guatemalan) Beaded Lizard and its habitat. This species was not even described until 1988. It is estimated that there only are 100-200 individuals remaining in the wild. The project conserves the lizards through an “integrated program of research, public awareness and education, local capacity building, ecological restoration, head starting and reintroduction, and habitat management.” Project Heloderma is one of the conservation successes being presented at the PARC symposium, “Conservation Successes during Times of Declining Biodiversity” at the World Congress of Herpetology meeting in Vancouver British Columbia, Canada, in August 2012 (www.worldcongressofherpetology.org).

Family Xantusiidae, Night Lizards

The family Xantusiidae is restricted to North and Central America. There are three genera: Xantusia (night lizards), Lepidophyma (tropical night lizards), and Cricosaura (Cuban Night Lizard). In the United States, only Xantusia is represented; members of this genus are also found in northern Mexico. It should be noted that the term “night lizard” is not an accurate portrayal of the family. Some species are nocturnal, some are not, and some are not known well enough to determine activity patterns. However, they tend to be cryptic in nature, usually occurring in microhabitats with low light levels. Those in the genus Xantusia have vertical pupils (the other genera do not), and most are flattened top to bottom.

There have been numerous research papers addressing the relationship of members of the genus, and these lizards remain a taxonomic challenge, but here I follow...
the PARC standard (Crother et al., 2008. SSAR Herp. Circular #37). The species in the United States are: Arizona Night Lizard (X. arizonae), Bezy’s Night Lizard (X. bezyi), Sandstone Night Lizard (X. gracilis), Granite Night Lizard (X. henshawi), Island Night Lizard (X. riversiana), Sierra Night Lizard (X. sierrae), Desert Night Lizard (X. vigilis), and Wiggins’ Night Lizard (X. wigginsi). Xantusia vigilis, X. sierrae, and X. wigginsi are all similar to one another and before genetic research became a commonplace taxonomic tool they were all considered to fall within X. vigilis. They are the smallest members of the genus, and can most easily be differentiated by their ranges. They are all dark brown with fine dark spotting. Another group includes X. arizonae and X. bezyi. These species are a little larger and tend to be lighter in background color with larger dark spots than the X. vigilis group. Both arizonae and bezyi are endemic to small areas of Arizona. They can usually be differentiated by color patterns, and their ranges do not overlap. Xantusia henshawi and X. gracilis are also similar to one another and differ from the other groups by being larger and having large spots (larger in henshawi than gracilis). That leaves us with X. riversiana. This lizard is quite different from all of the others. It is endemic to three small Channel Islands (and one nearby rocky islet) off the southern California coast. It is the largest of the bunch, not as flattened, and its color pattern can be speckled, mottled, reticulated, or striped.

All of the night lizards are found in cryptic situations, usually under exfoliated cap rocks (X. arizonae, X. bezyi, X. henshawi, X. sierrae), crevices (X. riversiana, X. gracilis, the species previously mentioned), or under vegetation, especially succulents (X. vigilis, X. wigginsi). Of course, this is not an absolute, so some populations or individuals may select different cover, but none are found in the open during the day. Xantusia henshawi and X. gracilis do come out from cover at night and may be seen actively moving about the surface. The former is found on large, granitic boulders, while the latter is only found in areas with sandstone within a very small area of Anza-Borrego Desert State Park.

Night lizards are difficult to view in nature and their habitats are prone to destruction by unethical collectors. Never under any circumstance should you break off cap rocks to search for night lizards. These microhabitats have formed over hundreds or thousands of years and can be destroyed in seconds. The microenvironments are extremely sensitive, having the right amounts of light, moisture, temperature, separation, litter, and prey that Xantusia have evolved with. For the species that dwell under vegetation, the microhabitat is also similarly developed. So how does one look for night lizards? One option is to not look for them (especially X. riversiana, X. gracilis, and X. sierrae). These are fascinating animals, but we can certainly let them be and read about them in the literature and look at photographs of ethically obtained specimens (NOTE: in Lizards of the American Southwest, Rob Lovich and I only accepted photographs of night lizards [and other species] if the photographers assured us they were collected legally using ethical means). So what are the ethical means of observation? For X. henshawi and X. gracilis, the species can be viewed when on the prowl at night using a lantern or flashlight. It is possible that other boulder-dwelling species are active at night, but this is not well known. Other rock/crevice dwellers can also be viewed during the day in or at the edges of cracks when they are near the interface with the outside world. Xantusia are found in this situation in the early spring when they are warming up at the edge of cracks. Later in the year when it is warmer, they tend to stay deeper in the interior of cracks and crevices. Use a mirror or flashlight to peer into cracks. The color patterns of some species (especially X. henshawi and X. gracilis) during the day are
quite different than at night. To view species that occur under vegetation or other surface debris, an observer can carefully look under cover objects and replace them exactly as they were. Of course, this can only be done by people permitted to do such an activity in an area where it is legal to do so. Never under any circumstance just flip objects out of the way to see what is underneath.

Because of their cryptic nature, much remains to be learned about night lizard natural history (most research to date has been focused on taxonomy). Certainly one of the more exciting discoveries about *Xantusia*—or lizards for that matter—in recent years came from Alison Davis and her colleagues at the University of California, Santa Cruz. It has long been known that *Xantusia* are viviparous—giving birth to live young, rather than eggs—but what was not known was that at least one species, *X. vigilis*, has a complex social structure oriented around family groups. This sort of social behavior is well known for many birds and mammals, but few lizards are known to be social (mostly viviparous species). *Xantusia vigilis* live in family groups, where the offspring can stay with the mother and father, often under the same yucca, for many years. *Xantusia* spp. also tend to be long-lived, living in excess of ten years, a fact that can help bolster the utility of social behavior.

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**Education Corner**

Here are some Lizard Lesson Plans in the Public Domain to use with your students or children to celebrate the Year of the Lizard:

<table>
<thead>
<tr>
<th>Description</th>
<th>Suggested Age Group</th>
<th>Link</th>
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<tbody>
<tr>
<td>Students “Take a Trip” to the Greater Antilles to figure out how the <em>Anolis</em> lizards on the islands might have evolved. They observe characteristics and use phylogeny to test evolutionary hypotheses.</td>
<td>Grades 7-13 (and potentially applicable for introductory college biology)</td>
<td><a href="http://www.ucmp.berkeley.edu/education/lessons/anolis.html">http://www.ucmp.berkeley.edu/education/lessons/anolis.html</a></td>
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<tr>
<td>Introduces students to some characteristics of reptiles including ectothermy, adaptations, and feeding habits.</td>
<td>Grades 4-6</td>
<td><a href="http://www.desertmuseum.org/center/edu/docs/UpperElem_TIP_lizards.pdf">http://www.desertmuseum.org/center/edu/docs/UpperElem_TIP_lizards.pdf</a></td>
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<tr>
<td>Participants describe characteristics of lizards that distinguish them from other animals and demonstrate how cold-blooded (ectothermic) animals regulate their body temperature.</td>
<td>Grades 3-6</td>
<td><a href="http://www.ces.ncsu.edu/forestry/projects/lizards.pdf">http://www.ces.ncsu.edu/forestry/projects/lizards.pdf</a></td>
</tr>
<tr>
<td>This unit provides an overview of lizard biology culminating in the “Life as a Lizard” role playing game. The game gives students a chance to move around indoors or outdoors, and use their movement to learn about lizards and their behavior.</td>
<td>Grades 3-12</td>
<td><a href="http://tolweb.org/treehouses/?treehouse_id=2488">http://tolweb.org/treehouses/?treehouse_id=2488</a> <strong>Approved by AZPARC</strong></td>
</tr>
<tr>
<td>A series of activities that will enable students to explore the diversity of lizards in terms of characteristics, behavior, and habitat and help them identify special characteristics that help them thrive in their habitat.</td>
<td>Grades 1-4</td>
<td><a href="http://www.pbs.org/teachers/includes/content/wildkratts/all_about_lizards.pdf">http://www.pbs.org/teachers/includes/content/wildkratts/all_about_lizards.pdf</a> <strong>Approved by AZPARC</strong></td>
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**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 yearofthelizard@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.
Conservation and Translocation of the Fijian Crested Iguana, *Brachylophus vitiensis*

Veterinarian Robert Johnson and Herpetofauna Manager Peter Harlow from the Taronga Conservation Society Australia travelled to Fiji in September 2010 to evaluate the health of the population of the critically endangered Fijian Crested Iguana (*Brachylophus vitiensis*) on the iguana sanctuary island of Yadua Taba.

Translocation of 100 healthy iguanas to the pest-free island of Namena is planned for early 2012 as part of the International Union for Conservation of Nature Fijian Crested Iguana Species Recovery Plan. The project is being undertaken using the protocols specified in the IUCN Guidelines for Reintroductions (1998), with input and support from the IUCN Iguana Specialist Group in order to secure the establishment of a second secure population (in 2012) using a large founding genetic base. Nature Fiji/Mareqeti Viti and the National Trust of Fiji Islands are overseeing the project. The common goal is to ensure the long-term survival of the species. Veterinary input sponsored by the Taronga Foundation is critical to the success of the program.

Today Fijian Crested Iguanas survive on just a few remote islands in the west of Fiji, predominately on Yadua Taba, a small sanctuary island administered by the National Trust of Fiji Islands. An integral part of the project is to engage with the local people to affirm the common purpose of preserving this critically endangered species. After staying overnight in Denimanu Village on Yadua Island and paying their respects to the chief, Ratu Jone, Drs Johnson and Harlow made the short boat trip to the small offshore island of Yadua Taba. Dr Harlow has conducted research on the island for over 14 years. Several days were spent catching iguanas for physical examination and sample collection (morphometrics, blood and faeces for haematological, biochemical and parasitological analysis) in preparation for the planned translocation. The study area is a small 50 metre by 50 metre section of forest with 591 tagged and numbered trees.

After capture and sampling, each lizard was returned to its home tree. Many had been microchipped during previous studies, enabling more accurate monitoring of the movement of individual animals. Content to spend most of their time in the upper canopy of the dry tropical forest, the iguanas usually remain within a small area.

The collection of baseline data will provide a solid background for the assessment of the translocated population this year, hopefully improving their chances of survival.
Submit your Articles for Consideration in The Year of the Lizard News

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

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 newsletters include a federal focused issue, and a pets/invasives/trade issue (but please do not feel limited).
Submit your potential articles or any questions pertaining to contributing via email to yearofthelizard@gmail.com. The newsletter will be bi-monthly, with further issues coming out in July, September, and November 2012.

Upcoming Meetings & Events


Endangered and Threatened Species of New Jersey Workshop, May 16-18, Rutgers University, Basking Ridge and Tuckerton, New Jersey

Hands-on Wetland Creation Workshop for Professionals, May 22-24, Barnstable, MA

World Congress of Herpetology 7, August 8-14, 2012, Vancouver, British Columbia, Canada.

Get your Year of the Lizard 2012 Gear!

Simply go online to the PARCStore (http://www.cafepress.com/parcstore).
Stay tuned and check out the website periodically...more PARC and Year of the Lizard products will be showing up. Proceeds from sales go to the Amphibian and Reptile Conservancy, a not-for-profit organization that helps support PARC activities, such as public education, publications, and research.