

BECOME AN ADVOCATE FOR THE TEXAS HORNED LIZARD



The **Texas Horned Lizard Advocacy Guide** is an information resource for individuals who wish to support the restoration of the Texas horned lizard (*Phrynosoma cornutum*). The Texas Horned Lizard Reintroduction Project at the Center for Conservation and Research at San Antonio Zoo was selected as a Texan by Nature **Conservation Wrangler**. This guide is a result of this collaboration and created with the help of the following organizations:



Please contact conservationinfo@sazoo.org if you have information or updates to this guide.

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SUMMARY



ABOUT THE TEXAS HORNED LIZARD:

The Texas horned lizard is a charismatic species, and the iconic state reptile of Texas. While this species was once found throughout most of the state, they have been in decline since the 1950s and have disappeared from a significant portion of their historic range. While there are many factors that have led to this species decline, the most significant causes are urbanization and the introduction of invasive species, both of which drastically reduced the quantity and quality of habitat for Texas horned lizards (see pages 4-9 for more details about this species and their decline).

HOW CAN I HELP?

While the Texas horned lizard has disappeared from many places, there is still a lot that can be done to help this species. Documenting sightings, collecting scat, and donating to established reintroduction projects are just some of the ways you can help ensure these beloved lizards are around for future generation to experience (see pages 10-17 for more information and suggestions). If you are a landowner and are interested in managing your property to benefit Texas horned lizards, see page 18 for land management resources. Please read through the rest of this guide to learn more about these reptiles, and all the ways you can become a **Texas horned lizard advocate!**



ABOUT THE TEXAS HORNED LIZARD



WHAT IS THE TEXAS HORNED LIZARD?

The Texas horned lizard (*Phrynosoma cornutum*) is one of fourteen species of horned lizards that are distributed from Southern Canada to Southern Mexico. The scientific name *Phrynosoma* means “toad-body” and *cornutum* means “horned” and though often referred to as “horned frog” or “horny toad”, they are actually reptiles, not amphibians. This beloved species is the state reptile of Texas and has been state listed as threatened since 1977.

Adult Texas horned lizards are three to five inches long, and have several horns on the back of the skull, the two center most being most prominent, and they have two rows of spiky fringed scales on either side of the body.

They are dietary specialists that feed primarily on red harvester ants (*Pogonomyrmex barbatus*), found throughout the majority of their habitat range. They have a sticky tongue that is specialized to catch ants quickly and effectively, and are resilient to most native ant toxins. Texas horned lizards live in grasslands, savannas, and deserts with little water and are adapted to survive in these harsh environments.

They have specialized skin which allows them to access water from moist sand and dew. Rough scales along their back collect and transport the water to the lizard's mouth via passive transport. This allows the horned lizard to save precious energy.

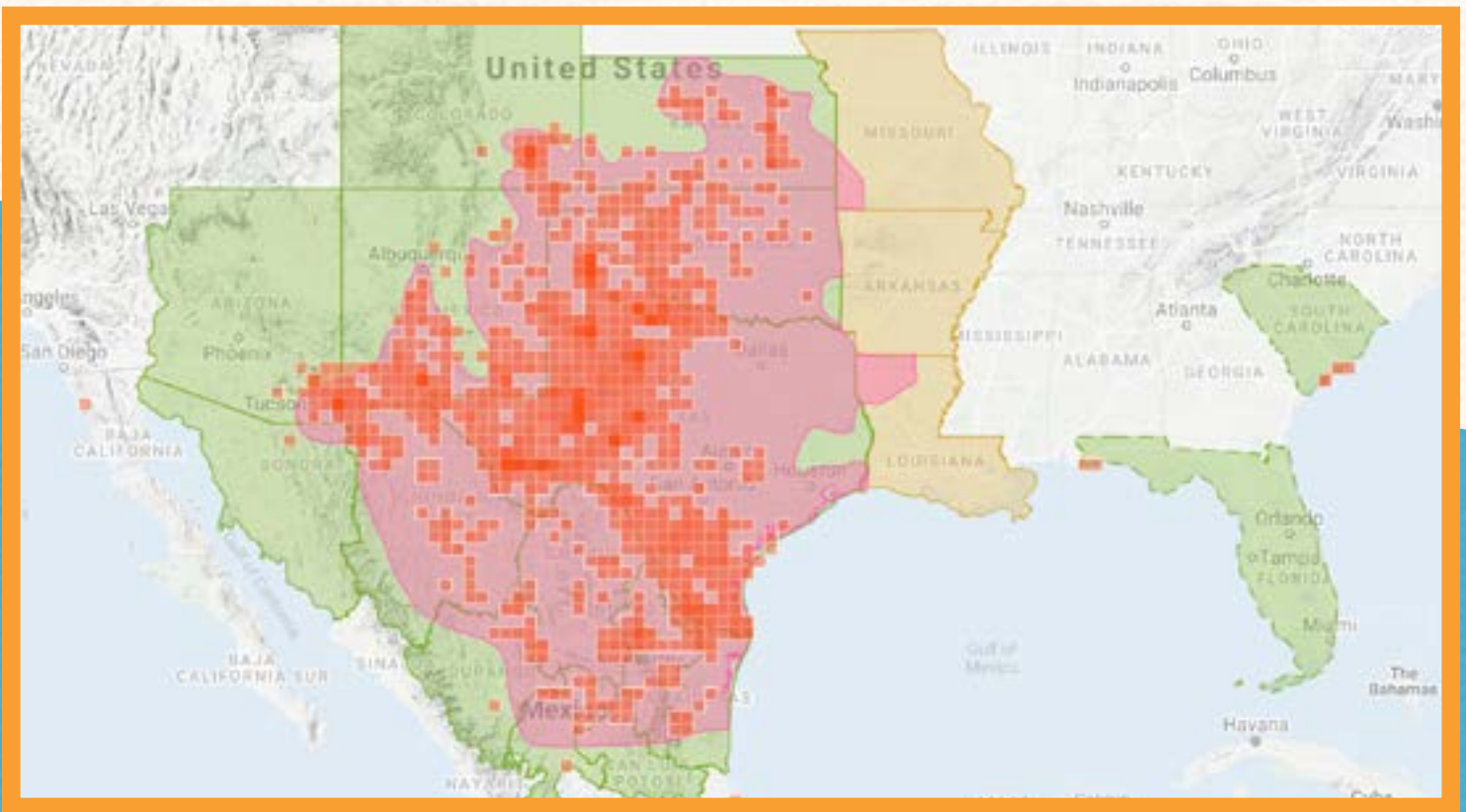
The Texas horned lizard's predator defense mechanisms are quite extraordinary. The first line of defense is camouflage. Horned lizards are so well adapted to blend perfectly into their surroundings that predators often do not even notice them. If this fails, the lizards can "puff up" their typically flat abdomen, appearing more intimidating and larger than normal, decreasing their chances of predation.



An additional defense, and possibly the most remarkable, is the Texas horned lizard's ability to shoot blood out of tissues in their eye sockets. The fluids have a noxious taste, and cause certain predators to retreat. This defense is most effective against encounters with wild canids, such as coyotes.

WHERE ARE THEY FOUND?

The map below shows the distribution (red shading) of the Texas horned lizard across a wide part of central North America. The state reptile was once found throughout most of Texas, but has disappeared from about a third of its historic range. Recent sightings are indicated by red squares.



WHY DID HORNED LIZARD POPULATIONS DECLINE?

The Texas horned lizard faces many threats including the effects of invasive species, fragmentation and loss of habitat, overuse of pesticides, and large-scale agriculture. Changes in land management practices in recent decades have resulted in woody encroachment of much former horned lizard habitat. In summary, there is no single cause for the decline of the Texas horned lizard.

INVASIVE SPECIES

Both invasive plants and animals negatively impact Texas horned lizard populations. Non-native invasive grasses such as Old World Bluestem (*Othriochloa*), were introduced from Europe and Asia in the 1920s and 1930s as forage for livestock and erosion control. These exotics grow in dense patches that restrict lizard movement, exclude native grasses and forbs, and typically support a lower density and diversity of arthropods.



Red Imported Fire Ant
(*Solenopsis invicta*)

Ant Size: 2 – 6 mm | 0.08 – 0.2 in



Red Imported Fire Ant Mound
(*Solenopsis invicta* mound)

Another harmful invasive species is the red imported fire ant (*Solenopsis invicta*) which was accidentally introduced to the U.S. from South America in the 1930s via cargo ships entering Mobile, Alabama. Since then, these voracious insects have spread to more than 320 million acres across fifteen states.

Due to their aggressive foraging behavior, high reproductive capability, and lack of predators and/or other strong competitors, red imported fire ants often become the dominant ant species in areas outside of their native range. These invasive ants impact native insects and other terrestrial organisms, including harvester ants, reducing the amount of food available for horned lizards to eat.



The Beneficial Red Harvester Ant
(*Pogonomyrmex barbatus*)
Ant Size: 5 – 7 mm | 0.2 – 0.3 in

The Beneficial Red Harvester Ant Nest
(*Pogonomyrmex barbatus* nest)

Texas horned lizards do not consume red imported fire ants and these invasive ants have even been known to attack vulnerable horned lizard hatchlings. Because of this, horned lizard populations have little or

no success in areas where this invasive species is present at high densities.



HABITAT FRAGMENTATION AND LOSS

The greatest decline of horned lizard populations in Texas occurred between the late 1960s and early 1970s as cities grew and surrounding communities became more urbanized.

- Urbanization of rural areas in Texas reduces the amount of suitable grassland and savanna habitats. Horned lizards struggle to find appropriate protective ground cover in areas of predominantly nonnative grasses, such as St. Augustine, which many people use to sod their residential lawns.
- As with other wildlife, horned lizards often fall victim to moving vehicles on paved roads. The number of highway miles in Texas has more than doubled from 35,000 miles to over 79,000 miles since 1935, although the area impacted by transportation infrastructure has increased exponentially in that time.
- Development also contributes to habitat fragmentation, creating isolated and inbred populations of Texas horned lizards that are more susceptible to existential threats.
- An additional effect of urbanization is increased pesticide use which greatly diminishes native harvester ant populations and other arthropods.





WHAT CAN I DO TO HELP HORNED LIZARDS?

BECOME A COMMUNITY SCIENTIST

The general public can assist scientists in addressing real-world problems through community science, by collecting and analyzing data, interpreting results, and making new discoveries.

One way to participate in community science is through **iNaturalist**. **iNaturalist** is an online group of amateur naturalists, scientists, and biologists, built on the concept of mapping and sharing observations of biodiversity across the globe. With over one million registered users, this platform serves as a comprehensive database that tracks global plant and wildlife biodiversity and abundance. You can help with the conservation of native species, like the Texas horned lizard, by creating an **iNaturalist** account to record your observations. If you come across a Texas horned lizard, eggs, scat (feces), or even shed skin in the wild, take a photo and upload your findings to the online platform. By keeping a record of sightings, wildlife biologists are able to better determine the most accurate and up-to-date population distribution of the species. **This platform automatically obscures precise location information for observations of threatened and endangered species. Only administrators can view actual location information.**



Texas horned lizard hatchling with U.S. quarter



LET WILDLIFE STAY WILD

The Texas horned lizard is listed as a threatened species in Texas. Handling Texas horned lizards is illegal in Texas, and even if your intentions are good, you are in violation of the law and could be ticketed for your actions. Scientists are required to obtain scientific research permits from the Texas Parks and Wildlife Department prior to handling and/or conducting research on Texas horned lizards ([TPWD: Wildlife Diversity Permits: Scientific Permits for Research](#)).

The best way to appreciate wildlife is by maintaining a safe distance, observing the animal in its natural habitat, and taking photos.



SPREAD THE WORD!

Education is crucial to get Texans excited about their state reptile. Educations leads to greater appreciation and fosters preservation of native biodiversity. By learning about the Texas horned lizard and sharing your knowledge with the world, you are acting as an advocate for the species, passing on the spirit of conservation to future generations.

San Antonio Zoo's Center for Conservation and Research provides outreach opportunities for the public, including citizen scientists. National organizations like the Horned Lizard Conservation Society (HLCS), as well as other Zoological facilities, such as the Dallas Zoo, also have great educational resources for conservationists of all ages.

COLLECTING
HARVESTER ANTS AT
A SAN ANTONIO ZOO
ED-ZOO-CATION
IN THE PARK EVENT



MANAGE YOUR BACKYARD

You can make your land more habitable for Texas horned lizards and other native species by making simple changes such as reducing pesticide use, planting native plants, and removing invasive species. These steps do not guarantee that horned lizards will return to your property, but sustainable land management practices support a variety of different native species, such as birds and pollinators, and native biodiversity in general.

Recommendations:

- **Treat fire ant mounds without the use of pesticides.**

While horned lizards depend on native harvester ants for food, invasive fire ants are harmful to horned lizards and other wildlife. Fire ants are common in many area and sustainable fire ant control is imperative in maintaining a healthy ecosystem. To individually treat each mound, drown the area with a bucket of very hot water and a drop of dish soap, digging the water in with a shovel. Remember to wear protective clothing such as gloves, closed-toed shoes, and long pants to protect yourself from ant bites and stings. For more information on fire ant mitigation, view this guide: [ant management](#).



- **Keep cats indoors and keep all pets away from wildlife.** Unsupervised pets negatively impact horned lizards and other wildlife.
- **Landscape your yard using native plants.** Native plant communities provide many benefits to the ecosystem- improved soil health, habitat for native pollinators, and even water conservation, which saves you money.



COLLECT TEXAS HORNED LIZARD SCAT

The Horned Lizard Detection Canine Network is a group of volunteer canines and their handlers who are trained to find evidence of Texas horned lizards. Dogs are trained with live horned lizards, scat (poop), eggs, and shed skin so that they may detect any traces of Texas horned lizards in the field. This partnership with Chiron K9 provides CCR with an efficient long-term method for horned lizard surveys and post-release monitoring. This is a critical tool in our reintroduction efforts.



HORNED LIZARD
DETECTION K9, "GREN" HAS
BEEN TRAINED TO CUE ON THE
SCENT OF HORNED LIZARD SCAT.

You can assist the Horned Lizard Detection Canine Network by collecting scat. To do so you may make your own kit (see how here: [Horned Lizard Scat Collection - YouTube](#)) or you can email Paul@Chiron-K9.com to have a kit sent to you.

Please ensure the following when collecting Texas horned lizard scat:

- Only collect Texas horned lizard poop – See above video for examples.
- Do not touch samples – Use clean tweezers, and/or plastic disposable gloves
- Use a glass jar – Must be cleaned prior to use.
- Store in the fridge or freezer – Maintains freshness and preserves scent.
- Do not touch or disturb horned lizards.
- Contact Chiron K9 once you have obtained samples – Paul@Chiron-K9.com

The TCU Horny Toad Project also utilizes scat in some of their studies. Horned lizard scat is a valuable source of DNA from horned lizards and provides a good record of their diet. If you are interested in providing fresh samples to our laboratory send an email to Dean Williams at dean.williams@tcu.edu to first determine if you are in an area of Texas we need samples from. If so, he can send you a kit with collecting vials containing preservative and instructions on how to collect the sample.

CLOSE-UP IMAGE OF
HORNED LIZARD SCAT,
COMPOSED ALMOST
ENTIRELY OF ANTS



MAKE A MONETARY DONATION

- **Donate** to support San Antonio Zoo's Texas Horned Lizard Reintroduction project (make sure to select "Texas Horned Lizard" from the donation drop down menu). Your donation will help contribute to a variety of husbandry items such as food, incubators, and could even help outfit a home for a horned lizard in the Zoo's "Lizard Lab".
- Order a Texas Parks and Wildlife Department **Conservation License Plate**. \$22 out of the yearly \$30 registration fee goes directly toward TPWD conservation initiatives. Your donation will help conserve wildlife diversity by funding a vast array of projects that help protect native species and their habitats.
- Become a member of the **Horned Lizard Conservation Society**. Support the HLCS mission to study, document and publicize the value and conservation needs of horned lizards, promote horned lizard conservation projects, and assist with horned lizard management initiatives throughout their ranges.
- **Purchase merchandise** to support the TCU Horny Toad Project. Proceeds go towards funding for field research.



RESOURCES FOR LANDOWNERS

If you are a landowner, and would like to learn more about management strategies for horned lizards, please refer to the following resources:

- If you are interested in utilizing your land as a reintroduction site, please fill out this brief **Landowner survey** so that the San Antonio Zoo Center for Conservation and Research can determine if your property meets habitat requirements. A member of the CCR team will be in touch once your survey has been submitted.
- **TPWD: Find a Wildlife Biologist.** The quickest and easiest way to learn more about how you can help wildlife on your land is to form a relationship with a TPWD Wildlife Biologist working in your county. TPWD Wildlife Biologists are the most knowledgeable and valuable resource when it comes to management strategies on private lands.
- The Texan by Nature **Landowner Guide** is a comprehensive list of state, federal, and NGO programs for conservation restoration, as well as resources for project planning and recognition for your efforts.
- Texas Horns (**RehorningTexas.com**) is a prairie wildlife management business concept that specializes in helping landowners and land managers who want to help restore Texas Horned Lizard populations and habitat. They help landowners in Texas with every aspect of habitat and population restoration and monitoring, including working with zoos for reintroduction, land and lizard surveys, developing wildlife management plans, and helping landowners achieve a wildlife tax valuation status for their land by improving the land for Texas Horned Lizards and their habitat needs, among other services. Contact email: **dusty@rehorningtexas.com**.
- The Caesar Kleberg Wildlife Research Institute at Texas A&M Kingsville **Management of Texas Horned Lizards bulletin** outlines the ecology and habitat requirements of the Texas Horned Lizard, and management practices are suggested that should benefit the species.
- **The Texas Parks and Wildlife Department Texas Horned Lizard Management and Monitoring packet** is a product of the Texas Horned Lizard Watch program, created to encourage volunteers to participate in horned lizard data collection and research.
- If you have existing red harvester ant mounds on your land, Texas Parks and Wildlife has also published a detailed guide outlining their strategies for management of the red harvester ant.

CONCLUSIONS

Sustainable land management practices are necessary to preserve and protect this beloved Texas icon. By supporting San Antonio Zoo's **Texas Horned Lizard Reintroduction Project**, *you* can help to restore this species to its historic abundance. Through educating the public about this species, collaborating on creative solutions for reintroduction, and implementing proven land management strategies, we have a chance to amplify the message of statewide conservation and *bring 'em back*.



CONTACT INFORMATION

TEXAN BY NATURE

Email: info@texanbynature.org

Program web page: <https://texanbynature.org/projects/san-antonio-zoo-horned-lizard-reintroduction-project/>

Texan by Nature unites conservation and business leaders who believe Texas' prosperity is dependent on the conservation of its natural resources. TxN amplifies projects and activates new investment in conservation which return real benefits for people, prosperity and natural resources. Texan by Nature achieves mission goals through the Texan by Nature Certification program, Conservation Wrangler program, Symposia series, and Texan by Nature 20.

Get involved and learn more at www.texanbynature.org

and follow on



@TexanbyNature

CENTER FOR CONSERVATION AND RESEARCH AT SAN ANTONIO ZOO

Email: conservationinfo@sazoo.org

Program webpage: <https://sazoo.org/conservation/texas-horned-lizard-reintroduction-project/>

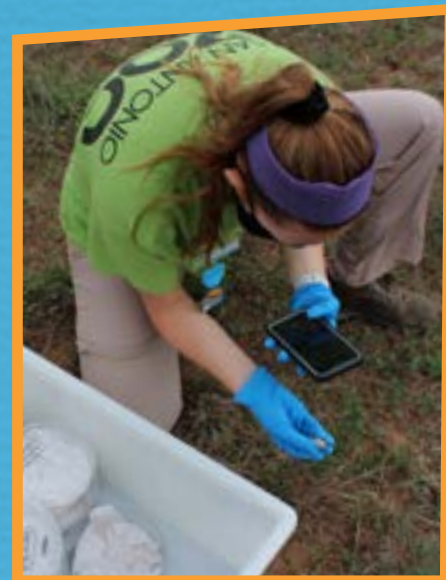
Center for Conservation and Research at San Antonio Zoo seeks to fulfill our mission through fieldwork and captive husbandry of rare and threatened species. Much of our work is collaborative, involving partners from state and federal agencies, academia, and the private sector. The scope of our efforts includes projects on three continents and projects throughout the United States – with particular emphasis on Texas. Current projects focus on fish, amphibians, reptiles, insects, crustaceans, and imperiled ecosystems and cultures. The results of this work include management recommendations, boots-on-the-ground conservation, and contributions to our understanding of the ecology, life history, and evolutionary history of a diversity of organisms in the form of technical reports, popular articles, books, and peer-reviewed papers.

Learn more at www.sazoo.org

and follow on



@SanAntonioZoo



CHIRON K9

Email: Paul@Chiron-K9.com

Program webpage: www.chiron-k9.com

Chiron K9 is a research-based training, coaching, and consulting company that is the leader in integrating proven canine science and support into field-based projects. The company's focus is detection, especially in conservation and the environment, and supporting scientific research. Based in Somerset, Texas, United States, they study the disciplines of detection canines and integrate the proven science-based research into applied practice. Chiron K9 has supported detection canine research with leading academia and Federal agencies.

Learn more at www.chiron-k9.com

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DALLAS ZOO

Email: info@DallasZoo.com

Program webpage: www.dallaszoo.com/protecting-the-twelve/texas-native-wildlife

The Dallas Zoo is dedicated to creating a better world for animals. Named one of the nation's Top 10 Zoos by USA Today, it is the largest zoological experience in Texas. The zoo has been accredited continuously by the Association of Zoos & Aquariums since 1985, and features a 106-acre park, thousands of animals, and an education department that offers programs for all ages. The zoo is located at 650 S. R.L. Thornton Freeway (I-35 at Marsalis) and is open seven days a week from 9 a.m. to 5 p.m.

Learn more at DallasZoo.com or call 469.554.7500.

and follow on



@DallasZoo



HORNED LIZARD CONSERVATION SOCIETY

Email: hornedlizardinfo@gmail.com

Program webpage: www.hornedlizards.org

The Horned Lizard Conservation Society (HLCS) is a 501(c)(3) non-profit organization and is the only organization in the world dedicated to protecting horned lizards. In late 1990, citizens concerned about the decline of the horned lizard from various states met in Texas and discussed creating an organization that would help to conserve the horned lizard. The HLCS became an officially formed organization in January 1991. The HLCS has a Board of Directors that oversee the general operation of this organization and has regional contacts. The HLCS offers grants for scientific research, education, and outreach events regarding information on conservation of horned lizards. In addition to offering research grants, some of the Society's other activities include: educational presentations at environmental and conservation events, organizing and leading horned lizard species surveys on both private (with permission) and public lands, rescue, recovery and reintroduction of displaced specimens, and creation and distribution of educational materials.

Learn more at www.hornedlizards.org

and follow on



**FB-@hornedlizard | IG-@hornedlizardconservation
YT-@Hornedlizardconservationsociety**

TCU HORNY TOAD PROJECT

Email: dean.williams@tcu.edu

Program webpage: www.deanwilliamslab.com

Our laboratory has been focused on understanding the genetic structure and ecology of Texas horned lizards. We have mapped the genetic diversity of Texas horned lizards across the state of Texas and in zoos to help inform reintroduction efforts. We have been studying the ecology of reintroduced lizards including diet, habitat usage, thermal ecology, predation, and survival. We also have a long-term study of Texas horned lizards living in the towns of Kenedy and Karnes City in south Texas to gain a better understanding of how they have persisted in close association with people in those towns. The purchase of merchandise from the following website

<https://www.redbubble.com/people/thlizard/shop>

goes towards supporting our field research.

Learn more at <http://www.hornedlizards.org/>

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PHOTO CREDITS

Page 2: A Texas horned lizard basking on a rock with a rocky background-

Shutterstock Id: 8371966 - Photographed by Rusty Dodson

<https://www.shutterstock.com/image-photo/texas-horned-lizard-basking-on-rock-8371966>

Page 3: Single horned lizard (top of page)- Photographed by Kamryn Richard

12 Texas horned lizards (right side of page) - Photographed by Caitlin Bailey

Page 5: The Horned Jack Lizard- Image credit: Flickr

Page 6: Range Map- Image credit: iNaturalist

Page 7: Fire Ant image- Image credit: USDA

Fire Ant mound image- Image credit: Terminix

Page 8: Harvester Ant images-Image credit: Wild Lens Collective

Page 9: Texas horned lizard in grass- Photographed by Brittany Nunn

Page 16: Texas Horned Lizard Scat- Photographed by Gary Nafis

<http://www.californiaherps.com/noncal/southwest/swlizards/images/pcornutumfeces810.jpg>

Page 24: 12 Texas horned lizards (right side of page) - Photographed by Caitlin Bailey

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GUIDE DESIGN by Courtney Lubke

