



Year of the Lizard News

No. 4

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www.YearoftheLizard.org

Lizards Across the Land: Federal Agencies' Role

From Alaska to Hawaii to Florida, hundreds of millions of acres of our public lands are held in trust by federal land management agencies. Many of these lands support rich and diverse populations of lizards. The following collection of articles provides a sample of the outstanding scholarly and practical work being conducted on our federal public lands. Biologists at these and other federal agencies are hard at work to answer many important questions regarding the science of lizard conservation and management and to identify and conserve priority habitats for lizards and other native wildlife.

—Terry Riley, National Park Service, National PARC
Federal Agencies Coordinator

USGS Reveals “Cryptic Extinction” of Pacific Lizard

A species of lizard is now extinct from the Hawaiian Islands, making it the latest native vertebrate species to become extirpated from this tropical archipelago.

The Copper-striped Blue-tailed Skink (*Emoia impar*) — a sleek lizard with smooth, polished scales and a long, sky-blue tail — was last confirmed in the Na’Pali coast of Kauai in the 1960s. But repeated field surveys on Kauai, Oahu, Maui and Hawai’i islands from 1988 to 2008 have yielded no sightings or specimens.



A Copper-striped Blue-tailed Skink (*Emoia impar*) photographed in Samoa during a USGS field survey. Photo: Chris Brown, USGS.

“No other landscape in these United States has been more impacted by extinction events and species invasions in historic times than the Hawaiian Islands, with as yet unknown long-term cascading consequences to the ecosystem,” said U.S. Geological Survey director Marcia McNutt. “Today, we close the book on one more animal that is unlikely to ever be re-established in this fragile island home.”

“This skink was once common throughout the Hawaiian Islands, and in fact the species can still be found on many other island groups in the tropical

continued on p. 4



One of the last known specimens of the Copper-striped Blue-tailed Skink collected from the Hawaiian Islands.

**Look for Issue No. 5 of
Year of the Lizard News
in September!**

Inside:	page
Photo Contest Calendar	2
Spotlight: Flat-tailed Horned Lizard	13
Let’s Go Lizard Watching!	14
An Interview with Debra Hill	17
A New Lizard for WA	19
Lizards in the News	20
Education Corner	21
Featured Lizard Families	22
An Interview with Patrick Malonza	26
Upcoming Events	27

“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 July Photo Contest Calendar



Leaves? No, it's a lizard! Striking natural camouflage is the feature on this month's Photo Contest Calendar. A trip to the Amazon Basin netted this winning photo for Caio A. Figueiredo de Andrade. Get a closer look at this beautiful little lizard and our equally well-disguised runner-up when you download your monthly calendar from <http://parcplace.org/images/stories/YOL/YearoftheLizardCalendarJuly.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>.



In case you missed the June calendar, take a look at this gorgeous Green Basilisk (*Basiliscus plumifrons*), captured by Bill Parker, the June winner.

Runner-up
Linda Weir caught her cat Snowball watching this juvenile Five-lined Skink (*Plestiodon fasciatus*) climbing her screen.



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.

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.

Lizard Art!

This striking Canegrass Two-lined Dragon (*Diporhora winneckeii*) from Australia was drawn by Stephano Rambaldi, a Master's student at the University of Bologna, on his trip across the continent.



Violet Gorman (age 3) colored this Anole, submitted by Jessica Homyack (Mom), SE PARC Co-chair, Weyerhaeuser NR Company.



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.

Lizards? Where?

Did you see a lizard? Document it with our Standard Inventory Forms!

Lizard localities are not always a priority for documentation in state or federal databases because few lizards have status of concern. Only generalized range maps are available in field guides or the scientific literature, in part because locality data have not been compiled for most lizards. With habitat alteration and environmental changes on the increase in our ever-changing world, now is the time to begin a more comprehensive assessment of species distributions. This is a task for lizard super-sleuths

like you! We have designed a generic inventory form for collecting species locality data. Forms can be downloaded from the Lizard Mapping page of the Year of the Lizard website: <http://parcplace.org/news-a-events/year-of-the-lizard/268.html>

If you find an unusual animal, or an animal in an unusual place, consider taking a photo voucher (dated, close-up, in-hand, or zoomed-in digital photo) to document your find. A photo is also helpful if you're not sure of the identification and want to get confirmation from an expert. And think ahead for Year of the Snake (2013)!

Completed forms and photo vouchers can be returned to our email address: yearofthelizard@gmail.com



Follow all of the Year of the Lizard news and happenings on Facebook (<http://www.facebook.com/yearofthelizard2012>) and Twitter (<http://twitter.com/YearOfTheLizard>).



continued from p. 1: *Lizards Across the Land*



Copper-striped Blue-tailed Skinks survive in Samoa and other Pacific islands. Photo: Chris Brown, USGS.

Pacific,” says Robert Fisher, a biologist with the USGS Western Ecological Research Center. “That’s what makes this extinction so intriguing: if an otherwise common animal can be completely extirpated from one island ecosystem but not others, then what does that tell us?”

Fisher and colleague Ivan Ineich of the Muséum national d’Histoire naturelle in Paris announced their findings on *E. impar* this month in the international conservation journal *Oryx*, published by Fauna and Flora International.

Small animals like this skink are prone to what Fisher and Ineich call “cryptic extinction”—when a species is easily confused with similar species, its extinction can go unnoticed for decades.

“The extinction of native Hawaiian bird species is well documented, partly because their presence and sounds had been so distinctive to humans,” says Ineich, who is also a researcher with the French National Center for Scientific Research (CNRS). “But without regular field surveys, we tend to overlook the disappearances of smaller, secretive species, along with the causes of their extinction.”

While the exact causes of the skink’s Hawaiian extinction are unclear, Fisher and Ineich note that island extinctions around the world often share similar factors, such as the loss of habitat due to uncontrolled human development. Another factor is competition or predation from invasive species accidentally or intentionally introduced through human migration and activity.

“There’s some evidence that an invasive ant was preying on these skinks,” Fisher says. “That’s a new factor we’ll need to examine as we look out for other at-risk species in the Pacific islands.”

— Ben Young Landis and Robert Fisher, *U.S. Geological Survey*

New ‘Bumblebee’ Gecko Discovered in Papua New Guinea

Biologists from the Papua New Guinea National Museum and the U.S. Geological Survey have discovered a new species of gecko, adorned like a bumblebee with black-and-gold bands and rows of skin nodules that enhance its camouflage on the tropical forest floor.



The Bumblebee Gecko (*Nactus kunan*), from Papua New Guinea was discovered in 2010, and described as a new species in 2012. The yellow and black gecko is about 5 inches long. Photos: Robert Fisher, USGS.

Specimens of the lizard, which measures about 5 inches from head to tail, were collected in May 2010 in Sohoniliu Village on Manus Island in Papua New Guinea. Herpetologists George Zug of the Smithsonian Institution and Robert Fisher of the USGS Western Ecological Research Center described the new species in a report published in *Zootaxa* this month.

“The discovery of a new species from deep in the forests of New Guinea is a cause for celebration, adding one more chapter to ‘The Book of Life,’” remarked USGS Director Marcia McNutt. “Now the real work begins! To fill those pages with the wonders of this new creature, its place in the forest ecosystem, its adaptation to its environment, and perhaps even novel strategies for coping with disease from which we will ultimately benefit.”

“We’ve officially named it *Nactus kunan* for its striking



Bumblebee Gecko. Photo: Robert Fisher, USGS.

color pattern—*kunan* means ‘bumblebee’ in the local Nali language,” says Fisher. “It belongs to a genus of slender-toed geckos, which means these guys don’t have the padded, wall-climbing toes like the Common House Gecko, or the Day Gecko in the car insurance commercials.”

Fisher found two individuals of the Bumblebee Gecko on Manus Island in 2010 and analyzed their genetics to show that the lizards were new and distinctive. Two additional species were found during that trip, and the specimens await further analysis.

“This species was a striking surprise, as I’ve been working on the genus since the 1970s, and would not have predicted this discovery,” says Zug, a curator emeritus at the National Museum of Natural History.

“Exploration of Manus Province is in its infancy, with many new species possible, and this joint expedition was our first to this region,” says Bulisa Iova, the reptile curator at the Papua New Guinea National Museum.

This research on Pacific lizard biodiversity was supported by the Smithsonian, U.S. Department of Defense, and USGS. USGS regularly collaborates on biological surveys with partner nations, as part of its mission to provide scientific information that helps government managers address critical natural resource issues.

— Ben Young Landis and Robert Fisher, U.S. Geological Survey

Meet the Lauan Ground Skink of Fiji

What you see here is one of the first photographs ever taken of a living Lauan Ground Skink (*Leiopisma alazon*), a three-inch-long lizard that is found only on three little islands in the entire world. The largest of those islands is less than one square kilometer in surface area—meaning the entire island can fit inside the playing field of

a Major League ballpark like AT&T Park or Petco Park.

In July 2011, USGS Western Ecological Research Center scientist Robert Fisher explored the Ono-I-Lau island complex of Fiji, with support of the Mohamed bin Zayed Species Conservation Fund, National Trust Fiji, and a team that included Fijian herpetologist Nunia Thomas of Nature Fiji-MareqetiViti, and graduate student Jesse Grismer from University of Kansas.

The expedition focused on the Lauan Ground Skink, which was discovered in 1982 by the Smithsonian Institution but not observed again by scientists until 2011, when the team photographed live specimens for the first time and discovered two more very small island populations.

Island species are of great interest to ecologists, because their existence and genetics can offer clues to how species become distributed across distant oceans, and how lineages diverge and become distinct, new species. On the flip side, island species are also of great interest because their disappearance can offer clues to why animals go extinct, given the presence or absence of various human or natural factors.



A Lauan Ground Skink. Photo by Robert Fisher, USGS.

Robert Fisher and colleagues are applying these questions to the Lauan Ground Skink and other island reptiles they are studying throughout the Pacific, from Hawaii to Papua New Guinea. On many islands, introduced pigs, rats, and even a type of “yellow crazy ant” are posing predatory dangers to small, native reptiles. Additionally, forecasted sea level rise may also pose a risk—particularly if a species’ home range is a tiny island just above sea level.

Ongoing surveys will help uncover the distribution and genetics of hard-to-find animals like the Lauan Ground Skink, and help resource agencies of island nations understand and manage their unique biodiversity.

— Ben Young Landis, U.S. Geological Survey

Cougars Encourage Lizards in Zion

Lizards and cougars are connected by food-web pathways. No, these big cats don't eat lizards, it's a little more complicated than that. "Trophic cascades" is a community ecology concept whereby a predator exerts a top-down influence on an ecosystem, affecting species diversity through a series of direct and indirect effects among organisms. In this light, Drs. Bill Ripple and Bob Beschta (Oregon State University) have investigated "predator-common" and "predator-rare" areas, including a study of wolves in Yellowstone National Park, Wyoming, and a study of cougars in Zion National Park, Utah. Both studies support the idea that these top predators have cascading effects on the biodiversity of the ecosystem: predator-common systems have much higher biodiversity. Why? Because the predators' presence tempers high levels of herbivory by elk and deer, and vegetation is retained along streams in particular. At Zion, lizards are part of the trickle-down effects (Ripple and Beschta 2006).

At Zion, Ripple and Beschta compared the biodiversity of a "Cougars-Rare" zone, where Mule Deer have become abundant, to the biodiversity of an otherwise similar "Cougars-Common" zone with fewer Mule Deer. They provide an interesting account of the history of Zion, with the heavy visitation by nature enthusiasts since the 1930s contributing to the displacement of cougars from Zion Canyon, the Cougars-Rare zone. Good records of deer populations since the 1930s also aided the study goals.

Lizard relative abundance (number per kilometer) and species richness (number of species) was higher in the Cougars-Common zone than in the Cougars-Rare zone. The number of lizard species in the Cougars-Common



Tree Lizards (*Urosaurus ornatus*) are found where cougars are common, in North Creek, but not in nearby Zion Canyon, where cougars are rare, as is riparian vegetation. Photo © LLC Jones.

zone doubled (see Table, below).

A similar pattern of higher relative abundance in the Cougars-Common zone was found for amphibians, butterflies, wildflowers, and aquatic plants. There were four butterfly subfamilies found in both zones, and six additional subfamilies found in the Cougars-Common zone: the butterfly diversity more than doubled with cougars present. An analysis of fish data showed an analogous pattern as well: more fish where cougars were common. Ripple and Beschta provided support for the key mechanism involved in this ecosystem transition being the Mule Deer herbivory on cottonwoods, in particular causing a drastic reduction in cottonwood recruitment. In the Cougars-Rare zone in Zion Canyon, high numbers of park visitors scared off cougars, deer flourished and diminished the gallery cottonwood forests, greater streambank erosion occurred, and cascading effects on other biota were striking. Important lessons from this work are that: 1) top predators can alter an

entire ecosystem; 2) an apparently benign signature of human influence can be related to drastic ecosystem changes; 3) some parts of US National Parks may be alarmingly degraded—they are not "pristine" areas; and 4) great strides in biodiversity conservation research are happening now. For lizards in Zion, cougars beget biodiversity!

I thank Bill Ripple and Bob Beschta (Oregon State University) for their conversations regarding their breakthrough studies, and Kathryn Ronnenberg for her editorial efforts. For more information: Ripple, W.J. and R.L. Beschta. 2006. Linking a cougar decline, trophic cascade, and catastrophic regime shift in Zion National Park. *Biological Conservation* 133:397-408.

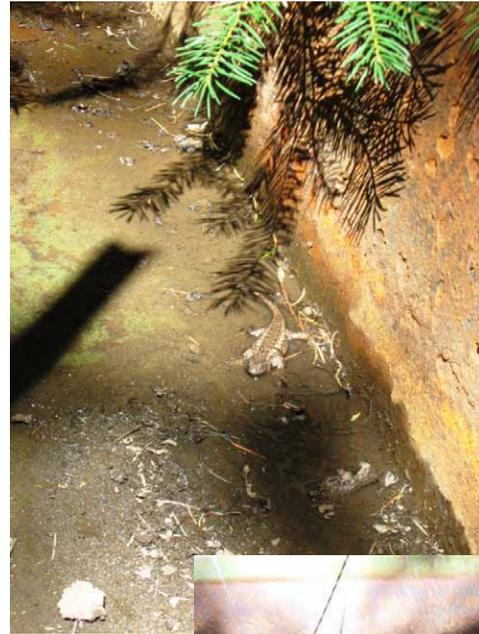
— Dede Olson

Species	Zion Canyon Cougars-Rare Zone	North Creek Cougars-Common Zone
Eastern Fence Lizard, <i>Sceloporus undulatus</i>	x	x
Sagebrush Lizard, <i>S. graciosus</i>	x	x
Plateau Whiptail, <i>Aspidoscelis velox</i>	x	x
Desert Spiny Lizard, <i>S. magister</i>		x
Common Side-blotched Lizard, <i>Uta stansburiana</i>		x
Tree Lizard, <i>Urosaurus ornatus</i>		x
Lizard density, no./km	~6 / km	~16 / km

Ramping up Lizard Conservation in Rangelands

A new perspective of California's rangelands is surfacing. Ranching families are being held in high regard for their land-use ethics, and undeveloped grasslands are becoming highly valued as the last open-space frontiers in the face of urban sprawl. More and more studies are being published refuting grazing as a threat to native species, rather finding that managed livestock grazing is essential to prevent loss or decline of species. For US Forest Service range specialist Joshua Read and wildlife biologist Kary Schlick, this perspective created a new working relationship between their disciplines on the Six Rivers National Forest in northwestern California. It started with a mutually valued resource, water. Ranchers for centuries have positioned water troughs across the landscape to encourage livestock dispersal and provide reliable water during critical hot and dry months. Read and Schlick recognized the value of this patch network of water sources in supporting local and migrating wildlife species. In 2010 they began enhancing and maintaining such systems. They never realized that their efforts would uncover new insights into trough-associated communities. Their experiences bring new meaning to the phrases: "dying of thirst" and "high and dry."

Several species were literally "dying of thirst" by falling into the water trough and drowning while attempting to drink or bathe. Decaying carcasses in troughs greatly diminished water quality. Consequently, Read and Schlick launched efforts to provide clean and safe drinking water for both livestock and wildlife. They purchased 104 Aquatic Escape Ramps (see photo above) and set out to affix them to troughs across the landscape. The Aquatic Escape Ramp concept has been around for several decades and is a Better Management Practice of



A fence lizard found trapped in a leaking water trough with no way out. Photo by Michelle McKenzie.

Upon installation of the escape ramp, it took no time at all for the trapped lizard to scurry up the edge and leap off into the grassy meadow.



John Meriwether (wildlife biologist) fits an escape ramp in a replacement trough with permittee and son. Photo by Vincent Slabe.

the Forest Service but often is implemented ineffectively with ad hoc branches, logs, or boards. Through proper installation with an effective design, Read and Schlick expect to significantly reduce the unnecessary drowning of species and increase the availability of clean water.

On a hot summer day during ramp installation, they came across an unfortunate fence lizard in an old metal trough. The trough was without water due to rust holes and was hot to the touch. The lizard tried to flee up the vertical side walls but could not maintain traction. As they pondered the situation, they suspected that it had used the small trees that had grown around the trough due to lack of use to access the rim. Perhaps the thirsty lizard was lured in by the tiny trickle of water in one corner and the prey insects the water attracted. Nonetheless, the unfortunate lizard was basically "high and dry." Upon installation of the escape ramp, it took no time at all for the unfortunate lizard to scurry up the edge and leap off into the grassy meadow.

In 2012, Region 5 of the Forest Service purchased 208 more ramps that have now been distributed to all California national forests with rangelands. Read and Schlick's objective to provide clean and safe drinking water for both livestock and wildlife has been taken



Aquatic escape ramp installed within an existing water trough. Photo by John Meriwether.

up by a larger team made up of range and wildlife resource specialists and the aquatic education leader, who conducted a week-long tour to distribute the ramps and reiterate the conservation message. The effort is in partnership with Bat Conservation international and Partners in Amphibian and Reptile Conservation, who seek to address this problem by bringing prototype affordable, effective escape ramps to water sources across the West. (For more information on the program, see *Water for Wildlife* at www.fs.fed.us/pnw/lwm/aem/docs/olson/bciwaterforwildlife.pdf.) The new ramps appear to be benefiting not only lizards, but birds, rodents, and bats. In just two years, 312 ramps have been installed, and the lives saved are too valuable to count. Ramping up native biodiversity on all lands is a take-home message for us all!

—by Kary Schlick, US Forest Service, Six Rivers National Forest, California

USDA Forest Service National Forests' Year of the Lizard Projects

Angeles National Forest:

Los Angeles River, San Gabriel River and Santa Clara/Mojave Rivers Ranger Districts: Leslie Welch (Wildlife Biologist) and Ann Berkley (Wildlife Biologist) continue to monitor lizard habitat affected by the 2009 Station Wildfire. Closures remain in place to allow for native vegetation and watershed recovery for numerous species including two listed Forest Service Sensitive lizards: 1) the San Diego Coast Horned Lizard (*Phrynosoma coronatum blainvillii*) and 2) California Legless Lizard (*Anniella pulchra*).

Santa Clara/Mojave Rivers Ranger District: Michael “Todd” Cook (Visitor Services Information) coordinates over 20 environmental educational programs with the Volunteers of the Angeles National Forest, reaching 1128 people. One program includes a focus on local reptile species showcasing live snakes and lizards from the area.

Coronado National Forest:

Larry Jones (Assistant Program Manager) continues a long term study surveying an area with the highest diversity of lizards known in the US. The study is a subset of the climate change work on the CNF which questions if lizard communities will be an early warning system.

Larry Jones, Elisa Baca (Hispanic Coordinator) and Alan Belauskas (Safety Officer) are in the third year implementing Sabino Canyon guided lizard walks that target summer day-care programs in minority-dominated parts of Tucson that support the “No Child Left Inside Act of 2008.” This is a successful effort that has evolved into both guided and self-guided programs for Sabino Canyon, which attracts 1.75 million visitors per year, numerous partnerships, lizard walks for the general public, and the creation of posters and handouts.



“No Child Left Inside Act” inspired herpetologist Larry Jones to share his knowledge with kids while hiking. Photo courtesy of Coronado NF.

Eldorado National Forest:

Placerville Ranger District: Jann Williams (Fisheries Biologist) & Rob Grasso (Fisheries & Aquatic Ecologist) hosted the California-Nevada Amphibian Task Force meetings, Susan Yasuda (Wildlife Biologist) handed out over 50 Year of the Lizard (YoL) buttons with informational ribbons describing YoL, the webpage, and how to get involved. Many participants stayed for the following California Reptile and Amphibian Conservation and Management Forum and proudly wore their “lizard bling”, further spreading the word about YoL.

Georgetown Ranger District: Tina Garcia (Rangeland Specialist), Jon Jue (Resource Officer) & Susan Yasuda (Wildlife Biologist) hosted an Aquatic Escape Ramp tour in March at a campground for stock. The all-day event included participants from the Regional Office, multiple forests, and the California Department of Fish and Game. Line Officers, range, recreation, wildlife, and fisheries were represented, too. They received verbal and hands-on instructions in evaluating man-made water sources for appropriate wildlife escape ramp placements to benefit lizards and other species.



Aquatic Escape Ramp Team (left to right Linda Anger-R5 Bat Lead, Kary Schlick-R5 Herpetology Lead, Anne Yost-R5 Range Manager, Dan Teater-R5 Aquatic Education) pose after explaining how best fit a ramp at this water source and before distributing them among those in attendance. Photo by Susan Yasuda.

Placerville Ranger District: Susan Yasuda (Wildlife Biologist) created an interactive display to showcase the Year of the Lizard to the patrons of the El Dorado County Main Library. Counters logged over 15,000 people walking by the three large glass display cases during May. The librarians mentioned the display was always heavily visited for extended periods of time. Participants learned about the Partners in Amphibian and Reptile Conservation organization, herpetology, research, community involvement, responsible viewing, health benefit contributions, the many YoL contests, the YoL calendar, and of course lizards.

San Bernardino National Forest:

Santa Rosa & San Jacinto Mountains National Monument: Danielle Ortiz (Natural Resources) educated 250 high school students on the conservation efforts for the Coachella Valley Fringe-toed Lizard (*Uma inornata*) and encouraged teens to get involved.

Six Rivers National Forest:

Joshua Read (Range Specialist) aims to outfit 104 livestock water troughs with aquatic escape ramps to prevent the unnecessary drowning or entrapment of numerous species including lizards.

Tahoe National Forest & Regional Office:

Dan Teater (R5 Aquatic Education Coordinator) & Michael Kellett (Regional Fisheries Biologist) obligated funds to support the Aquatic Escape Ramp Initiative in 2012. The funding provided for the construction of 208 ramps plus hardware, and the revision of “*Water for Wildlife – A Handbook for Ranchers and Range Managers*” created by Bat Conservation International. These materials were distributed to range and wildlife specialists and will be installed during the summer of 2012 across 18 national forests in California. The initiative was aimed at providing opportunity for managers to become involved with attaining safe and clean water sources on public lands for the benefit of livestock and wildlife, including lizards.



The Flat-tailed Horned Lizard takes camouflage a step further by shuffling down into the soft sand.

King of Horned Lizards Keeps the Victor's Crown

Remarkably elusive in both color and behavior (see photo above), the Flat-tailed Horned Lizard (*Phrynosoma mcallii*) is found only in extreme southwestern Arizona, southeastern California, and adjacent portions of Baja California and Sonora, Mexico. Of the 9 species of horned lizards in the United States, this species has the most restricted distribution, and is particularly dependent on its specialized diet of harvester ants. It is easily identified by a dark line down its back, plus it has the longest horns of all horned lizards relative to its head size (photo, next page). With about half of its historic range converted to agriculture, cities (such as Yuma, El Centro, and Palm

Springs), and other human uses (including new solar projects), this lizard has received federal attention for over 30 years. Yet, after multiple evaluations, petitions and lawsuits, the species has not been listed under the U.S. Endangered Species Act. Why not?



While the U.S. Fish and Wildlife Service was initially deliberating about whether or not to list this species as threatened under the Endangered Species Act, federal and state management agencies proactively organized themselves into an Interagency Coordinating Committee and a Management Oversight Group. They then drafted and implemented a Rangeland Management Strategy to conserve this charismatic lizard. Most importantly, this interagency group of 13 stakeholders from the United States and Mexico designated five large Management Areas, which encompassed nearly all of the remaining Flat-tailed Horned Lizard habitat on federal lands. The best available data indicate populations are currently in the hundreds of thousands within these protected Management Areas.

In spite of these successes, loss of previously-occupied habitat in the Coachella Valley and on state lands led environmental groups and concerned scientists to file lawsuits against the U.S. Fish and Wildlife Service, alleging that the decisions to not list were politically motivated rather than science-driven. These stakeholders maintain that a decision to list would have made more money available, promoted more academic research, and resulted in greater conservation measures on state and private lands. This has gone to court four times, and each time the USFWS has decided that listing was not warranted, thanks largely to the voluntary implementation of the Rangeland Management Strategy.

Research, conservation, and monitoring of the Flat-

tailed Horned Lizard is ongoing. Uncertainties and concerns remain, particularly with spread of invasive plant species, the threat of climate change, and the rapid influx of large-scale alternative energy projects in desert areas. The stakeholders of the Rangeland Management Strategy remain committed to the long-term viability of this species, and for now the king of horned lizards is keeping the victor's crown.

—Kevin V. Young, Professor, Arizona Western College
Robert E. Lovich, Naval Facilities Engineering Command
Southwest

My First Panoche Hills Leopard Lizard

In 2010, The Hollister Office of the Bureau of Land Management partnered with the USGS Conservation Genetics laboratory in San Diego to conduct a survey for the endangered Blunt-nosed Leopard Lizard, *Gambelia sila*, in the Panoche Hills of California. Rising from the west side of the San Joaquin Valley, the Panoche Hills are a rugged region of desert hills and canyons interspersed with plateaus and lowlands, and represent one of the northernmost outposts of the lizard. Other desert organisms also reach their northern limit here, including Mormon tea, a shrub used by leopard lizards for shade and protection from predators. I had been coming to the Panoche Hills to look for reptiles since the early 1990s and had never found *Gambelia*, although I had heard they were there. Now it had come time to



actually find them for real. For days I wandered through a strange landscape of barren desert soil and hulking Mormon tea bushes, hoping for a glimpse of the fabled Leopard Lizard. I enlisted the help of a colleague who had more experience with the lizard than I did and took him to the Hills. We drove up to a plateau that I thought provided good habitat, but he shook his head. “Too high,” he said. Glum words. The habitat looked so good, I thought to myself as we drove along—open land with the nonnative grass grazed almost to nonexistence, scattered with low shrubs. Suddenly I saw something running alongside the truck on two legs, like a small dinosaur. It could only be one thing. I called out, “Leopard lizard!” and stopped the truck. My colleague was skeptical, but he politely got

out of the truck and started peering into a shrub. I cast around, trying to see again what I had glimpsed. Then I heard a strange, choking noise. I looked around to see my colleague gesticulating towards the bush. “In here,” he was mouthing, trying not to speak out loud. I peered into the bush, and there he was. A huge lizard with dark spots and bright bands, looking out at me with an expression I have learned to love on this lizard: a gentle gaze, as if he had nothing to fear. If we are successful in setting aside land for the lizard in the Panoche Hills, and if we manage it wisely, we will not need to fear for the lizard’s continued existence.

—Mike Westphal, Ecologist, Hollister Field Office,
Bureau of Land Management

Conservation Regardless of Listing

The Dunes Sagebrush Lizard (*Sceloporus arenicolus*) is a spiny lizard native to remnant Shinnery Oak (*Quercus havardii*) dune habitat in southeastern New Mexico and adjacent western Texas. The lizard is a habitat specialist that flourishes in the hot sandy environment of shinnery oak dunes. The elusive species is active between March and October but is dormant underground during winter months. Its habitat range falls within the Permian Basin, an area dominated by oil and gas development. The rarity of the lizard combined with its highly specific habitat needs and associated threats require extensive collaborative efforts to identify appropriate management strategies to ensure its conservation.

In 2008, the Bureau of Land Management (BLM) in collaboration with the USFWS developed an innovative Candidate Conservation Agreement (CCA) and Candidate Conservation Agreement with Assurances (CCAA) as instruments to conserve the lizard while



Shinnery Oak dune habitat in the Mescalero Sands. Photo by Michael Hill.



Dunes Sagebrush Lizard under Shinnery Oak. Photo by John Sherman.

providing a mechanism that would allow continued oil and gas development and livestock grazing. These agreements are designed to provide a high level of certainty that if parties implement conservation activities, they will not be subject to additional restrictions if the species becomes listed. Conservation measures include requiring all surface disturbing activities to stay out of dune habitat; minimizing oil well pad size; reclaiming oilfield infrastructure; and keeping fences, roads, and powerlines out of dunes. In addition, for every enrolled oil and gas lease, companies contribute funds to implement conservation measures. To date, \$3 million dollars have been contributed by 29 oil and gas CCA cooperators to fund on-the-ground habitat improvements. Furthermore, over 1,500,000 acres of state, federal, and private lands have been dedicated to habitat protection. An unusual and invaluable accomplishment of this CCAA is the protection of 243,000 mineral acres (subsurface acres) on state and private lands, a resource which rarely experiences restricted use.

The U.S. Fish and Wildlife Service (USFWS) proposed to list the Dunes Sagebrush Lizard as endangered under the ESA in December 2010. Since the proposed rule, there has been extensive debate among conservationists, ranchers, industry officials, and politicians regarding the potential listing of the lizard. The debate continues, but whatever the outcome, through cooperative stewardship, creativity and due diligence by BLM and numerous partners, the Dunes Sagebrush Lizard will be conserved. The USFWS is scheduled to make a decision in mid-June.

—Kim Tripp, Threatened & Endangered Species
Specialist, Division of Fish and Wildlife Conservation,
Bureau of Land Management



Dunes Sagebrush Lizard. Photos by Mike Hill.

Perspective: Conservation, a Piece of Cake

Conservation is a piece of cake. I wish that I could repeat this statement every day when I walk into my office. It turns out there would be no need for the term, conservation, if there was nothing competing for species resources. Unfortunately, there are constant, and often conflicting, demands placed on the natural resources needed by a plethora of species. One such example is a small sand-dwelling lizard that lives in the Shinnery Oak dune system of southeastern New Mexico and adjacent west Texas. While this area appears to be desolate and devoid of life, it is a diverse ecosystem harboring a number of unique and endemic species. This area also is of economic importance due to the presence of oil and gas deposits and the rangeland that sustains cattle ranching. To the Dunes Sagebrush Lizard, *Sceloporus arenicolus*, the rolling shinnery oak dunes are home.

As a U.S. Fish and Wildlife Service biologist it is my job to work with research scientists, conservationists, land managers, oil and gas operators, and private landowners to provide conservation measures that allow continued, reasonable development while minimizing impacts to this unique ecosystem and the associated biodiversity. In the eleven years since the lizard became a candidate species under the Endangered Species Act, these groups have worked to develop conservation strategies to protect the lizard and the Lesser Prairie-chicken. Joint Candidate Conservation Agreements in New Mexico and Texas direct development away from lizard habitat, work to remove existing well pads and roads, and reduce habitat fragmentation on federal, state, and private land. These plans aim to conserve the unique Shinnery Oak dune habitat, and preserve the species while providing businesses and landowners a “no surprises” approach to conservation.

To date, over 80% of the lizards’ range has either been removed from leasing or is included in conservation agreements. Oil and gas companies and landowners are now aware of the lizard and its habitat requirements. Although it has taken many years and is not always a piece of cake, it’s my job and I love it.

—Debra Hill is a Fish and Wildlife Biologist with the U.S. Fish and Wildlife Service at the New Mexico Ecological Services Field Office in Albuquerque.



Sunset over Dunes Sagebrush Lizard habitat. Photo by Mike Hill.

Ask the Experts

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

Which continent has the highest level of lizard species diversity?

Eric Pianka, University of Texas at Austin, answers:

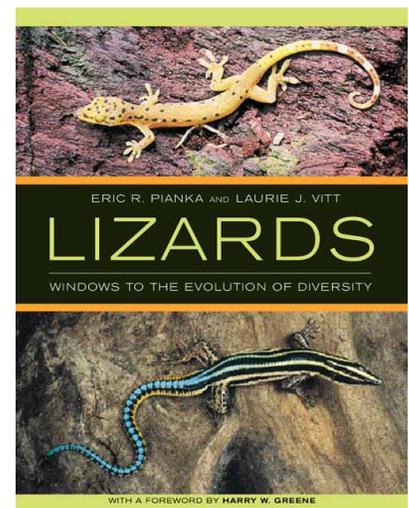
Australia probably takes the cake, with Africa and South America in second place. (Africa has an unfair

advantage due to its huge size.)

Learn more about why lizards make such great models for diversity studies in Pianka and Vitt’s book *Lizards: Windows to the Evolution of Diversity*

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.



Species Spotlight

Obstacles to Monitoring a Cryptic Desert Lizard

By Tyler Grant, PhD candidate in the Department of Natural Resource Ecology and Management, Iowa State University



Adult and juvenile Flat-tailed Horned Lizard.

The Flat-tailed Horned Lizard (*Phrynosoma mcallii*) occurred historically in southeastern California, southwestern Arizona and parts of Sonora and Baja California Norte in Mexico, a much smaller area than most other *Phrynosoma*. An estimated 45% of its historical habitat in the U.S. has been converted to agriculture, urban areas, or other anthropogenic uses. There is concern over its conservation status and controversy over its population size, threats to its persistence, and its legal protection has resulted in limited options for management and multiple lawsuits.

One controversy occurred because of a lack of reliable monitoring and abundance data. The lizard's primary anti-predator mechanism is to remain motionless and rely on cryptic coloration, even when it is about to be grasped by a researcher. Because researchers have difficulty

finding more than a few individuals in the field, large-scale estimates of its abundance have been discouraged for decades. Traditional survey methods such as converting the number of scats to the number of lizards or counting individuals within strip transects were plagued with problems of bias and underestimation. Scat counts do not correlate to numbers of lizards, and low detectability of the lizard suggests that there are more lizards present at a site than are discovered during surveys. Straightforward counts of individuals (aka: raw counts) fail to account for the less than perfect "detection probability" of individuals, which often results in biased estimates of the population size and misleading results. An alternative approach is to use methods that account for detection probability, such as mark-recapture or distance sampling.

In order to provide a rigorous estimate of lizard density across a large area, we implemented a closed mark-recapture approach that also accounted for spatial sampling and lizard availability. During the mark-recapture surveys, we caught a total of 184 unique lizards in 3 management areas (MAs) over two years. However, when this "naive estimate" of the population was adjusted for missed detections and availability, our estimates were considerably greater (see Table).

Our results provide the first large-scale abundance estimates of Flat-tailed Horned Lizards. Though difficult to survey, robust survey and analysis methods that incorporate detection probability provided estimates which were unbiased and were bounded by confidence intervals. Though some of the intervals were rather wide (e.g., East Mesa), these estimates portrayed our understanding of the lizard population in the MAs better than raw counts would have, which have no confidence intervals and give a false sense of precision.

The Flat-tailed Horned Lizard Range-wide Management Strategy (RMS) implemented by federal and state agencies—including the Bureau of Land Management, Department of the Navy, and U.S. Bureau of Reclamation—was developed to preclude the need to list the Flat-tailed Horned Lizard under the Endangered Species Act. The RMS currently allows development of only 1% of each MA, which means that surface disturbance is prohibited in the rest of the 485,000 acres within the MA. The RMS also details the need for robust monitoring, which was consistent with our approach. Monitoring for the Flat-tailed Horned Lizard continues to evolve, with the use of occupancy estimation and Pradel mark-recapture models in recent years. Monitoring this lizard has demonstrated that the increased effort needed to get unbiased estimates of a species can pay dividends for managers, especially when the path forward is unclear.

Area - Year	Population Size	95% Confidence Interval	
		Lower	Upper
Yuha Basin MA 2002	25,514	12,761	38,970
East Mesa MA 2003	42,619	19,704	67,639
West Mesa MA 2003	10,849	3,213	23,486

Let's Go Lizard Watching! By Lawrence L.C. Jones

Reprinted by permission from Arizona Wildlife Views, March-April 2012, Watchable Wildlife feature. Photographs for Year of the Lizard News may not be the same.



The Eastern Collared Lizard (Crotaphytus collaris) is the epitome of lizard-watching. Males, such as this one, are more vividly colored than females (also true for most other species).

For many a nature enthusiast, birding has long been the default pastime. Some bird-watchers have expanded their horizons to include butterflies, dragonflies, and other critters. But the ultimate in watchable wildlife (in my opinion) has largely gone unnoticed—lizards.

Lizards are ideal as watchable wildlife for a variety of reasons:

- Lizards are abundant in most locations.
- They occur across most of our public lands, especially in the Southwest.
- Most are diurnal (daylight-active).
- As with birds, lizards (especially males) possess beautiful colors and patterns.
- They have interesting behavioral traits, such as their famous “push-up” displays.
- Most species are fairly approachable.
- One generally can see a particular species by knowing where it occurs.

Also, for most Arizonans, it is inexpensive to go lizard-watching. All we need to do is sit on a lounge chair in our backyard to see the antics of these curious little animals. Arizona has more kinds of lizards (53 species) than anywhere else in the country and nearly every corner of the state is well-represented.

The lizard-watching pastime has not gone completely unnoticed among nature enthusiasts. In southern Arizona, this activity is going public. Tucson's Arizona-Sonora Desert Museum has a large lizard enclosure at the front entrance. This display houses several species native to southern Arizona and northern Mexico. Inside the museum grounds are other exhibits with reptiles, including “life in the rocks,” the reptile house, and viewing areas along the walkways. Stephane Poulin and Craig Ivanyi, museum herpetologists (those who study amphibians and reptiles), perform a reptile show, “Live and (Sort of) on the Loose.” It invariably includes a Gila Monster, the only venomous lizard in the United States.

I am aware of three regularly occurring guided lizard walks to help enthusiasts enjoy viewing and learning about the

saurian (lizard) denizens of southern Arizona. Two lizard walks have been going on for some time. At the Boyce Thompson Arboretum, naturalist Paul Wolterbeek organizes guided lizard walks on weekends during spring and summer. Local herpetologists who lead the walks include “Wildman Phil” Rakoci and Arizona Game and Fish Department's Abigail King and Randy Babb. Commonly observed species include Greater Earless Lizard, Desert Spiny Lizard, Ornate Tree Lizard, Common Side-blotched Lizard and the occasional Eastern Collared Lizard.

Ed Moll began the “reptile ramble” at Tohono Chul Park in Tucson in 2003. In recent years, Ed was joined by another herpetologist, Tom McDonald, and some park docents. The program runs on Fridays between April and October at 10:00 am. During the first hour, the audience is educated on the natural history and ecological roles of reptiles in southern Arizona. Attendees are allowed to touch or hold local snakes if they want, including Gophersnake, Common Kingsnake, and Sonoran Mountain Kingsnake. A live display of venomous reptiles, including a Gila Monster, is shown in an enclosure. The program culminates in a guided lizard walk on the park grounds, where participants can see common desert species such as Zebra-tailed Lizard, Tiger Whiptail and Desert Spiny Lizard.

The Zebra-tailed Lizard (Callisaurus draconoides) is a common species of the desert flats. It is always seen on the Sabino Canyon and Tohono Chul Park walks and the Arizona-Sonora Desert Museum.



As a lizard guy, I was feeling a little left out, so I helped initiate lizard walks at Sabino Canyon just outside Tucson. Sabino Canyon is not only the most popular tourist destination on the Coronado National Forest, but it also has some of the highest diversity of lizards in the United States, with at least 16 species. This high diversity is due to the fact that Sabino lies at a crossroad of desert, semi-desert grassland, riparian, and montane environments. The fact that Sabino receives 1.5 million visitors per year explains why lizards there are so tolerant of human observers.

Sabino lizard walks started in 2009 as a “kids-in-the-woods” activity for Tucson Parks and Recreation’s KIDCO program. Every year I train Sabino Canyon volunteer naturalists to lead the weekly walks for young urbanites. The naturalists are taught about lizard natural history in the classroom, and how to identify lizards by age class and sex in the field. The weekly walks are usually in the riparian area of Sabino Canyon during the summer school break.



The Regal Horned Lizard (Phrynosoma solare) is always a crowd pleaser on a lizard walk (as is the Gila Monster), but horned lizards are notoriously difficult to spot because of their cryptic nature (and Gila Monsters are rarely surface active, especially on hot days).

Kids are not only terribly interested in all things saurian, but are also excellent spotters. We take advantage of their keen eyes to help us tally lizards seen during the walks. As junior citizen-scientists, these kids will help us determine if there are changes in populations over time.

The Greater Earless Lizard (Cophosaurus texanus). During Sabino Canyon lizard walks, participants see the Zebra-tailed Lizard on the desert flats, then Greater Earless Lizards in the foothills and riparian area. This separation is physically very close (there is a narrow band where both species occur), and is a classic example of resource partitioning between closely related species. This is a gravid female showing off her dewlap.



The KIDCO program’s success is evidenced by the kids themselves. I am always impressed by how bright and attentive they are. During one outing, a young girl quickly picked up on how to differentiate the species, as well as sexes and reproductive traits. She pointed out that the pair of Greater Earless Lizards we were watching included a male and female, that they were probably a mated pair (she said they were “husband and wife”) and that the female was snubbing the male because she was already gravid (bearing eggs).

Another example of how well the program works for kids came from Arianna (age 9) and Alex Baca (age 10). They had been looking forward to the lizard walk for a long time and Arianna said “I will be very disappointed if I don’t see four lizards.” At the end of the walk, they were very excited and asked how many lizards we had seen. I replied, “We saw 48 lizards of eight different species, many of which you spotted first.” They were not disappointed.

After the success of KIDCO, it seemed that everyone should be encouraged to participate in a lizard walk program, so the Coronado National Forest began public lizard walks in Sabino Canyon in 2011. There are two ways the general public can participate. One is a guided public lizard walk led by Sabino Canyon volunteer naturalists and guest herpetologists, and the other is a self-guided tour. The guided walks are conducted from spring to early fall.

Visitors meet outside the visitor center in the morning and can choose a route ranging from easy to more difficult (none are difficult). The schedule of guided walks is posted online.

Easy walks take an hour or less, staying near the visitor center. Here participants can see lizards of the lower desert flats. (This area has about half the species potentially seen in Sabino Canyon). Walks through the desert flats to the riparian area require about two hours, but more species are seen. For hard-core participants wanting to see the full gamut, and have their best chance to view the showy Eastern Collared Lizard, a three-hour walk may be available (not during very hot weather). Water faucets and restrooms are located at various places along the routes, but water, sunscreen, sunglasses,



These children are part of the KIDCO lizard-watching program with Tucson Parks and Recreation Department. The lizard walk is a kids-in-the-woods program targeting urban youths. The program is used as an incentive: only well-behaved children are rewarded with a lizard-walk field trip.



Participants of Sabino Canyon lizard walks are rewarded with a full-color poster showing all 16 species of native lizards (photo actually at Tohono Chul Park during the National Forest wildfire closure in 2011).

a hat, and sensible shoes are important for safety anytime you're exposed to Arizona's desert sun (although we always finish before it gets really hot).

In the desert flats, participants usually see Tiger Whiptail, Zebra-tailed Lizard, Common Side-blotched Lizard and Desert Spiny Lizard. In the upper areas and riparian areas they find Greater Earless Lizard, Clark's Spiny Lizard, Ornate Tree Lizard, Sonoran Spotted Whiptail, and Giant Spotted Whiptail. The Sonoran Spotted Whiptail is an all-female species (a phenomenon known as "parthenogenesis," wherein all individuals are naturally occurring genetic clones), while the Giant Spotted Whiptail is the largest whiptail lizard in the United States. Occasionally, a Gila Monster or Regal Horned Lizard are seen. Rarely encountered species include Long-nosed Leopard Lizard, Madrean Alligator Lizard, Western Banded Gecko, and Great Plains Skink. In fact, we have not yet seen any of these rarer species during a guided lizard walk, so keep your eyes peeled and you could be the first to spot one.

Again, the best way to exemplify the success of the lizard walks is by the reaction of the participants. I noticed that we had several frequently returning guests. Lynn and Dorie Anne Ory said they love coming on lizard walks because, "What could be more fun than spending a Saturday morning in the Old Pueblo on a lizard walk in Sabino Canyon? Besides seeing lizards (we sighted 81 on our adventure and

a bonus of two snakes), it was a good way to meet people and make new friends." I have to agree.

Kristin Powell and Randall Pettit recently moved to Tucson from upstate New York, seeking a Sonoran Desert lifestyle. They love the lizard walks because they get to see wonders of nature witnessed only on the Discovery Channel.

Those who cannot make the Sabino Canyon guided lizard walk can pick up self-guided walk information at the visitor center. There are handouts showing routes, as well as a checklist of species. Participants are asked to fill out a simple questionnaire about what they saw and where.

The Coronado National Forest received a Heritage Fund grant from the Arizona Game and Fish Department to help support this program. The money was used to purchase close-focus binoculars for loaning to participants

On Sabino Canyon and Boyce-Thompson Arboretum lizard walks, the highlight is often a large, colorful male Eastern Collared Lizard. Lizards are relatively tolerant of humans at these venues because of constant exposure, so can be rather photogenic.



and to produce a poster, "Lizards of Sabino Canyon Recreation Area." Posters are available to anyone participating in the KIDCO, guided or self-guided lizard walk programs, as well as anyone involved with public education.

Although lizard season is year-round for some of the small species, the vast majority are active in late March or April through October. So, instead of thinking, "Here comes another long, hot summer," you should be thinking, "Great. Another lizard season is approaching!" Then mark a few days on your calendar to plan your lizard-watching adventures.

The author of this article (Larry Jones) and others lead public lizard walks at Sabino Canyon Recreation Area (Tucson, AZ) on the second Saturday of every month in 2012, from May through October. If you are in the area and would like to attend a guided lizard walk, just show up outside the Visitor's Center at 8:00 AM. There is a \$5 parking fee, or you can use your National Park and Forest annual pass. Bring water, sunscreen, hat, sensible shoes, and a camera (close-focus binoculars are supplied, but may be in limited supply; binocs are highly recommended).

An Interview with Debra Hill

By Terry Riley, National Park Service, National
PARC Federal Agencies Coordinator



Debra with a little horned friend. Photo by Mike Hill.

Debra Hill grew up in southwestern New Mexico, where her love for the outdoors drew her to pursuing a career as a biologist. She attended Western New Mexico University, where she majored in Zoology. She then received her MS in Biology from New Mexico State University, where she began working for the US Fish and Wildlife Service as a SCEP student (intern). As a SCEP student, she worked with the New Mexico Department of Game and Fish collecting field data for the Dunes Sagebrush Lizard, New Mexico Ridge-nosed Rattlesnake, Chiricahua Leopard Frog, Jemez Mountain Salamander, and other New Mexico reptiles and amphibians. In 2005, Debra became a full time employee for the Service as a grant manager for endangered species, aquatic education and hunter education grants in the southwest region. In 2007, Debra wanted to gain experience working directly with threatened and endangered species, and joined the New Mexico

Ecological Service Field Office team, where she remains today. Debra is the lead for the Dunes Sagebrush Lizard, Lesser Prairie-chicken, Southwestern Willow Flycatcher, and western Yellow-billed Cuckoo. She works with private landowners, companies, agencies, and other organizations to minimize or avoid impacts to threatened and endangered species, and develops conservation actions that benefit species into the future.

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

Growing up near the Gila Wilderness, I spent much of my time hiking, on horseback or camping. My parents took me camping when I was six weeks old, and I never stopped. Reptiles and amphibians are relatively easy for children to catch and as a result, I have fond memories of always having a horned lizard on my shoulder.

What is your current role in lizard research and conservation?

I am the USFWS lead for the Dunes Sagebrush Lizard in southeastern New Mexico. In this position I work with universities, the Bureau of Land Management, non-profit organizations, private landowners and



Texas Horned Lizards, *Phrynosoma cornutum*. Photo LLC Jones.

oil and gas companies to conserve the lizard. When I have the opportunity, I will also participate in other reptile and amphibian conservation work in the state. New Mexico is a diverse state with a wonderful group of herpetologists that care deeply about the reptiles and amphibians of our state.

Do you have a favorite lizard or group of lizards?

Locally, I am still a huge fan of horned lizards—they remind me of mini dinosaurs, blending into the landscape, and often going unnoticed. I would love to get to Australia and see a Thorny Devil, *Moloch horridus*.

How would you describe a defining moment or favorite memory of working with lizards?

As a SCEP student (intern) for the USFWS, I was given the opportunity to spend the summer with New Mexico Department of Game and Fish herpetologist, Charlie Painter. I spent months radio-tracking Dunes Sagebrush Lizards in southeastern New Mexico, and checking pitfall traps for a lizard diversity study in southwestern New Mexico. Those experiences, along with the relationships I have built around lizard conservation were stepping stones to my career today.

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

I believe that climate change and habitat loss are hand-in-hand the greatest threats to lizards world-wide. The less habitat you have available to feed, breed, and shelter makes

you more susceptible to increased temperatures in the future.

What are some of the ways that the public can help in the conservation of lizards?

I don't think lizards have the same bad reputation as snakes, but much of the public does not realize the benefit of having biodiversity, which includes lizards. Education is a key component to conservation that is often overlooked as a priority. The ability for people to see different habitat types, or actually see lizards is very important. It is important for conservation biologists to step out of their comfort zones and educate the public. It is also important to focus conservation efforts on companies and landowners who are developing within lizard habitat, or who are actively working to protect habitat. Conservation is not one-sided, and lizards are competing with a laundry list of activities that can potentially threaten their future. It is our job to educate the public and be the voice for these species. The public can help by encouraging companies to develop responsibly and encouraging federal, state, and local lawmakers to support conservation. At a very local level, people can create habitat in their yards that will benefit lizards. Build up rock piles, and plant shrubs for cover. I love having lizards in my yard.

What guidance would you give to natural resource managers and policy makers regarding lizard conservation?

The best advice I can give is for people to listen. Though it seems

simple, most managers, researchers, and conservation biologists have already made up their minds as to the direction conservation should go for their species. The ability to truly listen to other's perspectives, and incorporate input into your decision making process, will save time and effort in the end.



Dunes Sagebrush Lizard, Sceloporus arenicolus, on Shinnery Oak leaves, at Mescalero Sands. Photo by LLC Jones.

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

Get outside and volunteer! Step out of your shell, and ask for opportunities to collect data, or simply do grunt work. Look for universities that give you opportunities to gain field experience and get outside. New Mexico has some wonderful conservation partners who are passionate about public outreach and conservation. The Albuquerque Bio Park is dedicated to education, outreach, and conservation. The New Mexico Museum of Natural History and Science, Rio Grande Nature Center, local National Wildlife Refuges, and many others have opportunities to volunteer. You have the rest of your life to sit at a desk!

Is the process complicated to prepare a listing package for a potentially threatened or endangered lizard?

Making a listing determination for any species requires a great deal of research regarding the species biology, habitat, and threats. A threats analysis looks at all of the factors threatening the species historically, currently and into the future. For the Dunes Sagebrush Lizard, it was necessary to determine if the historic threats were anticipated to continue into the future with the existences of conservation agreements in Texas and New Mexico.

What is the most rewarding phase of preparing a listing package for a lizard?

Because I worked on the listing team along with the team that developed the Candidate Conservation Agreements, I have learned that on-the-ground conservation is the most rewarding part of my job, whether or not a species is listed. The saying "you can't satisfy everyone" is very true, but in the end I know that actions we have taken have resulted in the majority of the lizard's range either being removed from oil and natural gas leasing completely, or covered with conservation agreements.

How long did it take to prepare the listing package for the Dunes Sagebrush Lizard?

The proposed rule for the dunes sagebrush lizard took about a year to complete. The majority of time was spent reading reports, interviewing researchers, and writing. The Service's final determination to not list the dunes sagebrush lizard was made a year and a half after the proposed rule was published.

Are you content with the decision to not list the dunes sagebrush lizard at this time?

The Service determined that the Candidate Conservation Agreements in Texas and New Mexico are being implemented and will be effective at removing threats to this species, such that it no longer meets the definition of threatened or endangered. I do believe that we are in a new age of conservation that requires a great deal of collaboration and creativity. Establishing voluntary partnerships, where participants are actively involved, provides greater certainty that conservation will continue into the future. Since I work with

these agreements on a daily basis, I realize that continued effort is placed on keeping oil and natural gas energy development out of lizard habitat, and removing existing development. I have great confidence that these agreements will work. If participation in the program declines or conservation measures are not followed, the Service may reconsider the need to list.

What types of conservation measures are being implemented to keep the lizard off of the endangered species list?

The foundational conservation measure in both the New Mexico

and Texas agreements is habitat avoidance. The lizard depends on Shinnery Oak dunes, and these agreements first place development out of the dunes and into areas such as mesquite flats. The second most important conservation measure is the removal of existing development within habitat. Because we are unable to re-create the shinnery oak dune habitat at this time, it is necessary to keep large tracts of habitat intact.

Debra Hill is a conservation biologist with the US Fish and Wildlife Service at the New Mexico Ecological Services Field Office in Albuquerque.

A Novel Lizard in Washington State

By Marc Hayes, Habitat Program, Washington Department of Fish and Wildlife

Most recent herpetological additions to the faunas of states within the United States have resulted from the genetic partitioning of species that are difficult to tell apart. Here, the basis of the new addition is suspected to be an inadvertent release. The novel species is the all-female (parthenogenetic) Colorado Checkered Whiptail (*Aspidoscelis neotesselata*, see photo), the native range of which is roughly 1,600 km to the southeast. Alerted to their presence by the Snow family of Moses Lake (Washington), Dr. Robert Weaver (Central Washington University) and colleagues (Weaver et al. 2011) located this whiptail in a northern extension of Lind Coulee in Grant County south of Moses Lake. Sightings that may represent the same species have been made nearby, but to date, verified sightings are lacking outside of Lind Coulee. This site is heavily disturbed (quantities of discarded garbage and introduced



*Wild adult of *Aspidoscelis neotesselata* in situ in Grant County, Washington. Photo by Andrew O'Connor.*

weedy plants exist), a pattern often associated with the habitat of other parthenogenetic whiptail lizards in North America. That and the fact that parthenogenetic lizards are able to establish a population from only one animal puts this novel introduction at the forefront of management consideration.

Weaver RE, O'Connor AP, Wallace JL, King JM, Walker JM. 2011. Discovery of the parthenogenetic Colorado Checkered Whiptail, *Aspidoscelis neotesselata* (Squamate: Teiidae), in Washington State. *Northwestern Naturalist* 92(3):233-236.

Lizards in the News

U.S. researchers have identified two dozen new species of lizards on the Caribbean islands, and about half of them may be extinct or close to extinction. Read more from:

www.cbc.ca/news/technology/story/2012/04/30/reptile-skink-new-species.html

Read more about how the discovery was made at:

<http://green.blogs.nytimes.com/2012/05/02/a-taxonomic-error-reversed-decades-too-late/>

Using high-speed cameras and markers placed at key spots on the lizards' bodies researchers at Harvard create computer models to demonstrate why bigger is not always better when it comes to running speeds. See the story at:

www.thehindu.com/sci-tech/science/article3374028.ece

The Bureau of Land Management is moving closer to permitting a new photovoltaic solar power plant in an environmentally sensitive section of southern California's Colorado Desert region that is a Management Area for the Flat-tailed Horned Lizard. Find out more at:

www.eenews.net/public/Greenwire/2012/05/14/8

Lizard mania has hit Sparsholt College after a successful breeding program resulted in the birth of three Crested Geckos. Read the full story at:

www.thisishampshire.net/news/9708132.Lizard_mania_at_college/

On a diet? A drug made from the saliva of the Gila Monster is effective in reducing the craving for food. Read more from:

www.sciencedaily.com/releases/2012/05/120515165405.htm and

www2.macleans.ca/2012/05/31/gila-monster-saliva-the-new-appetite-suppressant/

Saudi Arabian Wildlife Conservation activists have warned against the danger of over-hunting the Dhabb (*Uromastix philbyi*) as many young Saudis regard the month of May as high season for a meat that is considered a delicacy. See the article at:

www.panorientnews.com/en/news.php?k=1739

Land users in New Mexico and Texas will be held accountable for agreements to conserve and restore habitat for the Dunes Sagebrush

Lizard. The full story available at:

www.eenews.net/pm/2012/06/13

The Dune Sagebrush Lizard not to be listed. Read more from:

www.capitolreportnewmexico.com/?tag=us-fish-and-wildlife-service

www.scientificamerican.com/article.cfm?id=conservation-deal-keeps-sand-dune-l

Though the drama may not be over. See the story at:

www.oaoa.com/news/lizard-89135-dunes-sagebrush.html

It's well known that monitor lizards sometimes practice cannibalism, and it should be no surprise to learn that big monitor species sometimes, or even often, prey on and eat smaller ones. Read the blog entry at:

<http://blogs.scientificamerican.com/tetrapod-zoology/2012/05/18/goanna-eating-goannas-dwarfism-gigantism/>

In central Africa, an unassuming little lizard has evolved a spectacular and oddly human feature of gestation: a complex placenta. Find out more from:

<http://discovermagazine.com/2012/mar/31-the-lizard-with-a-humanlike-placenta/?searchterm=lizard+2012>

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 pets, invasive species, and trade, but any lizard-related topic is welcome.

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 September and November 2012.



Melissa Patrick, of Weyerhaeuser Company's Cool Springs Center, introduces children to the local residents, a Ground Skink (*Scincella lateralis*) and an Eastern Narrowmouth Toad (*Gastrophryne carolinensis*). Photo by Jessica Homyack.

Chasing Scales at Cool Springs

Dr. Jessica A. Homyack, Weyerhaeuser NR Company

Every year over 3,000 people visit Weyerhaeuser Company's Cool Springs Environmental Education Center near New Bern, North Carolina. This 1,700 acre outdoor classroom is a working forest that is home to more than 60 species of amphibians and reptiles, including eight lizards. At Cool Springs, school groups and other members of the public participate in hands-on learning about how animals and plants interact with their environment through group outings and special events. Several plant communities, including longleaf pine savanna, cypress swamp, and slash pine plantation, serve as the stage where amphibians and reptiles are some of the star players.

The basic biology and habitat ecology of herpetiles is integrated into the educational program at Cool Springs, with lizards playing a key role. Environmental educator Melissa Patrick tailors her outings to the age and size of the group, but group activities often include checking the drift fences, tree frog tubes, and coverboard transects that were installed across the property by then graduate student Jeff Hall (now a PARC Biologist for the North Carolina Wildlife Resources Commission). For many children and some adults, checking drift fences is their first opportunity to have a personal encounter with anoles, skinks, racerunners, glass lizards and other lizards that occur in the North Carolina coastal plain. From preschoolers to retirees, coming face to face with live animals in their environment helps people to develop an appreciation for these scaly creatures.

Education Corner

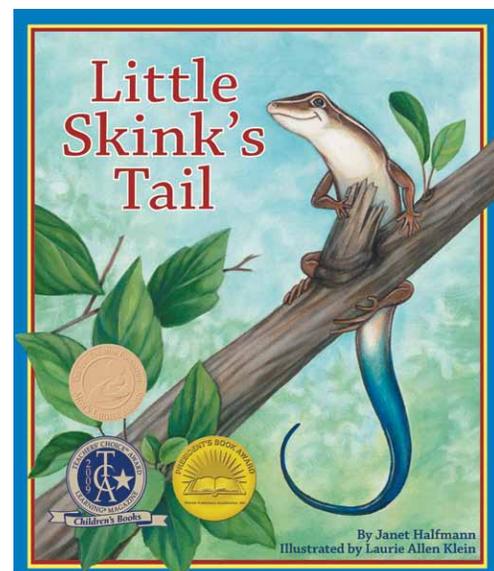
Something to Share: Little Skink's Tail

Library Media Connection - January 2008

Grades K-4: Animal physiology, predator-prey relationships, and survival techniques are among the science concepts presented in this fictional picture book by an author of many children's stories about the animal world. Little Skink, a perky, blue-tailed lizard, dislodges her prized appendage to distract a hungry crow and make a quick escape. Mourning her loss, she imagines herself wearing the tails of various forest animals she meets until she realizes her own has grown back, and it's the perfect one for her. Illustrations depict Little Skink with a series of mismatched tails and show how porcupines, owls, skunks, and other critters differ physically from lizards. Children will enjoy trying to explain why different tails look and work the way they do. The book also touches on themes of individuality and self-acceptance. Author **Janet Halfmann's** animal characters are personified enough to enliven the story, but this does not detract from the simple biological principles introduced. The forest setting and illustrations are natural and believable. A section of activities reinforces comprehension and logical thinking and can be downloaded from the publisher's Web site for classroom use. This is a practical read-aloud choice for younger elementary audiences. Recommended.

—Jennifer MacKay, Staff Editor, American Book Publishing

Little Skink's Tail is on the 2012 *Just Read, Florida!* Summer Recommended Reading list for K-3



Featured Lizard Families

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

Each of the six issues of Year of the Lizard News showcases two of the twelve families native to the United States of America. This issue discusses two families of lizards that can be superficially similar, the whiptails (Family Teiidae) and alligator and legless lizards (Anguidae). Both families are long and slender, with long tails and short (to absent) legs. This general morphology renders these lizards somewhat snake-like, which of course, is taken to the extreme in glass and legless lizards. And speaking of snakes, before launching into the family accounts, people often ask me “what is the difference between snakes and lizards?” or “why isn’t a legless lizard a snake?” Good question—some lizards lack legs and some snakes have vestigial limbs. Without going into too much detail, suffice to say snakes and lizards are very closely related—especially anguids and their relatives. Both snakes and lizards belong to the same order, Squamata, and are collectively termed “squamates” by herpetologists. Lizards, suborder Lacertilia (or Sauria) tend to have legs, eyelids, and external ears, while snakes, suborder Serpentes, typically lack these. There are also skeletal features that either show their relatedness as squamates or divergence into the suborders.

Family Teiidae, Whiptails



Northern Caiman Lizard, *Dracaena guianensis*. Photo by Rick Haeffner, Denver Zoo.

This is a New World family of lizards from North, Central and South America. There are about 130 species in ten genera (Persons and Wright. 2009, Teiidae. In: Jones and Lovich, *Lizards of the American Southwest*). In the United States, we only have representatives of the genus *Aspidoscelis*, but in the tropics there are several other genera. Members of the genus *Aspidoscelis*, one of the genera called “whiptails” (except *A. sexlineata*), are all very similar in body form and similar to the other genus commonly known as whiptails (*Cnemidophorus*). Until fairly recently, whiptails were all lumped in the genus *Cnemidophorus*, and many herpetologists still recognize the US members as *Cnemidophorus* (but I expect because it is fun to call them “Cnemmies” [silent “C”] and no one knows how to pronounce *Aspidoscelis*). Whiptails are slender, with long tails, short limbs, and a pointy snout.

Some of the other genera include species of ameivas, racerunners, tegus, and caiman lizards. The ameivas, racerunners, and tropical whiptails can have stunning coloration. Tegus (genus *Tupinambis*) and caiman lizards

(genus *Dracaena*) are large, fascinating animals. They can reach about 4 ft in length. Tegus are impressive, heavy-bodied lizards, unlike our own svelte whiptails. Caiman lizards are not quite as heavy bodied and are rather different than all other teiids. They are semi-aquatic and semi-arboreal, living near streams and swamps in the tropics. Their scalation is reminiscent of crocodilians; hence the common name “caiman lizard.” Both are popular as exotic pets. Several species of teiids have become established in Florida (Gibbons, Green, and Mills. 2009. *Lizards and Crocodilians of the Southeast*): Rainbow Whiptail (*C. lemniscatus*), Giant Whiptail (*A. motaguae*), Giant Ameiva (*Ameiva ameiva*), and Black and White Tegu (*T. merrianae*). Although I will probably be flogged in public by ecologists for saying this, it is kind of exciting for a herpetologist in Florida these days with tegus, monitor lizards, Green Iguanas, and pythons running about. Having said that, I certainly know better—many of the non-native, invasive species can wreak havoc on the native plant and animal communities, and pet owners should **never, never, ever, ever**, release pets into the wild. The reptile fauna (not to mention scores of other plants and animals) of Hawaii and Florida are premier examples



Ameiva, photo by Kortney Jaworski.



Large adult male Giant Spotted Whiptail (*A. stictogramma*), Tucson, AZ. This is the largest whiptail in the U.S. Juveniles are striped with no spots, then change to completely spotted. Photo © Tom Brennan.

of nature gone awry thanks to the introduction of exotic species (I'm sure the Burmese Python will be a target of Year of the Snake News in 2013!). Many of the invasive reptiles originated from the exotic pet trade, sometimes from releases by well-meaning pet owners.

OK, enough about those big showy tropical teiids. We have some pretty cool whiptails that are native to the U.S., and there are more species of *Aspidoscelis* than any other genus (22 species; nearly twice as many in Mexico). Of course, the actual number of species depends on how you designate members of the genus—no simple task with these critters. The epicenter of whiptail diversity is the American Southwest, with Arizona (13 species), New Mexico (14), and Texas (11) having the motherload. There is a single species in the mid and eastern U.S., the Six-lined Racerunner (*A. sexlineata*). Colorado has an endemic species, the Colorado Checkered Whiptail (*A. neotesselata*), and California has a species only known elsewhere from Baja California, Mexico, the Orange-



The Arizona Striped Whiptail (*A. arizonae*) is endemic to Arizona, mostly in the vicinity of the Willcox Playa. Photo © LLC Jones.

throated Whiptail (*A. hyperythra*). Arizona, New Mexico, and Texas also have species that are shared with Mexico or state endemics. Other than *A. sexlineata*, the most wide-ranging whiptail is the Tiger Whiptail, *A. tigris*. It is found from eastern Arizona to the west coast as far south as southern Baja California and Sinaloa, and as far north as Oregon and Idaho. It is generally a desert dweller, but also occurs in more mesic climates on the west coast. There are quite a few species with very limited ranges, including the Little White Whiptail (*A. gypsi*), only known from White Sands, New Mexico (some consider it a color variant of *A. inornata*), and the closely related Arizona Whiptail (*A. arizonae*), essentially endemic to the area of the Willcox Playa in Arizona. The Gray Checkered Whiptail (*A. dixonii*) has a very limited, but interesting distribution, only found in two small areas—one in a tiny area of southwest New Mexico and one in the Chinati Mountains of Big Bend of Texas (although they appear to have the same hybrid origin, it has been suggested they are likely separate species).

And speaking of hybrids, there are many whiptail species that have a hybrid origin. I am only going to touch on this because I can't do the subject justice with such a small amount of space—one of our whiptail specialists needs to write a Year of the Lizard article just on parthenogenesis, especially among our native whiptails. But here are the Cliff Notes. Among whiptails, a large percentage of species are parthenogenetic. Parthenogenesis is also termed “unisexual” or “all female” in the literature. “All female” explains the situation pretty well. These are all-female species that resulted from hybridization with two or more different, usually bisexual (or gonochoristic) species or subspecies. For example, the all-female Common Checkered Whiptail (*A. tessellata*) resulted from the cross of two bisexual species, a female Western Marbled Whiptail (*A. m. marmorata*) and male Big Bend Spotted Whiptail (*A. scalaris septemvittata*). This hybrid species is diploid (2n). Just to complicate things, *A. tessellata* (female, obviously) then mated with a male Six-lined Racerunner (*A. sexlineata*) to produce a triploid (3n) all-female species, the Colorado Checkered Whiptail (*A. neotesselata*)! Each all-female species has identical genetic make-up, passed down from mother to daughter—daughters are clones of their mothers. They have no use for males, making them more advanced than human beings! Crazy, eh?

One of my saurian passions is lizard-watching. It is not just an entertaining pastime—I also lead leading lizard-watching trips for educational purposes. Whiptails are



The Colorado Checkered Whiptail (*A. neotesselata*) is a triploid (3n) all-female species that is the result of hybridization between four species, three bisexual and one all-female. Photo © LLC Jones.

decidedly watchable wildlife. Our native species do not bask on rocks and are not arboreal, but they are very surface-active animals. As a group, whiptails tend to be extremely active, moving about constantly searching for prey. And they seem terribly successful at finding prey. I often see whiptails eating something (invertebrates), rather than most lizards that sit on rocks waiting for prey to come to them. Some whiptails, such as the Tiger and Marbled, never seem to stop, while others (e.g., Common Spotted Whiptail, *A. gularis*) have more deliberate movements, often pausing. Either way, they are very aware animals and entertaining to watch. Bird-watchers that like sparrows and warblers may favor whiptails as viewing subjects, because they are among the more challenging species to identify. The key to learning whiptails is knowing ahead of time which species are present and how they change from hatchling to large adult (generally little to no sexual dimorphism for bisexual species), then targeting these visual characters: size; color; pattern of stripes, spots, reticulation, or a combination; and tail color. The most difficult are the pesky all-female striped-and-spotted whiptails (e.g. *A. sonora*, *A. flagellicauda*, *A. exsanguis*, *A. neomexicana*), as the ranges of two or more may overlap. The striped whiptails (*A. inornata* group) can also be confusing but tend to separate out geographically.

Family Anguidae, Alligator, Glass, and Legless Lizards

The Anguidae is composed of about 100 species of 15 genera. They include the subfamilies Gerrhonotinae (alligator lizards), Diploglossinae (galliwasp), Anguinidae (slow worms and glass lizards), and sometimes Anniellinae

(North American legless lizards). The first two have small limbs while the latter two lack limbs or have vestiges. Collectively, they are found in North to South America, including the West Indies, Eurasia, and North Africa. Anguids have a lateral fold separating the ventral scales from the lateral and dorsal scales. Anguids tend to be slender, with long tails, and have small to non-existent legs. Some are live-bearing, while others lay eggs. As with the teiids, some of the tropical species are pretty stunning animals, such as some of the galliwasp and arboreal alligator lizards (genus *Abronia*, native to Central and South America). Although most of our U.S. species are fairly mundane, there are some notable exceptions. They may be locally abundant, but most are rather cryptic and infrequently seen.



Abronia graminea is a species of arboreal alligator lizard that is a rare Mexican endemic (IUCN Red-Listed as "endangered"), but is being bred in captivity. Photo by Sheri Ashley, Chiricahua Desert Museum, Rodeo, NM.

In the U.S., there are two genera of alligator Lizards, *Elgaria* (western alligator lizards) and *Gerrhonotus* (eastern alligator lizards). On the west coast are two species, the Southern Alligator Lizard (*E. multicarinata*), with three subspecies, and Northern Alligator Lizard (*E. coerulea*), with four subspecies. As might be expected, species' distribution differs north to south, but there is considerable overlap in ranges from Washington to California. Although they are superficially similar, they can be differentiated on color pattern, eye color, and scalation. The Madrean (*Elgaria kingii*) and Panamint (*E. panamintina*) alligator lizards are among the more beautiful alligator lizards in the U.S., but there can be some really interesting variants of the other alligator lizards, as well. Five additional *Elgaria* are found in Mexico. The only representative of the genus *Gerrhonotus* in the U.S. is *G. infernalis*, the Texas Alligator Lizard. There are a handful of other members of the genus in Mexico. The



As is typical for the genus, this San Diego Alligator Lizard (*E. multicarinata webbii*) has a tail more than twice the length of its body. If the tail is lost and regenerated, it will be unmarked rather than patterned. Photo © LLC Jones.

Texas Alligator Lizard is found in the Big Bend and hill country of Texas, as well as northern Mexico. Most of the *Elgaria* have crossbars, but juveniles tend to have much more vivid, contrasting crossbars than adults (exceptions are *E. coerulea* and some *E. multicarinata*). Alligator lizards tend to be found in more mesic environments than most lizards, such as riparian areas, mountains, and coastal areas; this also explains the distribution of two species in the cool northern climes of the Pacific Northwest, where few lizards occur.

The glass lizards, genus *Ophisaurus*, resemble alligator lizards with an even longer tail, but without legs, and tend to be striped, rather than having crossbars. The common name comes from the fact that they may autotomize their very long tails in more than one piece, so appear to “shatter” when roughly handled. Alligator lizards are also very quick to lose their very long tail, so one must always handle these animals with caution (they can also deliver a strong, but non-venomous, bite). Glass lizards are a



This Eastern Glass Lizard (*Ophisaurus ventralis*) was found under boards in a Florida back yard. Photo © Laurie J. Vitt (January Photo Contest Calendar winner).

specialty of the southeastern U.S. (two different species occur in Mexico). They include four similar species. The most widespread species is the Slender Glass Lizard (*O. attenuatus*), occurring in all states of the Southeast and into some of the Great Plains states. The western and eastern subspecies are divided by the Mississippi River Valley. The Island Glass Lizard (*O. compressus*) is found throughout most of Florida and north along the Atlantic Coast to South Carolina. This animal has one of those unfortunate standard English names that does not reflect the natural history or geography of the species, since the vast majority of its range is mainland, although it does occur on barrier islands. The Eastern Glass Lizard (*O. ventralis*) is found in the southeast from Louisiana to North Carolina. It tends to be fairly heavy bodied and overall greenish in coloration, or at least having a more complex, less stripy dorsal pattern than other glass lizards. The Mimic Glass Lizard (*O. mimicus*) has narrow distribution from Mississippi to North Carolina and tends to be in mesic habitats, unlike the Slender and Island glass lizards. Those species tend to be found in drier, more open habitats such as grasslands, pine woods, sandhills, and coastal dunes. The Eastern Glass Lizard is more of a generalist.

The Anniellinae (= Family Anniellidae) only includes



Black phase of the pencil-sized California Legless Lizard (*Anniella pulchra*), the color phase commonly found around Monterey Bay. Photo © LLC Jones.

a single genus and two species, which are endemic to the Californias. The California Legless Lizard (*Anniella pulchra*) is the only member in the U.S., while the Baja California Legless Lizard is endemic to Baja California (Norte), Mexico. These are very small lizards that require loose soils in mild climates. They are generally coastal, being found in sand dunes or other sandy areas inland. They are not desert-dwellers, but can be found in near-desert conditions or woodlands if there are areas with mesic microclimates and sandy-loamy soils. They are about

the size of a pencil and usually remain in the sand, leaf litter, or under cover objects—so not what we would call watchable wildlife. *Anniella pulchra* has two general color patterns that are not usually regarded as subspecies these days: the *nigra* phase (most common around Monterey Bay) can be glossy brown to black with a contrasting bright yellow venter, while the *pulchra* phase is silvery, gray, or light brown (throughout most of the range), with a more subdued cream to yellow venter. The epithet “*pulchra*” means beautiful.

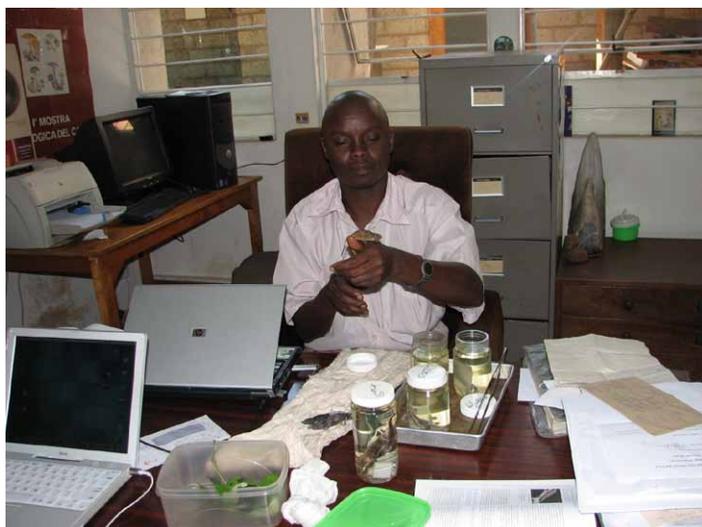
Anguids, like most other families of lizards, have their share of conservation issues. Several of the galliwasp are

either rare, extirpated, or extinct. The Panamint Alligator Lizard is one of the most poorly known lizard species in the U.S., and the number of specimens known to science is not large, but they do occur in relatively remote areas. Unfortunately, this may not completely protect them from threats to their habitat or from collectors (illegal and unethical). *Anniella pulchra* is probably much less common than it used to be due to habitat degradation (development and invasion by Mediterranean Ice Plant and other invasives).

An Interview with Dr. Patrick K. Malonza

By Dr. David Wojnowski, University of North Texas

Dr. Patrick K. Malonza is a Senior Research Scientist at the National Museums of Kenya in Nairobi, Kenya. His areas of special expertise include taxonomy, biogeography, and natural history.



Dr. Malonza at his desk, holding a chameleon.

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

When I was 15 years old - because of the way they change colors.

What is your current role in lizard research and conservation?

Taxonomy and conservation.

Do you have a favorite lizard or group of lizards?

Chameleons.

How would you describe a defining moment or favorite memory of working with lizards?

Looking for chameleons at night: This was in 1999 in Taita Hills and I found the Taita Chameleon (*Kinyongia boehmei*).

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

Habitat alteration.

What are some of the ways that the public can help in the conservation of lizards?

Organizing public shows and nature walks.

What guidance would you give to natural resource managers and policy makers regarding lizard conservation?

Involve the local people, and the youth in particular, in conservation education.

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

They can learn a lot by observing lizard behavior in the wild.

Kilimanjaro Two-horned Chameleon (Kinyongia tavetana). Photo by James Quinn Brantley, Year of the Lizard Photo Contest March runner-up.



Upcoming Meetings & Events

Lizards and Snakes Exhibition, July 1-8, Denver Museum of Nature and Science, Denver, CO. More than 60 species of live lizards and snakes from five continents. Catch it before it ends! www.dmns.org/lizards-and-snakes

Modeling Patterns and Dynamics of Species Occurrence Workshop, July 9-13, Calgary Zoo, Calgary, Canada

Sabino Canyon Lizard Walk, July 14, 8:00 am, Sabino Canyon Recreation Area, Tucson, AZ

Herpetology Field Course, July 22-31, American Museum of Natural History, Southwest Research Station, Portal, AZ

Alabama Nongame Wildlife Conference, July 23-24, Auburn, AL

Northeast PARC Annual Meeting, July 24-26, Highlands Center, Scenic White Mountains Region, Crawford Notch, NH

35th International Herpetological Symposium, July 25-28, Hanover, Maryland, USA

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

Sabino Canyon Lizard Walk, August 11, 8:00 am, Sabino Canyon Recreation Area, Tucson, AZ

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