



Year of the Lizard News

No. 1

January 2012



www.YearoftheLizard.org

State of the Lizard



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A Common Chuckwalla (*Sauromalus ater*), peers out of a rock crevice in Valley of Fire State Park, NV. Photo © LLC Jones.

The “2012 – Year of the Lizard” campaign is sponsored by Partners in Amphibian and Reptile Conservation (PARC) to raise awareness for lizard conservation. Why lizards, and why now? The growth of human communities and its effects on natural habitats are taking a toll on our lizards. Threats to lizards include habitat loss and fragmentation, invasive species, predation, overexploitation, and climate change. The good news is that most of these concerns have solutions. With some focused attention, we can engineer a future for our lizards within our developing world.

As 2012 unfolds, PARC will shine a spotlight on our amazing lizard fauna and highlight the work of researchers, land and resource managers, and

the public to develop conservation measures that will identify threats and forestall losses at local levels. Here, we provide a brief background on our lizards today, identify urgent needs for the conservation of this fauna, and outline actions that can aid in their persistence. With place-based management, local populations can thrive. Lizards are a taxonomic group that can benefit by Citizen Science actions. YOU can help.

The Gila Monster, Heloderma suspectum, is a venomous lizard of the southwestern US and northwestern Mexico. This species has near-threatened status under the IUCN, and is protected in Arizona, New Mexico, and Nevada. Photo © C Klinger.

What are Lizards?

Lizards are reptiles. They are:

- 1) vertebrates, having a backbone like fish, amphibians, birds, and mammals; and
- 2) ectothermic, deriving their body heat from the outside world.

Lizards characteristically have dry, scaly skin. They are generally

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Look for Issue No. 2 of Year of the Lizard News in March!

“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 January Photo Contest Calendar



It's not your typical lizard! Laurie Vitt photographed this legless Eastern Glass Lizard (*Ophisaurus ventralis*) in a neighbor's back yard in Florida. To get a better look at this month's winner and runner-up, download the free Year of the Lizard Photo Contest Calendar for January at www.yearofthelizard.org. And don't forget to check back in February for the next monthly calendar.

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>.

A preview of some of the great photos we've already received: (above) Caymanian Anole (Anolis conspersus) from Grand Cayman Island, by Jim Harding; (below) a Horned Wood Lizard (Enyalioides palpebralis), native to Bolivia, Peru, and Brazil, by Laurie Vitt.



Year of the Lizard Partners

The Year of the Lizard Team thanks the following individuals for assistance in planning the Year of the Lizard:

David Pilliod (USGS, Idaho), Denim Jochimsen (University of Idaho), Larry Jones (US Forest Service, Arizona), Ester Nelson (US Forest Service, New Mexico), Jason Jones (Utah Division of Wild. Resources), Brian Aucone (Denver Zoo), Leland Pierce (New Mexico Department of Fish and Game), Chris Titus (NE PARC), Denise Parsons (University of Nevada), ML Robinson (University of Nevada), David Wojnowski (University of North Texas), Kathryn Ronnenberg (US Forest Service, Oregon), Valorie Titus (Bronx Zoo, New York), Tom Giermakowski (University of New Mexico), Brian Aucone (Denver Zoo), David Dimitrie (Arcata, California), Teal Richards-Dimitrie (California Department of Fish and Game), Denise Parsons (University of Nevada), Dede Olson (PARC National Co-Chair; US Forest Service, Oregon), Al Breisch (PARC National Co-Chair; Albany, New York), Priya Nanjappa (PARC State Agencies Coordinator; Association of Fish & Wildlife Agencies), Terry Riley (PARC Federal Agencies Coordinator, National Park Service)

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

YOU Can Participate!

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.

Submit your potential articles or any questions pertaining to contributing via email to yearofthelizard@gmail.com. The newsletter will be bi-monthly, with issues coming out in March, May, July, September, and November 2012.

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.

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.



Green Iguana (Iguana iguana) in pastels, by Joyce McGee.

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.

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.



Year of the Lizard Logo Contest – We Have a Winner!

PARC's Year of the Lizard Planning Task Team sought help from the herpetological community to develop an appropriate logo for PARC's 2012 Year of the Lizard Campaign. Among the many outstanding logos submitted, the Team selected a logo submitted by **Todd Long**. Thanks and congratulations, Todd!



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



Species Spotlight

The Dunes Sagebrush Lizard: an Endemic Lizard in an Endangered Ecosystem

By Daniel Leavitt, PhD candidate, Texas A&M University



The Dunes Sagebrush Lizard's scale color patterns closely resemble the sand. This allows for them to sit and wait for their prey without compromising their position to visually cued predators. Photo by Michael T. Hill.

In tough economic times, societies can lose sight of long-term goals in search of immediate economic gain. Jared Diamond in *Collapse* notes that societies that demonstrate this lack of vision for the future play a risky game. Let me introduce you to a lizard that exists in an oil field. Once again, the scene is set. I hope this society can find a way to meet both long- and short-term needs.

The Dunes Sagebrush Lizard (*Sceloporus arenicolus*) lives only in the sand dunes of southeastern New Mexico and west Texas. In fact, it has one of the most restricted ranges among North American lizards. The word endemic is all that resource managers need to raise awareness among the ranks. 'Endemism' describes organisms adapted to unique environmental characteristics that occur in a restricted geographic range (e.g., sand dunes). This endemism and the uncertainty about the future of its ecosystem demonstrate just a few reasons why the US Fish and Wildlife Service recently proposed to list the Dunes Sagebrush Lizard as an endangered species.

The dunes where you can find this psammophile (*psammo* = sand,

phile = lover) exist in the Mescalero-Monahans Shinnery Sands ecosystem, a place where sand dunes and dwarf oaks reign supreme. But the lizard is not the only endemic species here. In fact, this ecosystem is home to many other endemics including eleven beetles and three grasshoppers (the list is still growing!). By understanding this lizard's biology, it becomes clear why recent human-caused disruptions in the dunes are concerning to resource managers.

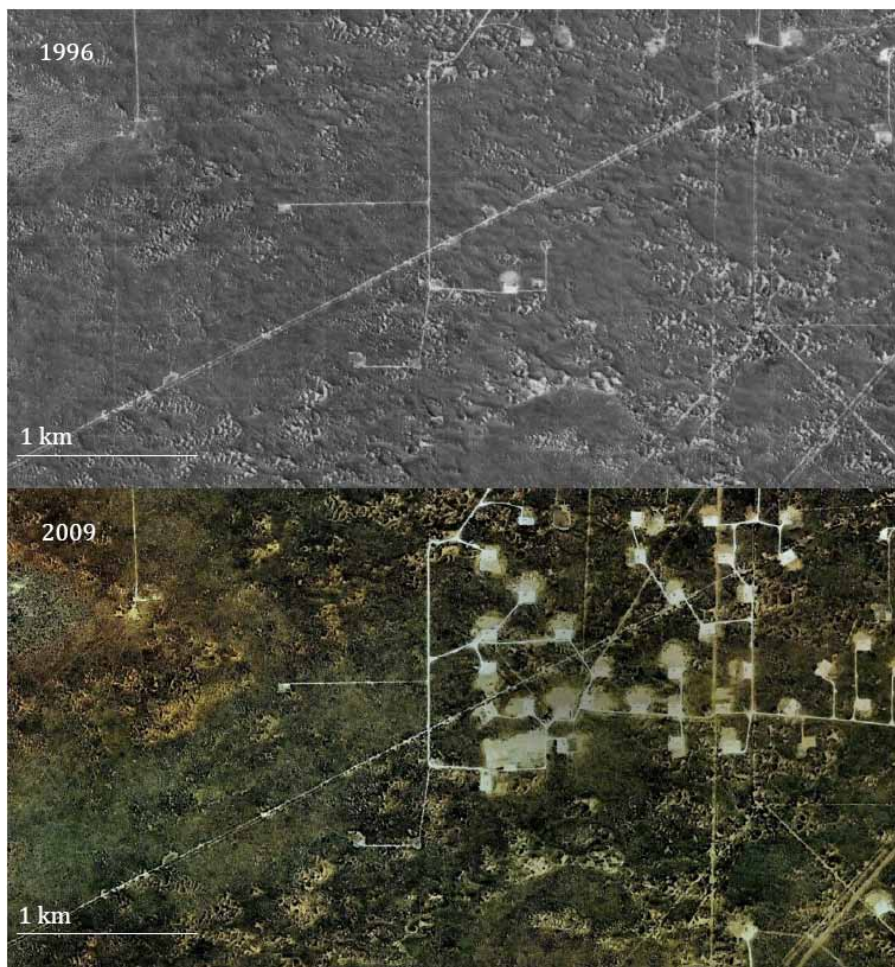
You might find Dunes Sagebrush Lizards in open patches of sand, called "blowouts", or on the periphery of large dune fields. Many of their

The bumpy landscape found in the Mescalero-Monahans Shinnery Sands ecosystem west of Caprock, NM. Dwarf Shinnery Oak tops the hummocks and blowouts are formed where shifting sands open up vegetative cover. Photo by Daniel J. Leavitt.



basic requirements are met in these locations. They are well adapted to living in and around sand. They bury themselves in the sand, lay eggs deep in the sand, and swim through the sand to avoid above-ground movement. However, the lizard also requires cover above the sand and seeks refuge beneath Shinnery Oak (*Quercus havardii*), dives into leaf litter for shelter, and basks atop grasses and on oak branches. Because they require the complimentary presence of open sand and Shinnery Oak cover, it is not hard to understand why they are endemic to this ecosystem.

But the future is uncertain for this ecosystem. Over the last 80 years, oil and gas exploration in the Permian Basin has driven economic prosperity for local communities, the states of New Mexico and Texas, and the nation. This economic prosperity has come with an associated ecological cost. The Mescalero-Monahans Shinnery Sands took thousands of years to form. Yet within a century we have dramatically altered the natural dynamics that maintain this



The Eddy - Lea County Line, New Mexico in 1996 and 2009. In the 2009 photo new development of oil and gas wells are surrounded by well pads (white squares) and connected by roads. Imagery from United States Department of Agriculture.

ecosystem through exploration and extraction of below-ground resources.

To extract oil resources at each well pad, the sands are flattened with bulldozers, then “caliche” (an underground calcium carbonate rock) is mined and smoothed out over the surface. The bulldozed sand pile is pushed aside and flattens out over the course of the following years. While creating one well pad may not make a difference to ecosystem dynamics, the development of a vast oil field results in habitat fragmentation.

My research on this lizard began in 2008. I have focused on their presence in the oil fields, the habitat requirements and structure

of the lizard communities, and the implications of protected status for conservation goals. Alongside Dr. Lee A. Fitzgerald (Texas A&M University), I have established a long-term comparative and experimental study to investigate the impacts of oil and gas development, and subsequent fragmentation, on populations of this lizard. Our study design allows us to compare our findings with baseline data for the Dunes Sagebrush Lizard, and the data from the first few years illuminates the extent of the problem.

Dunes Sagebrush Lizards are absent from 44% of the sites within the oilfields where they once existed, as compared to 100% presence outside of the oil field. At oil field locations where we do find them, populations

are very low and in possibly unsustainable numbers. Habitat loss and an increase in edge habitat appear to be the driving forces in the environment that are reducing this lizards’ presence in the ecosystem.

More research has begun by a collaborative team including behavioral ecologists, geneticists, and conservation biologists to explore the depth of the problems surrounding this lizard and its ecosystem. However, the pace of research, policy, and oil field development are not equal. Recent efforts in Texas and New Mexico to establish conservation agreements between land use cooperatives and agencies are just now at the beginning stages. The common goal is to ensure effective conservation of the ecosystem while reducing economic impacts of conservation measures. That is, shareholders in economic prosperity (set on satisfying immediate societal needs) must work with the shareholders in environmental prosperity (who focus on the long-term viability of Planet Earth). We have been progressing as a society for centuries. Let us not lose sight of our long-term goals for future generations.

Wanted: Volunteer Translators

The Year of the Lizard campaign needs volunteers to translate the *State of the Lizard* into Spanish and French, for online publication: www.yearofthelizard.org. If you are interested, please contact Dede Olson, dedeolson@fs.fed.us.

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New Mexico Whiptails, Aspidoscelis neomexicana, are all females and can reproduce without mating with males. Unfertilized eggs develop and become clones of the mother. Photo © LLC Jones.

distinguished from their close relatives the snakes by their limbs and external ears. A great variety of forms exist among lizards, however, as can be seen when you compare whiptails with Gila Monsters. Some lizards have overlapping scales or are legless, like snakes. Some can drop their tails without injury to themselves to distract a predator and escape. Some lay eggs, and others give birth to live young. They have myriad social behaviors, with some lizards known

for using push-ups, head bobbing, and posturing to communicate. Interestingly, most lizards have color vision, which explains the spectrum of hues characterizing the different species, as seen in the brilliant blues of skink tails and the wild variety of color patterns in other families. Coloration is often seasonal, becoming vivid in the mating season. Many species are territorial—each male defends a territory and the females within it against rivals. But then there are the whiptails of the American Southwest: some species are all females, and their eggs can develop without fertilization by a male! The diversity among lizards

today is quite astounding.

Over 5,000 species of lizards live on Earth today, and they can be found on all continents but Antarctica. Our North American fauna is a small subset of the world's lizards, with only 118 species occurring north of Mexico. Spanning the United States and Canada, whiptails and spiny lizards are most diverse, with 21 and 22 species, respectively. The American Southwest is the regional hotspot, with ~96 known species, inclusive of northern Mexico. Latitudinal and longitudinal gradients in diversity are quite apparent—for example, 16 species are known in northwestern North America, 10 species occur in the northeastern U.S., with only one species in New England, 18 species occur in the southeastern U.S., and only 6 native species are recorded for Canada.

2012 is also the Chinese Year of the Dragon. Are dragons lizards?

Yes and No. Some lizards have 'dragon' in their names. These include the Australian Water Dragon (*Physignathus lesueurii*) and Central Bearded Dragon (*Pogona vitticeps*), and the Komodo Dragon (Komodo Monitor, *Varanus komodoensis*, right) of Indonesia. So in one sense some dragons are lizards. Dragons are also mythological beasts that have lizard-like features, such as scales. However, lizards do not breathe fire or have wings to fly like fictional dragons, although the Common Gliding Lizard (*Draco sumatranus*) of southeast Asia has skin flaps that allow it to soar between tree trunks. Some dragon legends place the creatures into aquatic realms. Today, most lizards occur on land in often arid settings, and only a few such as the famous Marine Iguanas (*Amblyrhynchus cristatus*) of the Galapagos Islands venture into water. A common theme among both dragons and lizards is that they are revered in many cultures, and are symbolic of power and wisdom. Photo from <http://reptilespictures.net/Komodo-Dragon.html>



Are salamanders lizards?

No. Although both salamanders and lizards have elongate bodies, four legs and a long tail, salamanders are not reptiles. Salamanders (and newts) are amphibians. Lizards have scales covering their skin and can live in very dry areas, whereas salamanders generally have smooth skin that must remain moist or they will dry out and die. However, in folklore the "fire lizard" was likely a salamander that emerged from campfires because salamanders often are found within decaying wood. In the southeastern U.S., salamanders used for bait are called 'spring lizards'.

How about Alligators and Crocodiles?

No. These are not lizards, either. Today, thanks to technological advances, modern crocodylians are considered to be most closely related to birds, and more distantly related to lizards and snakes! There may be a link between crocodiles and dragons, as it has been suggested that the symbolic Chinese dragon is a stylized crocodile.

Lizards listed as Threatened or Endangered by the United States Endangered Species Act (ESA) and by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (http://ecos.fws.gov/tess_public/SpeciesReport.doc; <http://www.cosewic.gc.ca/eng/>; accessed 18 November 2011).

Common Name	Scientific Name	Status
St. Croix Ground Lizard	<i>Ameiva polops</i>	Endangered (ESA)
Maria Island Ground Lizard	<i>Cnemidophorus vanzoi</i>	Endangered (ESA)
Hierro Giant Lizard	<i>Gallotia simonyi simonyi</i>	Endangered (ESA)
Blunt-nosed Leopard Lizard	<i>Gambelia sila</i>	Endangered (ESA)
Dunes Sagebrush Lizard	<i>Sceloporus arenicolus</i>	Proposed Endangered (ESA)
Blue-tailed Mole Skink	<i>Plestiodon egregius lividus</i>	Threatened (ESA)
Florida Sand Skink	<i>Plestiodon reynoldsi</i>	Threatened (ESA)
Ibiza Wall Lizard	<i>Podarcis pityusensis</i>	Threatened (ESA)
Coachella Valley Fringe-toed Lizard	<i>Uma inornata</i>	Threatened (ESA)
Island Night Lizard	<i>Xantusia riversiana</i>	Threatened (ESA)
Greater Short-horned Lizard	<i>Phrynosoma hernandesi</i>	Endangered (COSEWIC)
Five-lined Skink	<i>Plestiodon fasciatus</i>	Endangered (COSEWIC)
Prairie Skink	<i>Plestiodon septentrionalis</i>	Endangered (COSEWIC)

Primary Threats to Lizards

- Habitat loss, degradation, fragmentation
- Invasive species
- Over-exploitation
- Predation
- Climate change

Threats: At a Loss for Lizards

Unfortunately, our understanding of lizard status is incomplete. The IUCN Red List of Threatened Species acknowledges that their assessment is lacking relative to arid and semi-arid species, including lizards. The IUCN recognizes that these systems are expanding, and a focus on the world's 5,000+ lizards is needed.

In North America, we have a better understanding of lizard status through the various lists categorizing Endangered, Threatened, or Sensitive species, including the U.S. Endangered Species Act (ESA) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). To date, more than

20% of lizards north of Mexico have status rankings of concern. We are truly 'at a loss for lizards'! In the U.S., 38 lizard species are considered under the ESA, with five species identified as Endangered or proposed Endangered, five species are listed as Threatened, and 20 are Species of Concern. An additional three species are Endangered in Canada. Other lizard species are in concern categories within U.S. states.

*Lizards are common art icons in our everyday life today, and in native cultures worldwide. This mural of a dinosaur-sized Desert Iguana, *Dipsosaurus dorsalis*, can be seen in 29 Palms, California! Photo © LLC Jones.*

1. Habitat Loss, Alteration, and Fragmentation

Habitat loss, degradation, and fragmentation are the most significant threats to lizards, overall. These threats coincide with human development, and are resulting from the outright conversion of land for rural or urban expansion, the incursion of energy development into remote areas, a relatively recent threat in the U.S. west, and additional human-associated threats that tag along with our growing population.

Lizard habitats are quite diverse because the different species can live in different biomes such as deserts, forests, or prairies. They





The Island Glass Lizard, Ophisaurus compressus, is US ESA-listed as a Species of Concern due to habitat loss and degradation. It is legless and occurs in sandy scrub habitats of South Carolina, Georgia and Florida. Photo © JD Willson.

usually live on the ground or climb up into vegetation or over rocks. In North America, physical habitat conditions are of paramount concern for many lizards. Two prime habitat elements of consideration for lizards include temperatures suitable for thermoregulation and substrates suitable for burrowing or providing spaces used for cover. Vegetation is key for providing a variety of hiding places, refugia from predators, and habitat for their prey. As these elements are altered, so are lizard habitats, and lizard survival and/or reproduction also may be affected.

Habitat fragmentation is a subtle change to the spatial arrangements of habitats that alters lizard distributions and their interactions with each other. In particular, roads disrupt habitat connectivity and can affect habitat suitability for individuals and the dynamics among individuals that characterize lizard populations. Maintenance of connected habitats across large areas is an emerging concern for all wildlife species.

Two examples follow. The Dunes

Green Anoles (Anolis carolinensis) are some of the most common lizards in the pet trade. A pet store may call it a chameleon. They can be captive-bred, which reduces stress on animals and threats to wild populations. Green Anole declines in Florida are associated with both increasing non-native anoles and habitat degradation. Photo © JD Willson.

Sagebrush Lizard, *Sceloporus arenicolus*, of New Mexico and Texas occurs in a small area of shinnery oak dunes habitat. Its habitat is threatened by oil and gas development, off-road vehicle traffic, brush invasion, and chemical spraying. The Flat-tailed Horned Lizard, *Phrynosoma mcallii*, occurs in sandy desert hardpan or gravel flats in southern California, southwestern Arizona, and northwestern Mexico. Agricultural, urban, and geothermal developments, in addition to off-road vehicles and sand and gravel mining, restrict its habitat. Federal protection was withdrawn for this lizard in 2006, and it is listed as 'near threatened' by IUCN and a species of special concern in California. Ongoing monitoring efforts are assessing population status of this species.

2. Invasive Species

Invasive species concerns for lizards are numerous, and this threat category overlaps with two other threat categories—habitat degradation and predation. Non-native plants



invading arid western landscapes are a particular threat to lizard habitats. For example, Buffelgrass (*Pennisetum ciliare*) is changing the southwestern U.S. and northern Mexico ecosystems from desert to grassland. Buffelgrass outcompetes native plants, is drought tolerant, persisting in dry years, and appears to deplete soil fertility. Its spread has changed fire dynamics, from a desert system without fire and fire-adapted communities, to systems in which hotter fires may be created year-round and subsequent loss of desert species. This grass degrades habitat for lizards such as the Reticulate Collared Lizard (*Crotaphytus reticulatus*), a species listed as vulnerable by the IUCN and threatened in the state of Texas.

Another example is Cheatgrass (*Bromus tectorum*), an invasive grass of western American shrub-steppe communities, which is suggested to have negative effects on lizards such as Desert Horned Lizards (*Phrynosoma platyrhinos*) in the Great Basin Desert of Utah. These horned lizards appear to avoid areas with Cheatgrass, which impairs their mobility.

Is this a horned frog or horny toad? No, this is a horned lizard! This Round-tailed Horned Lizard (Phrynosoma modestum) lives in desert scrub and semi-desert grassland with gravelly or rocky soil in Texas, New Mexico, Arizona, and Mexico. It eats ants! Due to its very specialized diet, the ant-eating horned lizards generally make poor pets - watch these and other native lizards in the wild; don't take them home. Photo © JD Willson.



Non-native species are competitors and predators of native lizards, with cascading effects through food-web dynamics. Forty introduced exotic lizard species occur in the southeastern U.S., mostly in Florida. Many of these have origins from the pet trade; release of non-native animals into the wild can harm native species through both food web dynamics, displacement from habitats, and disease introductions. Another non-native species concern for lizards is ants. Some invasive ants displace native ants, depleting the main food resource for horned lizards. In a 'turn of the tables', invasive Fire Ants eat lizards. Additional threats that both non-native and native predators pose to lizards are included in the next section.



This Common Five-lined Skink, Plestiodon fasciatus, may be on the menu for your outdoor cat. Unprecedented predation rates by domestic or feral cats are key threats to many lizards. Photo © JD Willson.

3. Predation

Domestic and feral cats eat lizards, and they can be a dominant threat to lizard species. Cats are named as key threats to the Common Five-lined Skink in Canada. In New Zealand, a single cat was found with 49 skinks in its stomach—that one animal was a significant threat. The Galapagos National Park and the Charles Darwin Research Center spent years removing feral cats from a single island, Baltra, just to restore the

ecosystem and native land iguanas there. Domestic cats may sometimes bring home only a lizard's tail. Perhaps sacrificing that tail saved the lizard's life for the moment, but tail loss can affect locomotion, social status, and longer-term survival and reproduction. Keeping domestic cats indoors and reducing feral cat populations are the best ways to reduce this threat to wild lizard populations.

Other human-associated mammals have been implicated as being threats to lizards as well. The St. Croix Ground Lizard (*Ameiva polops*) is a U.S. Endangered species. Its main threat appears to have been the Indian Mongoose which was introduced into the U.S. Virgin Islands in the late 1800s. Dogs, pigs, and rats are other known non-native predators that may be threats to lizards in different parts of the world.

Natural predators of lizards include a diversity of snakes, birds, and mammals. Predation rates of native predators on lizards may increase with human development. For example, with human development has come increased fencing, and electrical and telephone poles and wires. These are perches for avian predators. Predation rates on lizards by their natural bird predators may have increased due to the artificial perches and the

The Southern Alligator Lizard, Elgaria multicarinata, can be found in chaparral, forests, grasslands, and urban areas from Washington to Mexico. They have a reputation for being fierce, and will bite. Climate change is a concern for altering microclimates upon which this species relies. Photo © B McCreary.

Were dinosaurs lizards?

Dinosaurs flourished in the Age of Reptiles, the Mesozoic period of ~100-250 million years ago, a time when reptiles dominated life on the planet. Many different groups of reptiles coexisted during the Mesozoic: dinosaurs were part of a larger group of reptiles, the Archosaurs, and lizards stem from another lineage called the Lepidosaurs.

heightened visibility such perches afford birds. As human development fragments lizard habitat, predation edge effects may result—meaning more of a lizard's habitat may be near a boundary with human habitation or development and these edges may have new perches for avian predators. Avian predator use of power-line grids was discussed in the 2010 ESA-listing proposal for the Dunes Sagebrush Lizard; this potential threat warrants further research. Another example is the increasing raccoon populations associated with human development; this is another potential threat to lizards from native predators.

4. Over-Exploitation

Collection of wild animals can lead to over-exploitation. Lizard over-exploitation is an issue of particular concern for the rare and unique species, but common species also can be locally extirpated due to over-collection of wild animals. Lizards may be valued highly for a variety of human uses, including pets,





*The Eastern Collared Lizard, *Crotaphytus collaris*, is widespread in North America, native to areas from Kansas to Mexico. Males are brightly colored during the breeding season. They eat a variety of arthropods and other lizards. Over-collection of collared lizards is a conservation concern. Photo © LJ Vitt.*

skins (monitors), meat (iguanas), traditional or modern medicines (monitor fat—antibacterial; monitor oil—aphrodisiac; geckos—miracle cures), and souvenirs (stuffed horned lizards!). This is not solely an issue for other parts of the globe—large numbers of lizards or lizard products are sold in the U.S. every year, although the demand for lizards is higher elsewhere. The lack of harvest and trade regulations and difficulty in the enforcement of existing regulations exacerbate this over-exploitation problem.

Reptile trade issues currently are a focus of attention in the U.S. and abroad. For the U.S., PARC and State Partners have developed Model State Herpetofauna Regulatory Guidelines (<http://parcplace.org/publications/>) to assist wildlife management agencies in creating or modifying their regulations regarding the collection, manipulation, possession, and sale of native and non-native herpetofauna. For the average citizen in the U.S. or Canada, please check with your state or province regulations before taking them out of the wild. Permits may be required, and collection of rare animals for personal use may be prohibited. However, in many places, it is legal to collect lizards.

For prospective pet owners, with proper care, some lizards make excellent pets, and help connect us

to the wonders of the natural world. Although lizards can be bred in captivity, and lizard trade enthusiasts have been transitioning to the trade of captive-bred stock, there is no real certification process to ensure that wild animals are not taken illegally and sold. The onus is upon the buyer to ensure that their purchase either has been legally collected or is a captive-bred animal. Release of captive animals back into the wild is problematic due to disease issues and potential mixing of isolated genetic populations; these concerns also hold for wild-caught animals brought into captivity temporarily. Non-native species that are turned loose also can compete with or prey on native populations, upsetting the balance of a local animal community. For more information, “Don’t turn it loose!” brochures are available at: <http://parcplace.org/images/stories/pdfs/DontTurn.pdf>.

5. Climate Change

The first fossil lizards have been dated to 250 million years ago, and fossils from about 140 million years ago begin to look like modern lizards. Although climates have changed radically over the last hundred million years, the combined effects of the more-recent heightened rate of climate change, the restricted distribution of many of today’s lizards, lizard dispersal limitations,

and the fragmentation of current lizard habitats due to extensive human developments are proposed to be putting today’s lizards at unprecedented risk. They may not be resilient enough to ‘weather this storm,’ especially species with restricted distributions. This is a hot topic for lizard researchers today.

“Altered thermal niches” are an emerging concern for the effects of climate change on lizards. A recent study of Mexican lizards found that 12% of local populations have been lost since 1975, and local extirpations were projected to reach 40% by 2080—the study provides support for climate change as the cause. The basic premise of this threat is that lizards are active during optimal temperatures because they are ectothermic, and the timing of these ‘windows’ may vary with weather patterns and climate change trends. With current climate change scenarios, these windows of activity can narrow during critical active seasons such as during breeding, and also at inappropriate times such as during winter hibernation.

Mounting evidence suggests that climate change is affecting some species. For example, in Oregon,



*Males of the Greater Earless Lizard, *Cophosaurus texanus*, become brightly colored in the mating season. They do not have external ear openings, and thus appear to be earless. Photo © LLC Jones.*



The Western Banded Gecko, Coleonyx variegatus, is nocturnal, and occurs in arid habitats of southern California, Arizona, Nevada, and Mexico. Photo © LLC Jones.

reproductive ‘busts’ from variable spring conditions narrowing the time window of suitable breeding conditions have been reported in the Side-blotched Lizard, *Uta stansburiana*. In Alberta, Canada, lizard mortality has been seen with unseasonal warm weather midwinter, followed by more cold weather. Winter survival for the Greater Short-horned Lizard, *Phrynosoma hernandesi*, in Alberta may rely on persistent snow cover, which insulates hibernating animals from such warm spells. North temperate zones may be particularly susceptible to such year-round weather vagaries, and in North America, lizard range boundaries are coincident with areas subject to widely fluctuating weather patterns. In short, if the rate of climate change increases, lizards may be in peril. It should be noted that predicting weather patterns from climate-change trends is not straightforward, many complex factors come into play, including geographic variation in climate drivers. However the point here is that it is also not a straightforward conclusion to assume that global warming trends will create warmer habitats that will be ‘good’ for ectothermic lizards, expanding population boundaries. Nevertheless, in Spain’s Mediterranean-influenced environments, one study has found a significant northward expansion of lizard ranges between two time

periods, 1940-1975 and 1991-2005. Those researchers pointed out constraints in lizard range shifts in their region due to the geographic barriers of the Cantabrian Sea and the Pyrenees Mountains. Such dispersal limitations can also be caused by anthropogenic habitat fragmentation. The relationships between lizard ecology and climate may have regional and taxonomic patterns. These topics warrant closer inspection.

Conservation Needs:

1) Conservation Actions

Members of the public, biologists, land and resource managers, and policy makers all have roles in wildlife conservation. Effective lizard conservation can occur within local communities. Citizen-scientists, school groups, and nature enthusiasts can have a strong voice in managing local areas to retain and improve lizard habitats and connectivity among habitats. At larger scales, county, state and provincial planning efforts can

Are geckos lizards?

Yes. Geckos are indeed lizards, and there are almost 1,500 species of geckos on Earth. They are found in warm areas and can be very colorful. Many geckos can produce sounds and are excellent climbers. Geckos can be found in pet stores, and some varieties are captive-bred and make excellent pets. However, prospective gecko owners need to do their homework to make their selection a successful endeavor for both the gecko and the human!

identify priority areas for lizards, and then address habitat-management and connectivity-corridor alternatives accordingly. Habitats for lizards are habitats for a wealth of biodiversity, so connecting lizards to other species and conserving the jointly used habitats will help communities of organisms. By dedicating conservation efforts to lizards while we still have thriving populations, we will also address ecosystem sustainability, and retain our treasured natural heritage for future generations, bio-medical research opportunities, bio-ethics, and aesthetics.

2) Public awareness and education

Raising conservation awareness for lizards is an educational theme that can have rewarding benefits for ‘children of all ages’! Lizards are watchable wildlife, and as such can

www.yearofthelizard.org

PARC is dedicated to herpetofaunal conservation. You can become involved in PARC to help address lizard conservation needs in your area. For more information about PARC and the Regional Working Group in your area, please go to: www.parcplace.org!

help us to connect to our natural world. As the '2012 – Year of the Lizard' campaign unfolds, watch for newsletters and other informational materials at www.yearofthelizard.org. Contribute to these newsletters with your own stories—share your experiences. 'Pay it Forward' by helping to raise lizard-conservation awareness in your area!

3) Research

A greater understanding of emerging threats to lizards is a priority research need. Each of the threats discussed above has associated knowledge gaps that research can address. In a human-dominated world, how much habitat is needed to keep lizard populations sustainable? How resilient are they to our changing world? Are other threats looming, such as disease? Emerging concerns such as climate change need greater attention. More knowledge of this diverse and colorful fauna will assist us in making management decisions in the future.

Seven Small Ways YOU Can Help Lizards

1. Provide lizard-friendly habitats in your backyard and elsewhere to help keep common species common
2. Focus special attention on rare species
3. Lizards are watchable wildlife, watch them!
4. Do not take wild lizards as pets, or release pets into the wild
5. Consider adopting a lizard from a shelter or wildlife rehabilitation center rather than buying a new one
6. Keep pet cats indoors, or if you let them out, try not to let them eat lizards
7. Tell others about lizard conservation needs

Courting Broad-headed Skinks, (Plestiodon laticeps). Photo © LJ Vitt



Make lizard conservation happen!

For More Information

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“At noon in the desert a panting lizard waited for history, its elbows tense, watching the curve of a particular road as if something might happen.”— William Stafford

An Interview with Larry Jones

By Kathryn Ronnenberg, US Forest Service, Pacific Northwest Research Station



Larry Jones and friend (a subadult Sonoran Spiny-tailed Iguana, *Ctenosaura macrolopha*) in San Carlos, Mexico. Photo by Michael Sredl.

Lawrence L.C. Jones has worked with many species of reptiles, amphibians, mammals (especially American Marten), birds, and fishes over the course of thirty years in both the research and management branches of multiple public agencies. He is the Southwest PARC co-chair and has always been fascinated by both 'wet' and 'dry' herps. A move from the Northwest to the Southwest enabled him to fully indulge his passion for lizards. Larry has authored or edited over 80 scientific and popular publications, including three books on amphibians and reptiles. In 2009, he and co-editor Rob Lovich published the encyclopedic *"Lizards of the American Southwest: A Photographic Field Guide"*, the most comprehensive recent treatment of the subject. Currently, Larry is involved in long-term monitoring of a highly diverse lizard assemblage in southeastern Arizona, as well as teaching and leading lizard-watching adventures for urban youths and the general public.

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

I think I was in the womb. Actually, I was hooked on animals when I was about 5 years old and always wanted to be a "naturalist" (like a Mr. Charles Darwin in one of my kid's books). Early on I was most interested in reptiles and mammals. I remember drawing all of the lizards in the Peterson Field Guide of Western Reptiles and Amphibians while in Junior High and memorizing the scientific names of all reptiles and mammals in the US. In college, I became very herp-centric (but also dabbled in Marine Biology). I have to admit, during herpetology class field trips, noosing lizards was "what we did while waiting for snakes to come out." So, I guess I am a born-again lizard aficionado.

What is your current role in lizard research and conservation?

Currently, I have two lizard projects. One is tracking changes in a lizard assemblage in an ecotone of southeastern Arizona where there are 20 species, the highest diversity in the U.S. The other is educational—there are two programs to introduce people to the wonders of lizards as watchable wildlife. One of the projects is geared toward urban youths as part of a "kids in the woods" program to help young urbanites experience the outdoors.

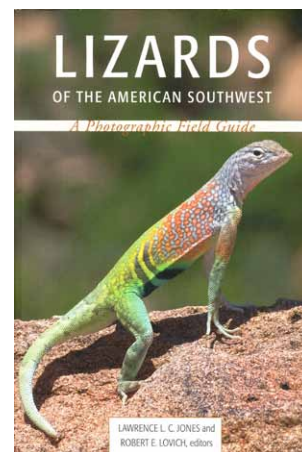
What is your favorite lizard or group of lizards?

The Gila Monster...duh! OK, so the Gila Monster has to be the holy grail of lizards, but there are scads

of other interesting lizards, such as whiptails with their fascinating life-history and evolutionary traits. I do have a special place in my heart for Red-backed and Giant Spotted whiptails. Some other whiptails are parthenogenetic, so they have no use for males. Obviously, they are more advanced than humans. Bunchgrass Lizards and Night Lizards are among my favorite little brown jobs.

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

My defining moment was probably the "Marijilda Experience" I mention in the preface of *"Lizards of the American Southwest."* At that time I realized what a dearth of information there was in the general literature on lizards, particularly given the fact that lizards are so well-known and well-studied; that last synthesis of information devoted to lizards was Hobart Smith's *"Handbook of Lizards"* from 1946! Not only do I continue to monitor lizards in Marijilda Canyon, but I also signed up for the Adopt-



**The views and opinions of interviewees are not necessarily shared by all members of PARC or other Year of the Lizard Partners*



Southwest PARC members were very fortunate to see no fewer than three Gila Monsters (Heloderma suspectum) on a single field trip to Sabino Canyon near Tucson, Arizona. Photo © LLC Jones.

a-Highway program there. A recent favorite memory came during the 2011 Southwest PARC annual meeting in Tucson. I was hosting the meeting so I wanted everything to run smoothly. Thankfully the stars lined up for our field trip to Sabino Canyon in the Santa Catalina Mountains. We scored big time and I will always remember how I treated SW PARC attendees to a three-Gila Monster day.

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

My answer is simply the anthropogenic menace. It is hard to tease out “the biggest threat” among all of the problems humans create for other critters, and there are often local threats that are problematic for certain species. I am tempted to join in on the Sinervo et al. (2010) bandwagon about the effects of climate change on lizard assemblages, but lizards and their habitats are so complex, I would prefer to fast-forward a decade or two to see what changes will have happened, and if and how they are linked to climate change. Invasive species, disease, and energy development also have to be in the front of our reptilian brainstems when we are considering threats to lizards.

Given that 2012 has been designated Year of the Lizard, how can people be made aware of the importance of lizards and the role they play in our ecosystems?

The public needs to receive factual and honest education about lizards as important components of our ecosystems. In today’s society, people are actually very aware of what lizards are and unlike snakes, almost nobody is afraid of a lizard. This interest should be nurtured, as I am doing with my public lizard walks. One of my pet peeves is how sensational animal programs are on the TV these days. I’m afraid the Crocodile Hunter generation requires life-threatening encounters and I fear the public will not embrace any critters as innocuous as lizards (although Komodo Dragons fit the bill for sensational megafauna).

The Giant Spotted Whiptail (Aspidoscelis stictogramma) is just one of many whiptail species that inhabit the wildlands of Arizona, including Sycamore Canyon in the Pajarito Mountains, where this animal was photographed. Photo © LLC Jones.



How can the public help in the conservation of lizards?

Awareness is a key issue. Most lizards do not fare well in urban settings and are most diverse and numerous in the vast expanses of public lands. These lands should not be taken for granted. If the public can recognize how important lizards are in ecosystems (they eat insects and are prey themselves to a host of other critters), they will understand how we have to take lizard management seriously. As an example, for the 2012 annual meeting of SW PARC in Las Vegas, Nevada, there are two themes that will go hand-in-hand: Year of the Lizard and Renewable Energy Resources. Public lands will be targeted for renewable energy sources (and non-renewable), so it is crucial that we work on meeting our energy needs while maintaining the diversity of lizards occupying the arid Southwest.

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

For the more casual lizard aficionado, they can participate in lizard walks where they occur, or encourage biologists to hold public lizard walks. Lizards are eminently watchable wildlife. This is an important first step for children. The public can also become citizen

scientists; because there are a fair number of lizard researchers, a little homework could lead to working with a renowned herpetologist. For the lizard aficionado who wants to become a professional herpetologist, that is almost like trying to make it in Hollywood, because the jobs are few and far between and competition can be fierce. Having said that, if someone is sufficiently motivated they may be able to find the lizard at the end of the rainbow (a Rainbow Lizard?). And unlike Hollywood, the herpetological community will embrace you, rather than chewing you up and spitting you out!

Is there anything else you would like to add? Are there any questions I should have asked that you're burning to answer?

Yes. What are the most common questions you get from the public about lizards? 1. "What is the difference between a gecko and a lizard?" The answer is that geckos are types of lizards, belonging to the Gekkonidae (Geckos) or Eublepharidae (Eyelidded Geckos) families. 2. "Are there fewer horned lizards now than there used to be)? I used to see a lot more of them when I was a kid." (They usually call them "horny toads," but then, so do I!)

This question is not as easy to answer. There are certainly fewer horned lizards in certain areas now than in the past, but I also subscribe to the horned lizard-child phenomenon. It is that people tend to remember things they saw as kids, so the images of the event are etched in the brain, but they tend to forget "not seeing horned lizards" when they were young. Also, young folk are generally out there playing in the bush, at lizard level, poking around and looking for lizards...only a few of us never grew up and still do that!

Lizards in the News

Scott Hensley, of NPR's SHOTS health blog, discusses an investigation into the exploitation of Tokay Geckos (*Gekko gecko*) collected for their 'so called' anti-viral properties. The full story available at <http://www.npr.org/blogs/health/2011/11/16/142401191/geckos-threatened-by-booming-demand-for-traditional-medicines>.

The *Fresno Bee's* Mark Grossi shares highlights of a unique conservation project using cows to keep non-native grasses at bay in traditional endangered Blunt-Nosed Leopard Lizard (*Gambelia siva*) habitat. The full story is available at <http://www.fresnobee.com/2011/12/10/2645192/managed-grazing-aids-valley-lizard.html>.

Tracy Miles explains attempts being made to save South Canterbury, New Zealand's unique paddock habitat, which is home to an assemblage of both common/widespread and very rare lizard species. The full story is available at <http://www.stuff.co.nz/timaru-herald/communities/6069901/Lizards-face-grim-fate-if-not-helped>

Leiolepis ngovantrii was one of 208 species new to science discovered in the Vietnam section of the greater Mekong River – found being sold live at restaurants. The photograph and full story are available at http://news.nationalgeographic.com/news/2011/12/pictures/111213-elvis-monkey-new-species-mekong-animals-science/#/cloning-lizard-eaten_28416_600x450.jpg

Upcoming Meetings & Events

Southeast PARC Annual Meeting, February 16-19, Fall Creek Falls State Park, TN

North Carolina PARC Annual Meeting, March 20, Weymouth Woods Sandhills Nature Preserve, Southern Pines, NC

Northwest PARC Annual Meeting, March 19-20, Portland and Hood River, OR

Association of Zoos and Aquariums (AZA) Mid-Year Meeting, March 24-30, Palm Springs, CA

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

Featured Lizard Families

By Lawrence L. C. Jones

[Larry "the Lizard Guy" Jones"]

There are about as many lizard families in the United States as there are months in the year (depending on your view of taxonomy and nomenclature), so the Year of the Lizard newsletter is a golden opportunity to showcase lizards by family each month. There are only six newsletters per year; therefore, each issue will highlight two families. The feature will briefly describe some of the genera and species within that featured family, with information on natural history, lizard-watching opportunities, and conservation issues. Becoming familiar with the families really helps the reader to learn species. Note that I use initial upper case letters for standard English names of species (e.g., Gila Monster) but not groups of lizards (e.g., night lizards), following the general convention of Crother et al. (2008, SSAR Herpetological Circular 37). I generally follow the naming standards of Crother et al. (2008, op. cit.) for species in the United States, and Liner and Casas-Andreu (2008, SSAR Herpetological Circular 38) for species in Mexico.

Featured families for the six issues of the Year of the Lizard News will be:

January: Family Crotaphytidae (collared and leopard lizards) and Family Iguanidae (iguanas and chuckwallas)

March: Family Phrynosomatidae (phrynosomatid lizards) and Family Scincidae (skinks)

May: Family Helodermatidae (Gila Monsters and Beaded Lizards) and Family Xantusiidae (night lizards)

July: Family Teiidae (whiptails) and Family Anguidae (alligator and legless lizards)

September: Family Gekkonidae (geckos) and Family Eublepharidae (eyelidded geckos)

November: Family Polychrotidae (anoles) and Family Amphisbaenidae (worm lizards)



Specacuarly colored male Eastern Collared Lizards (*Crotaphytus collaris*), © Larry Jones.

Family Crotaphytidae, Collared and Leopard Lizards

This is a small family of lizards consisting of only two genera restricted to North America: collared lizards (genus *Crotaphytus*) and leopard lizards (genus *Gambelia*). There are nine species of *Crotaphytus* and three species of *Gambelia*. Five species of collared lizards and all three of the leopard lizards are found in the United States. Both genera are similar in that they are heavy bodied, have large heads, stout limbs, and long tails. Collared lizards have the tell-tale black collars on the neck, while leopard lizards are invariably some shade of tan with brown

spots. Both genera are renowned for their feeding habits. Besides the usual fare of invertebrates, smaller lizards are an important part of the diet of crotaphytids. In fact, captive animals may need vertebrate prey in the diet to thrive.

The collared lizards found in the U.S. include the Great Basin Collared Lizard (*Crotaphytus bicinctores*), Eastern Collared Lizard (*C. collaris*), Sonoran Collared Lizard (*C. nebricus*), Reticulate Collared Lizard (*C. reticulatus*), and the Baja California Collared Lizard (*C. vestigium*). Not too far south of the border into Mexico we can find the rest of the species: Venerable Collared Lizard (*C. antiquus*), Sonoran Collared Lizard (*C. dickersonae*),



The Sonoran Collared Lizard (*C. nebris*) is much paler in color than most of its kin. Photo © Larry Jones.

Sierra los Cucapás Collared Lizard (*C. grisei*), and Isla Ángel de la Guardia Collared Lizard (*C. insularis*). One thing that all collared lizards have in common (besides the collar) is that they are attractive, stately animals. Males are usually much more vibrant than the females, although *C. nebris* is rather bland for a collared lizard. Eastern Collared Lizards are the most widespread of the species, occurring over much of the U.S. and northern Mexico. Males may be bright green to bluish. However, they are outdone by the cobalt-blue color of the male Sonoran Collared Lizard. The Venerable and Reticulate collared lizards have a beautiful reticulated pattern that is quite unlike the other species (although juveniles of most species have a weakly reticulated pattern). Females of all species sport bright orange bars along the sides when gravid. Juveniles also tend to have orange bars, especially young males.

Collared lizards are the epitome of lizards as watchable wildlife. They are relatively large, may be locally abundant, and the bright color of males catches the eye from a distance. On public lizard walks, participants invariably want to see and photograph collared lizards. Most species of collared lizards are seen while they perch atop boulders. From these promontories, they can bask, locate prey, advertise their territories, and watch for danger. When a potential meal or danger is detected, a collared lizard will bolt from the boulder and may run on its hind legs, using the tail as a counterbalance. Most species of collared lizards (except *C. reticulatus*) require open space with scattered boulders for high-quality habitat. Some species of collared lizards are more wary than others, and wariness seems to vary by locality even for a given species. Collared and leopard lizards can deliver a painful bite when captured.

Leopard lizards are not as showy as collared lizards, but are nevertheless impressive creatures. The three species are

Long-nosed Leopard Lizard (*Gambelia wislizenii*), Cope's Leopard Lizard (*G. copeii*), and Blunt-nosed Leopard Lizard (*G. sila*). The latter species is restricted to several valleys in central California. Cope's is endemic to the Baja California, Mexico, and a small area of adjacent southern California. The Long-nosed Leopard Lizard is much more widespread, being found in all deserts of the Southwest from Oregon to northern Mexico. All species are similarly marked, and there is little difference between the sexes, although gravid females have orange bars, as do their cousins the collared lizards. However, male Blunt-nosed Leopard Lizards have an orange blush over the entire body during the active season. Juvenile leopard lizards have red, rather than brown, spots. Leopard lizards prefer open areas of shrubs and bunchgrasses, but do not require boulders like most collared lizards. Leopard lizards are most commonly seen while basking on roadways, road berms, or while in the shade of bushes. In some areas leopard lizards are locally abundant and fairly easy to find, while in other areas they can be quite difficult to locate.



Long-nosed Leopard Lizard (*Gambelia wislizenii*) basking in the sun. Photo © LLC Jones.

Although collared and leopard lizards may be relatively abundant, there are conservation concerns, especially for two of the species. The Reticulate Collared Lizard is considered threatened in Texas and is apparently declining due to loss of habitat, negative interactions with non-native species (e.g., buffelgrass), and possibly climate change. The Blunt-nosed Leopard Lizard has lost much of its former habitat due to development and conversion of lands to agriculture. It is federally listed as endangered, and is also considered endangered by the State of California and the IUCN Red List. The Eastern Collared Lizard and possibly other species are subject to over-collection by commercial collectors and poachers for the pet trade. Collared and leopard lizards species may do well in captivity, but many pet owners do not give them

proper care (e.g., exposure to the appropriate spectrum of light, temperature balance, vitamins, and vertebrates in the diet), so they may languish in captivity.



A Common Chuckwalla, *Sauromalus ater*. Photo © Larry Jones.

Family Iguanidae, Iguanas and Chuckwallas

According to some authorities, the family Iguanidae includes some of the other families I will discuss in later issues of the *Year of the Lizard News*, including the crotaphytids (above), and the diverse group of phrynosomatid lizards. For our purposes, I consider Iguanidae restricted to the relatively large lizards typically known as iguanas and chuckwallas. One thing that stands out about this family is that they are largely herbivorous, compared to other lizard families that are carnivorous (especially insectivorous). There are about 40 species from North and South America, the West Indies, and even the South Pacific. Some of the noteworthy iguanids from afar include the famous Galápagos Marine Iguanas, the spectacular Fiji Iguanas, and the well-known Green Iguanas that flood U.S. pet shops. In the continental United States, we have only two native species—the Desert Iguana (*Dipsosaurus dorsalis*) and the Common Chuckwalla (*Sauromalus ater*). These species are quite different in appearance from one another, but both are relatively large and herbivorous, like other iguanids. Both species seem to be fairly well known where they occur, and both have been well-studied by researchers. The Green Iguana (*Iguana iguana*) is native to the US Virgin Islands and has become established in Florida and Hawaii. Several species of spiny-tailed iguanas (genus *Ctenosaura*) are found to the south in Mexico and some have become naturalized in parts of the U.S.

The genus *Dipsosaurus* has only 2-3 species, depending on your taxonomic leanings. All are known from northern Mexico, and the single U.S. species, *D. dorsalis*,

is found in the Mojave and Sonoran Deserts. The Desert Iguana is a relatively cylindrical lizard with a long tail, moderately sized limbs, and a small head. Overall, it is tan colored, with subtle, but intricate, markings. The sexes are similar and juveniles are similar to adults. The aptly named Desert Iguana is found in the hottest and driest parts of the desert. They are the most heat-tolerant lizard known in the U.S. This species can be seen basking on pavement when the temperature in the shade is in the triple digits and its body temperature can reach 45°C (113°F), well beyond the lethal maximum temperature for other species. Desert Iguanas are typically found in open areas of Creosote Bush, often on sandy soils. They are readily observed in dune areas and creosote flats. Good places to see Desert Iguanas include Anza-Borrego Desert State Park, Joshua Tree National Monument, and in the desert next to my house in Tucson (the eastern limit of the species).

Juvenile chuckwallas have striped tails, like the one that has climbed on top of this orange-bodied male. Photo © Larry Jones.



Common Chuckwallas are also found in the Mojave and Sonoran deserts and are also associated with Creosote Bush. However, this lizard will not be found in the flats—instead you need to look to boulder piles and outcrops. The Common Chuckwalla is the second largest lizard in the continental United States. They are heavy-bodied animals with a large head, thick legs, and thick tail. The torso is broad, with loose folds of skin. The loose skin allows for the expansion of the torso, as chuckwallas have a well-known behavior of inflating themselves by gulping air and wedging themselves in rock crevices to avoid capture and predation. Males are variously colored, depending on the location. They may have a red, white, black, banded, or cryptically colored torso. In most areas the head and legs are black. An unusual color pattern is found in South Mountain Park near Tucson, Arizona—the males are all black except for a bright orange tail. Elsewhere the tail is cream-colored. Females from all areas are brownish to grayish and usually lightly banded. Juveniles are similar to adult females but have a distinctly banded tail.



A Desert Iguana (*Dipsosaurus dorsalis*), out in the mid-day heat, which it tolerates better than any other U.S. species. Photo © Larry Jones.

If you are interested in chuckwallas, you should check out the Sea of Cortez (Gulf of California) for the island forms. There are five additional species of chuckwallas endemic to one or more of the islands. In his book, Lee Grismer (2002, *Amphibians and Reptiles of Baja California*, University of California Press) gives an excellent account of all species of chuckwallas. The Sea of Cortez also has island-endemic spiny-tailed iguanas.

At the time of this writing, Desert Iguanas and Common Chuckwallas are locally common and relatively widespread within their range. The biggest conservation concerns are urban growth and development, collecting, and habitat alteration. Unscrupulous collectors and poachers break rocks apart to get at chuckwallas in crevices; this will destroy habitat that has taken thousands of years to develop. There is a new threat looming on the horizon—development of renewable energy sources. The sun and wind may be renewable energy sources, but there is a cost: blading desert habitat. PARC intends to meet the challenge by working with industry. For the 2012 Southwest PARC annual meeting in Las Vegas, NV in October, the two themes “Year of the Lizard” and “Renewable Energy” will be emphasized. The U.S. is becoming more self-sufficient in energy, so solar and wind energy development is imminent. PARC will work with industry to minimize effects on species such as Desert Iguanas and Common Chuckwallas. In the eyes of lizards and herpetologists, the vast areas of desert are not a wasteland.

Get your Year of the Lizard 2012 Gear! An Introduction to the Cafepress Store

To kick off the Year of the Lizard, PARC launched their first product--the 2012 Year of the Lizard wall calendar! Just in time for the holidays! Now there other products for you to view, purchase, and enjoy. To view and order the merchandise, simply go online to the PARCStore (www.cafepress.com/parcstore)



Stay tuned and check out the website periodically...more PARC and Year of the Lizard products will be showing up. Proceeds from sales go to the Amphibian and Reptile Conservancy, a not-for-profit organization that helps support PARC activities, such as public education, publications, and research.