

TRANSCRIPT

INTERVIEWEE: Andy Gluesenkamp

INTERVIEWER: David Todd

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David Todd [00:00:03] Well, good morning. My name is David Todd, and I have the privilege of being here with Andy Gluesenkamp.

David Todd [00:00:11] And with his permission, we plan on recording this interview for research and educational work on behalf of a nonprofit group called the Conservation History Association of Texas. And it's also for a book and a web site for Texas A&M Press, and finally, for an archive at the Briscoe Center for American History at the University of Texas at Austin.

David Todd [00:00:33] And I want to stress that he would have all rights to use the recording as he sees fit. It is his.

David Todd [00:00:39] And I wanted to make sure that that's okay with you before we went any further.

Andy Gluesenkamp [00:00:43] That's okay with me.

David Todd [00:00:45] Great.

Andy Gluesenkamp [00:00:45] You have my permission.

David Todd [00:00:47] Thank you.

David Todd [00:00:48] Well, let's get started, then.

David Todd [00:00:50] It is Thursday, August 3rd, 2023. It's about 11:30 a.m. Central Time. My name is David Todd. As I said, I'm representing the Conservation History Association of Texas, and I am in Austin. And we are conducting a remote audio interview over Zoom with Andy Gluesenkamp, who is based in the San Antonio area.

David Todd [00:01:14] Dr. Gluesenkamp is the Director of Conservation at the San Antonio Zoo and earlier was the state herpetologist for Texas Parks and Wildlife. He has also taught at Texas State University and at Huston-Tillotson University. He's worked at the Texas Memorial Museum. He has consulted for various list of consulting firms, including GEO Marine, Athabasca, George Veni and Associates and Zara Environmental. And through the course of his career, he has been involved in efforts to study and protect, breed and release horned lizards in Texas.

David Todd [00:01:55] And so, I thought that maybe we could talk about his general background and about his experience with these horned lizards.

David Todd [00:02:04] So with that little preamble, I wanted to ask you if you would tell us about your childhood and early years and if there might be any people or events in those young days that might have influenced your interest in animals and reptiles in particular?

Andy Gluesenkamp [00:02:23] I was very fortunate to grow up in a small town in Southern California in the 1970s and '80s, So as a kid we could walk out the back door and there were wild places with wild critters. Lucky for me, there were all kinds of snakes - beautiful California king snakes and gopher snakes and coach whips that we could hardly ever catch. So it was a wonderful place for a kid who like snakes to grow up.

Andy Gluesenkamp [00:02:53] I'll be honest, I was really excited early on equally about reptiles, amphibians, paleontology ichthyology. And I thought, I want to be an ichthyologist. But at the age of five, I couldn't spell it. And I had a lot more experience with reptiles than fish at that point. So I guess that may have played a role in that decision. But I think I would have wound up a herpetologist either way.

Andy Gluesenkamp [00:03:24] My mother was an amazing influence on me. My mother was an amazing influence on me as a young naturalist, and so was my father. My father brought all sorts of great books into the house, and we had a full library of new and old science and history texts. My mom was much more hands-on and helped me build my first snake cage at the age of six. She was my accomplice in collecting roadkill and preparing skulls that I'd found so that they wouldn't stink up my bedroom, and that played a major part in my later career.

Andy Gluesenkamp [00:04:09] And then I was fortunate as a kid, actually, to start working on fishing boats, on day boats. And so, I lived about half an hour from the coast and my parents were willing to drive me over to the coast at 6 a.m. on my days off from school. And I'd go out and fish in the Pacific and teach people about Pacific fish from six to midnight some days.

David Todd [00:04:39] Wow, that's quite a combination. So, I'm intrigued by, you know, all these influences. But, the one that really catches my attention is, is your experience with your mother and road kills and preparing skulls. Can you give us a few anecdotes about those experiences?

Andy Gluesenkamp [00:05:06] Yeah. She was really supportive of my interest in natural history. And I grew up on a farm. My mom raised dairy goats and fiber livestock, and we always had chickens and pigs and things. So, biology and life and death were a normal part of our everyday experience. We ate chicken and pigs that we cared for and butchered.

Andy Gluesenkamp [00:05:32] So, my interest in a petrified toad seemed pretty natural and normal. And my mom was very able and had, I think she had an interest in that sort of thing as well, judging by some of the baby clothes that she made out of roadkilled bobcats.

Andy Gluesenkamp [00:06:00] Let's strike that one. It's poorly stated and it wouldn't play well for me. If we could strike that bobcat anecdote.

Andy Gluesenkamp [00:06:09] But I'll just say my mother brought a lot my mother was a professional teacher and she was a hands-on farmer. So, she was able to provide me a lot of boots-on-the-ground guidance.

Andy Gluesenkamp [00:06:30] My dad was wonderful in teaching me what things look like on the inside because he was a doctor. So, I learned a lot of anatomy from butchering livestock with my father.

David Todd [00:06:44] Well, and so say you have a chicken or a pig that you are butchering and tell me the typical course of a conversation with your dad as this animal's getting flayed and opened up.

Andy Gluesenkamp [00:07:01] You know, not as exciting as you'd think. It's more like, "Where to put what?" And you know, we would talk about the anatomy of the things. But, growing up on a farm, we recognized that, you know, in that context, those living animals had a role that they were playing.

David Todd [00:07:24] So, it sounds like you had good teachers right there at home with your mother and father. And it sounds like you also spent time on these fishing boats out in the Pacific. Was there a captain or a fisherman who might have laid out some of the issues you ought to know about for ocean-going fish?

Andy Gluesenkamp [00:07:50] Oh, yeah. I learned far more from other experienced passengers than I did from any single crew member. Because if you think about it, on a boat of 30 passengers, probably half of them have been doing that longer than I was alive. So, I learned a lot from passengers.

Andy Gluesenkamp [00:08:08] I also learned a lot about how to talk to people. And people were having a great day. People were having a terrible day. So that was really helpful for me, really more than just sort of getting my "I love to fish itch" scratched, was working with people and helping them.

David Todd [00:08:29] What was the most unusual fish that you caught or saw? C.

Andy Gluesenkamp [00:08:36] I was working on the boat the day a passenger caught a an undersized black seabass, the last day that it was legal to catch black seabass in the United States.

Andy Gluesenkamp [00:08:51] And so, it was a special moment for all of us when we recognized what this large fish was and we brought out the big soft net. And that fish got the most gentle return to the ocean. And it was celebratory for everyone on the boat, because we all knew that that was the last time somebody would be pulling one of those up and have the option of keeping it.

Andy Gluesenkamp [00:09:16] And black seabass populations, I'm proud to say, in Southern California, are recovering nicely. And there are big, beautiful black seabass off those same grounds where we fished and released.

Andy Gluesenkamp [00:09:27] And so, that one stands out.

David Todd [00:09:32] I can see. I mean, both something rare and something that recovers.

Andy Gluesenkamp [00:09:37] Yeah. Conservation's full of happy endings. It's easy for us to be distracted by the big, chaotic tragedies that are always unfolding around us. But there are plenty of bright spots and shiny things that we should focus on, right?

David Todd [00:09:57] Absolutely. Yeah.

David Todd [00:09:59] So, you told us a little bit about your mother and father and about some of these fishing boat companions, both the ones with fins, and the ones with feet.

David Todd [00:10:09] And I was wondering if you could maybe take us forward a little bit and talk about maybe your formal education, you know, during grade school or maybe while you were at the University of California at Davis or as a graduate student at UT, here in Austin.

Andy Gluesenkamp [00:10:27] You know, grade school, really in hindsight, I'm very appreciative for so many of the teachers that I had who tolerated and approved a kid bringing a snake in a sack for show and tell. Or someone reading Steinbeck and Hemingway for their second grade book reports.

Andy Gluesenkamp [00:10:53] So I know it required a lot of patience to be my teacher. And I'm thankful to all of those individuals. If they're still with us, thanks.

Andy Gluesenkamp [00:11:03] Later on, in college, as it is for most people, it was an eye-opening experience where I met people with different backgrounds and skill sets and interests than I had ever encountered.

Andy Gluesenkamp [00:11:20] There were a couple of individuals who really stand out. And one is the guy who was the teaching assistant running my first biology lab. And he actually was the person who convinced me that zoology was a valid field of study and that yes, indeed, I could focus on herpetology, as a subdiscipline within zoology, and that was a real thing that people could do. And he did a lot more than just say that. But I thank Robert Fisher for giving me that early guidance and his advisor for giving me the opportunity to engage in real boots-on-the-ground fieldwork and museum curation when I was not a student of merit.

Andy Gluesenkamp [00:12:15] So, it took a number of letters based on my GPA to receive permission to switch majors from fermentation science to zoology. But I never looked back and I finished my undergraduate with exemplary grades and a couple of publications under my belt. So I'm really thankful to those two.

David Todd [00:12:43] It's nice when you have people who are tolerant and supportive and get you on your way to something that really intrigues you.

David Todd [00:12:52] So, I gather you bundled up this good history at UC-Davis, and then you come to grad school at UT-Austin. And tell us a little bit about that experience.

Andy Gluesenkamp [00:13:07] Yeah, well, um. Give me a moment to compose my thoughts because let's talk a little bit about my work as undergrad.

Andy Gluesenkamp [00:13:22] So in college I wasn't like other kids, and I spent a good bit of time scheming, planning and saving money for independent field expeditions to Central and South America, with varying degrees of success. But as a result, I led, as an undergrad, I wound up spending quite a bit of time studying cloud forest reptile and amphibian communities on the Amazonian slopes of the Andes in Ecuador, and that resulted in the discovery of several species new to science.

Andy Gluesenkamp [00:14:04] And so, I became rather engaged in describing these bizarre toad species and really neotropical Ameroindian neotropical frog work and neotropical frog research. And UT-Austin is not only a powerhouse for neotropical frog research, but also was home to some of the world's most respected lizard ecologists.

Andy Gluesenkamp [00:14:37] And so, I came to UT-Austin to study frogs with a lizard advisor.

Andy Gluesenkamp [00:14:48] Round it up. I'm going to round it up.

David Todd [00:14:50] Okay. Who were your major advisers while you were there, and what was your course of study?

Andy Gluesenkamp [00:15:04] I'll answer the second one.

David Todd [00:15:07] Please.

Andy Gluesenkamp [00:15:08] So. I didn't have a good relationship with my advisor, so I don't really want to talk about it, if that's okay. I can tell you that now and no one else will hear that. But I would love to sing praise to my alma mater and it's a great program, so let me work around that a little bit.

Andy Gluesenkamp [00:15:27] Do you want to ask it different?

David Todd [00:15:29] Yeah. So could you tell us a little bit about your course of study there and what your thesis and dissertation was about?

Andy Gluesenkamp [00:15:38] Well, predictably, my dissertation was about the relationship between developmental ... mode and adult morphology of bufonic frogs. So, if you're not asleep yet, basically I was interested in the fact that some of these groups of toads that have direct development, where they skip a tadpole stage and they hatch out of the egg, as tiny toadlets. They have some unusual morphological traits - things like fewer vertebrae, reduction in the numbers of toe bones. They're missing bones that are involved in hearing, etc.

Andy Gluesenkamp [00:16:30] And I got really interested in the process by which this might occur. But then also looking at the distribution of these traits, it didn't seem to make a whole lot of sense in terms of who was related to who. And so, I set about creating a molecular base phylogeny for about 200 species of toads. And with that, I was able to test some of these hypotheses between developmental mode and adult morphology. And I regret that I never published this part of the work, but the correlations were extraordinarily high.

Andy Gluesenkamp [00:17:11] So basically, if you have to pack everything, you need to make a toadlet into an egg that toadlet might have to give up a few features. It might have fewer bones, and its toes or some of its vertebrae might be fused together, just because it has to make that whole complex thing within the tiny confines of an egg.

Andy Gluesenkamp [00:17:34] Whereas, most frogs and toads that you and I think about, they just have to make a little tadpole out of that egg - that's a mouth, a stomach, and a tail. And then this thing grows more complex as it grows in size, and it's got all the room in the world to develop long legs, beautiful ears. So, that's what I did for fun in grad school.

David Todd [00:17:59] That's fascinating - you know, the whole metamorphosis of an animal and the the packaging. I mean, imagine what trouble I get into trying to just pack my suitcase and to put it all in an egg must be really challenging.

David Todd [00:18:19] While you were at UT-Austin, were you doing much work with horned lizards or did that come later?

Andy Gluesenkamp [00:18:26] I did a little bit of work with horned lizards. Most of the lizard work that I did was actually with what's called a little brown skink, a fairly common backyard species that we find here in Texas. And I was looking at that same sort of concept with allometric engineering: so, how the size of the lizard's egg affects the resulting hatchling. And some of that work extended into experiments I conducted with Barry Senervo in California, at altering the size of lizard eggs and then measuring the resulting hatchlings.

Andy Gluesenkamp [00:19:07] Actually, you can make bigger and smaller babies by changing the size of the egg with a syringe. They're perfectly healthy. They're just a little bigger or a little smaller. And so, that's the way lizards are able to understand some of the constraints that the females are under - that tradeoff between number of eggs and size of eggs.

David Todd [00:19:32] This is fascinating. Thank you.

Andy Gluesenkamp [00:19:34] My first-hand experience with Texas horned lizards in Texas was a lab mate who was doing research on horned lizards, was also deeply involved in horned lizard conservation, and received a phone call from an individual in a small town in South Texas who was very concerned about the horned lizards in their yard because they were getting ready to have their house fumigated. And a group of volunteers were a little skeptical that the guy really had as many horned lizards in his postage stamp yard as he claimed.

Andy Gluesenkamp [00:20:11] But they drove down there. And in the little well-maintained yard about a shotgun house, they found 80 horned lizards. And so, what became apparent was that this guy's well-manicured yard was an oasis for all the lizards in the undeveloped yards and lots nearby. And so, a lot of the lizards that they recovered, they were missing horns or maybe even a piece of a foot or something, because of the lawnmower.

Andy Gluesenkamp [00:20:46] And that was really interesting. That was the first time that I was face-to-face with some of the unusual things about horned lizard distributions. So this guy lived in a little town and had huge numbers of horned lizards all around his place. You could go a mile away from there in undisturbed habitat and probably not find a single one. It took me a long time, a couple of decades, to come around to exploring some of those questions.

David Todd [00:21:21] Well, we should get back to that.

David Todd [00:21:22] I had one more question about sort of your formation, your time in the egg. And that was, you had these wonderful people in your family, on the fishing boat, you know, around you in school. But I think you mentioned that you were an early reader - you know, Hemingway, Steinbeck. Were there books or movies or TV shows that were sort of part of the general culture that you were soaking up some interest in natural history or in reptiles or in even horned lizards in particular?

Andy Gluesenkamp [00:22:02] Yes. In preparation for this interview, I actually tried to look up the title of a book that inspired me as a child. Unfortunately, it's lost. It's lost back there

somewhere. But when I was a single-digit kid, I had this wonderful book about amazing reptile facts. And I was absolutely overwhelmed, fascinated, and had to see in real life, this thing about horned lizard squirting blood out their eyes. I thought that was the coolest trick for a little lizard to be able to do that.

Andy Gluesenkamp [00:22:38] And the book explained that, you know, it's, they're not being harmed. This is something they do to avoid predators.

Andy Gluesenkamp [00:22:44] And it got me thinking about things in different ways than I had previously as a six or seven year old - thinking about physiology and predation and defense. So, I can't mention that book because I can't remember the title.

Andy Gluesenkamp [00:23:03] But a book that influenced and informed me all the way through college was a book that I received in 1974 called "Snakes of the American West" by Shaw and Campbell. And it was just a great book. It had easy-to-read adult text with fascinating anecdotes and life history information about this array of snakes that I had hardly ever heard of, and beautiful photos of these snakes, some in the wild and some at the San Diego Zoo. So, that book, I pretty much wore the cover off of it. I still have it. It's here somewhere. It's unrecognizable. It's just a brown thing now.

Andy Gluesenkamp [00:24:02] So, another book - so, a book that my mother introduced me to as a young child that had a big influence on me then, and I think to this day, was a book that she picked up at a reading by the author, called "Frogs as Wild Pets". And it was exactly what it sounds like. It was about appreciating frogs in your backyard, learning about the development of the tadpoles in your pond or your bird feeder or wherever, and appreciating them where they are, as they are. And I don't know what it was about that book, but I felt like that book revealed a really important secret.

Andy Gluesenkamp [00:24:45] I was well familiar with catching frogs in jars and keeping a snake in a shoe box and all of these sorts of interactions. But, the idea of a being able to sit back and appreciate wildlife where it is doing what it wants to do, that was a game-changer for me.

David Todd [00:25:08] That's really interesting. So maybe you start to piece together the needs that it has, the habitat that it requires outside of the shoebox or the jar. I get it.

David Todd [00:25:23] Well, good.

Andy Gluesenkamp [00:25:23] We had we had where I grew up, we had slender salamanders. So, this is a very small worm-like brown salamander with really tiny little legs. And they're interesting in the sense that one of these salamanders could spend its entire life under one rock or one log. They live a really long time, and they can go weeks and months without meals. And they seem as insignificant as an earthworm to the casual observer.

Andy Gluesenkamp [00:25:53] But, here's an amphibian that lives on the surface in a dry place and is literally as tender as an earthworm. What amazing tricks they have!

Andy Gluesenkamp [00:26:04] So, encountering one (they were quite common in my yard) was always a precious moment, because they seemed like the ultimate survivors.

David Todd [00:26:17] Yeah. With many tricks and strategies to make their way and survive without, you know, getting eaten or not eating.

Andy Gluesenkamp [00:26:30] Well, and they play the long game. So, a graduate student at UC-Berkeley actually did a study looking at the genetics of populations on either side of a stretch of the San Andreas fault. And she found that the populations were related diagonally, across the San Andreas fault, where you could walk, you could walk in 5 minutes from one end to the other. But these populations of salamanders were on different plates, slowly sliding past each other faster and further than a salamander cared to walk.

Andy Gluesenkamp [00:27:06] That's pretty cool.

David Todd [00:27:08] That is very cool. Absolutely.

David Todd [00:27:11] Well, there are so many animals to talk about. But, for today, maybe we can focus on the horned lizards here in Texas. I gather there are three. Correct me if I'm wrong, but there's Texas, round-tailed and mountain short-horned lizards.

Andy Gluesenkamp [00:27:31] Yes.

David Todd [00:27:32] And I would love it if you could sort of give us a layperson's scale introduction to their life history and the niche that they fill.

Andy Gluesenkamp [00:27:42] Absolutely.

Andy Gluesenkamp [00:27:43] Well, let's start with the Texas horned lizard. So, it's the largest of all 14 described species of horned lizards in North America. It also has the largest range. So, historically, the Texas horned lizard range went from northern Mexico up into Kansas, as far east as Louisiana, and all the way to Arizona.

Andy Gluesenkamp [00:28:08] The mountain short-horned lizard - in Texas, it's restricted to the sky islands like the Davis Mountains, where they only like to live at higher elevation. And a cool thing about them is that they actually carry the eggs inside: the females carry the eggs inside and give live birth. So, they're viviparous instead of being oviparous. And why would these little mountain lizards want to do that? Well, gets cold at elevation, and so, if you lay a clutch of eggs somewhere, it might get cold. But if you hold those eggs inside, that female can thermo-regulate during the day and actively keep the eggs warm. And so that's a really cool little trick about this little lizard that lives up in the mountains.

Andy Gluesenkamp [00:28:54] The third one, the round-tailed horned lizard, they are fascinating. If you are out in an area where there are round-tails, there are probably a lot of them. Unfortunately, you'll see very, very few of them because, although no two round-tailed horned lizards look alike, every round-tailed horned lizard looks exactly like a pebble.

David Todd [00:29:25] Great camouflage.

Andy Gluesenkamp [00:29:27] Yeah. It's funny, but when you see one and then suddenly, like, the magic poster reveals itself and you realize you walked by two or three others. So their trick is to look like a pebble.

Andy Gluesenkamp [00:29:42] The larger Texas horned lizard, their camouflage is obviously, you know, for all horned lizards, it's breaking up that body shape with these spines and things. Just like a, think of a ghillie suit on a tiny reptile.

Andy Gluesenkamp [00:29:55] The spines and spikes and scales, they also make them difficult for predators to handle. So if they do actually get attacked, maybe that will thwart the predator.

Andy Gluesenkamp [00:30:06] But that coloration, if you look at Texas horned lizard from the top side, they have these beautiful little ocelli on their backs. So, these concentric spots and then a light mid-dorsal line, a dark stripe that goes from head to tail. And when that individual runs into a bunch of dried grass, it is instantly invisible.

David Todd [00:30:37] Tell us a little bit about their diet.

Andy Gluesenkamp [00:30:40] So horned lizards ... most of us can recognize a horned lizard as a horned lizard simply because there are these not just with the horns, but they're these pancake-shaped lizards. They have these kind of big round, flat abdomens. And ... they have those big round flat stomachs because, on average, about two thirds of their diet in the wild is harvester ants, and the rest is mostly other ant species. They'll eat wherever they can, but mostly ants. And harvester ants, like all ants, they don't have a lot of nutritional quality. They're not super-high energy. There's a lot of handling time involved. Picture really spicy sunflower seeds. You got to work. You got to know how to open them to make it worthwhile.

Andy Gluesenkamp [00:31:33] And so they need to eat a lot of ants. So, they need to have a big stomach, which means they're probably not going to be a good runner. So, you kind of see that played out in the predator detection avoidance, where they have excellent camouflage behaviors that just make them hard for a predator to notice.

Andy Gluesenkamp [00:32:03] And a last-ditch effort is run. But stop. And when they stop, they become invisible.

David Todd [00:32:19] Okay. Well, I think that one of the things that I'd really like to focus on, with your help, is trying to understand why these really interesting animals have been in decline. I understand the horny toads, as they're often fondly called, have dropped in range and number over the last couple of generations. First of all, is that true? And then if it is, can you help us sort of understand why that might be happening?

Andy Gluesenkamp [00:32:59] It's true that the Texas horned lizard has disappeared from a good chunk of its range in Texas. That's mostly in the eastern third of their historic distribution. So that line from DFW to Austin, San Antonio and Houston, they've pretty much just disappeared and blinked out east of that. And then close to that line, on the west, they've had similar issues. So in far north Texas, West Texas and south Texas, they're actually doing quite well.

Andy Gluesenkamp [00:33:35] The issue is, is that 80% of Texans live in that area where horned lizards have disappeared. So, they've disappeared from the lives of 80% of Texans. That's where that loss is so deeply felt.

Andy Gluesenkamp [00:33:57] There's still plenty of great horned lizard habitat out there. It's just not necessarily in the places where it used to be - like Katy. There is no place to put a horned lizard in Katy anymore.

Andy Gluesenkamp [00:34:10] That's okay. With changes in land ownership, land management practices, etc., we see a lot of regions that were perhaps subjected to really intensive farming. They're being used for other purposes or recreational ranches and even active cattle, livestock - that actually helps keep open range for horned lizards - that I would argue that we're seeing a lot of horned lizard habitat growing and blooming throughout the state.

Andy Gluesenkamp [00:34:44] It's just not where it used to be.

Andy Gluesenkamp [00:34:46] But that's where we step in. So, recognizing that, first of all, the Texas Horned Lizard is, it's state listed as "threatened". And, after a recent review, that status did not change.

Andy Gluesenkamp [00:35:00] However, the NatureServe conservation rank estimate for this species would suggest that it's not doing terrible and it's not doing fantastic. They're doing okay.

Andy Gluesenkamp [00:35:14] The reason why Parks and Wildlife chose to keep the species on the threatened species list is because they love them and they recognize that they're important icons for Texans and that they felt that de-listing the species would signal that it wasn't important to them. And it's very important to Parks and Wildlife.

David Todd [00:36:00] So, from what you're saying, part of the issue is that the horned lizards aren't where the people are, but maybe you can help us parse out why people and horned lizards don't coexist well.

Andy Gluesenkamp [00:36:21] Right. One of the major factors is pretty obvious. So, you're in Austin? I'm in San Antonio. Neither one of us have had horned lizards in our town for 30-plus years. Step outside. Look around. Where would you put one? Right? So, those sorts of issues with urbanization and fragmentation, they're really obvious. That's easy to see. And certainly those are very, very significant factors in the decline of horned lizards and other wildlife and, frankly, biodiversity in general.

Andy Gluesenkamp [00:37:06] That said, there are a lot of less obvious threats to the species, such as non-native invasives. So, if you ask people what happened to horned lizards, nine out of ten times, they'll say it's that red imported fire ant. And I agree that the red imported fire is not without blame. They're terrible for horned lizards. They're terrible for other things.

Andy Gluesenkamp [00:37:34] But there's no single smoking gun here. Fire ants are a part of it. Urbanization and fragmentation are a part of it. Post-World War Two, we saw the evolution of industrial-scale agriculture, which, unfortunately, that doesn't leave room for wildlife in most cases.

Andy Gluesenkamp [00:37:57] And then others have suggested that changes in land use practices going back some time may have been responsible for not just a decline in lizards, but

while goat and sheep and cattle ranching were at their peak up until the 1970s or so, we had lots of horned lizard habitat, and lots of horned lizards by most accounts.

Andy Gluesenkamp [00:38:28] And so, it could be that these land use practices related to ranching actually artificially increased the abundance of horned lizards during European colonization.

Andy Gluesenkamp [00:38:44] And then we reached the point where these other anthropogenic factors have started to take a toll, while we see a decline in those types of land use practices overall. So, our grandparents may have seen sort of an artificially high population of lizards in some area that makes that precipitous decline seem more extreme than it is.

Andy Gluesenkamp [00:39:09] I'm just throwing it out there, but I'm trying to be optimistic here. And there's good reason to be with horned lizards. I see thriving populations in the wild. I see landowners managing their property to become horned lizard habitat. I see released horned lizards flourishing at sites within their former historic range. So I'm very, very optimistic for the future of the Texas horned lizard and in a way that we're going to benefit from it. Right.

Andy Gluesenkamp [00:39:41] We want to bring them back to those places they've disappeared. Those are places where people will see them. We're really trying to fill that hole.

David Todd [00:39:51] That's great. That's great. They're certainly much loved. And I'm sure many people would like to see them return.

David Todd [00:40:00] One of the things that I thought was really interesting and I'm just a newbie here, but I've read that they were so popular that they found their way into the curio markets as stuffed, sort of taxidermied horned lizards, or that they were traded among scouts at jamborees. Is there ...

David Todd [00:40:31] Yes. Is there truth to those anecdotes or not?

Andy Gluesenkamp [00:40:34] That's all, that's all true. But that's also, those are historical events. So there's nothing like that taking place anymore.

Andy Gluesenkamp [00:40:44] I'd love to see one of those stuffed horned lizards. That be interesting. But, things like Boy Scouts trading them at jamborees and stuffed curios, and they were available in the back of comic books for some period of time. And I pity anyone who purchased one and had to bury it a week later.

Andy Gluesenkamp [00:41:05] But, those are kind of in-your-face abuses of this iconic species, but certainly not the most impactful. Right? I don't think the Boy Scouts are responsible for the perceived decline in horned lizards.

Andy Gluesenkamp [00:41:28] And despite the fact that they may have removed and distributed a lot of horned lizards from their habitat, those horned lizards in one way or another were ambassadors for Texas, for the species. So, thank you for your sacrifice.

Andy Gluesenkamp [00:41:45] All that stuff's completely illegal now, and there's no evidence of any trade.

Andy Gluesenkamp [00:41:49] So I'm thankful that we can focus on the other threats.

David Todd [00:41:56] So one of the things I think you did mention was maybe a contributing factor was the spread of the red imported fire ants. And maybe you can give us a little bit more elaborate story about the fire ant's impact on the red harvesters, and maybe insecticides that were used to control the fire ants that might have affected the harvesters - that whole sort of plot. Could you lay that out for us?

Andy Gluesenkamp [00:42:29] Oh, I can. So first, I just want to start: fire ants are just one of many non-native invasive species that impact horned lizards. Go for it. Fire ants are terrible. I can't think of any use for them outside of their native range. No, I'm sorry. Strike that. Please don't. I understand why fire ants are first on everyone's list.

Andy Gluesenkamp [00:42:54] But, I would argue that non-native invasive grasses, like Old World bluestem, these species that were introduced for livestock forage, they create an impenetrable monoculture for horned lizards and other species. And it's been demonstrated through studies at A&M-Kingsville that these non-native invasive grasses support a lower density and diversity of arthropods, which that translates into fewer, worse prey items for things like lizards and quail.

Andy Gluesenkamp [00:43:28] So, we look out on a nice pasture of Texas grass and we think that looks pretty good. For a horned lizard, if it's that non-native invasive grass, it looks like a solid bamboo thicket and it's a non-starter.

Andy Gluesenkamp [00:43:44] So it's sometimes hard for us to recognize what the real threats are. It's easy to recognize fire ants and it's really easy and worthy to blame them. But there are there are others.

Andy Gluesenkamp [00:43:59] The fire ant story is a little bit complicated. So, they were introduced accidentally at the Port of Mobile, Alabama, I believe, in the 1930s or 1920s. They were introduced in Mobile, Alabama early in the last century. And they spread across the Southeast and then across Texas, really during the 1980s. The spread of fire ants and the decline of horn lizards do not correlate well.

Andy Gluesenkamp [00:44:33] So, the problem with fire ants right now is that where we have high densities of fire ants, that makes it extremely difficult for native ants and other prey species to establish and thereby horned lizards as well.

Andy Gluesenkamp [00:44:47] So controlling non-native invasive fire ants with non-chemical, non-toxic means is really important at a lot of sites. Most of the sites we look at, that's kind of the number one management issue. And fortunately we've developed approaches to controlling fire ants that are species-specific and don't involve toxins and chemicals that could impact other species, etc.

David Todd [00:45:15] Okay, well, maybe we can talk about some of those conservation strategies in a bit. I did want to just get the full story for why these horned lizards aren't perhaps as common as they once were or seen as commonly.

David Todd [00:45:36] And one of the stories I heard was that, well two, I'll just list two, and then maybe you can comment on them: feral cats.

Andy Gluesenkamp [00:45:48] Absolutely.

David Todd [00:45:49] And secondly, just roads, I think you mentioned lawnmowers and I guess traffic in general maybe has some impact.

David Todd [00:45:58] Can you maybe speculate about those two items?

Andy Gluesenkamp [00:46:01] Yes. So feral cats, they're an issue for all sorts of small wildlife. Right. I think most of us are aware of the impact that feral cats have on native wildlife. That's particularly problematic in urban areas and in suburban areas. Right, that's where we have the highest density of these cats.

Andy Gluesenkamp [00:46:23] And so feral cats really become part of that fragmentation problem, where you have small isolated populations, say in an empty lot in a small South Texas town. And they're dying a death by a thousand cuts. Right? They're surrounded by pavement and feral cats come and visit. This and that.

Andy Gluesenkamp [00:46:46] So, that's part of the reason why we have plenty of information on small populations of horned lizards in small towns, even in East Texas. But most of them blink out eventually because of all these edge effects.

Andy Gluesenkamp [00:47:03] You mentioned roads. And horned lizards are slow, and they like to bask out in open places. And so direct road mortality, it certainly occurs. I wouldn't consider it an existential threat for any population, or for the species in general.

Andy Gluesenkamp [00:47:21] However, as a isolating force, roads are incredibly powerful. And Dean Williams and his students (Dean Williams is professor at Texas Christian University), he and his lab focus on horned lizards, horned lizard conservation and horned lizard natural history and genetics. And what they found, in their study in Kennedy, Texas, there are two major highways that crisscross the town, and there are horned lizards on all four corners. But these highways aren't that old and they haven't been big, wide four-lane paved things for all that long.

Andy Gluesenkamp [00:48:03] But, in that time that those highways have been there and paved, the horned lizards in either of those four quadrants no longer exchange genes. Although you could literally chase a horned lizard across that road, they're not going to willingly cross it. And so, effectively, we have an impenetrable wall of a horned lizard barrier that's basically invisible to us.

David Todd [00:48:40] That's fascinating. So, it's the way we get to the grocery store. But for them, it's like the Maginot Line. It's impenetrable.

Andy Gluesenkamp [00:48:47] Yeah. Yeah. Big picture. If it was an irrigation canal with high flow, you would do everything you could to not cross that.

David Todd [00:49:02] Right. Right. I follow you.

David Todd [00:49:05] So, maybe you can sort of zoom back out and help us understand whether, or how, the decline of horned lizards in Texas, where it's happened, what sort of impact that might have more broadly. I mean, does this horned lizard phenomenon sort of

have bigger significance outside of horned lizarddom? I mean, does it work as an indicator species? Does it tell us a story?

Andy Gluesenkamp [00:49:34] That's a great question. I have a hard time making the argument that horned lizards are a keystone species in their environment. They're an indicator of healthy, intact, for the most part, healthy, intact native habitat.

Andy Gluesenkamp [00:49:57] But as we've seen, when horned lizards have been removed from the landscape, those ecosystems don't collapse entirely.

Andy Gluesenkamp [00:50:41] Where the Texas horned lizard serves as a critical keystone species is to encourage voluntary conservation action on the part of private landowners. And this is extremely important to affect conservation... to effectively engage in conservation on the ground in Texas, one must partner with private landowners. 95% of Texas is privately owned. So, in effect, you can't do anything without working with those partners.

David Todd [00:51:23] Got you. So it's sort of an iconic species that helps make the case for voluntary land conservation efforts by property owners.

Andy Gluesenkamp [00:51:40] Yeah, they're my Trojan horse, to be honest. They're incredibly iconic. They're charismatic. Most everybody knows what they look like. Folks of my generation are older, they'll have fond stories of abundant horned lizards in their world when they were young. And every single one of them misses having horned lizards around.

Andy Gluesenkamp [00:52:03] So, you don't have to make the argument for why we should care about horned lizards. People just love them. They just straight up love them.

Andy Gluesenkamp [00:52:11] And I'll remind you, Texas Parks and Wildlife declined to delist the species because they love them.

Andy Gluesenkamp [00:52:19] So it's from top to bottom. What a great place to start. This is a species I feel that working with private landowners and other zoos and conservation organizations and land managers, that we can create a bright future for the species. And it serves as an example for all these other species that we could be focusing on.

Andy Gluesenkamp [00:52:41] Another really nice thing about horned lizards, or why it's a keystone species, is that it doesn't really require special horned lizard specific management. Right? The habitat that horned lizards like is pretty typical habitat - mosaic of open spaces where they can forage and bask and interact, hide in little bushes and shrubs where they can seek refuge or shelter during the day, and then places where they can hibernate during the winter.

Andy Gluesenkamp [00:53:22] That's a common component of much of Texas, intact or not. And ... that's a starting point by which we're able to use really powerful tools that are in the hands of our friends at Texas Parks and Wildlife. So, working with Texas Parks and Wildlife GIS specialists, they've developed a detailed vegetation map of the entire state. And then a team of us sat down and we worked on basically ranking each of these plant communities with a likelihood of whether you would encounter horned lizards in that community.

Andy Gluesenkamp [00:54:08] So, we have a proxy of a habitat map for horned lizards that allows us not only to work with landowners or land managers on identifying whether or not

they have suitable habitat or where it is on their property, but we can look at the plant communities that are represented there, and in some cases there are specific management guidelines that they can use to address a "two" quality chunk of habitat and turn it into a higher quality chunk of habitat, and maybe connect chunks of habitat that will serve as corridors for the species.

Andy Gluesenkamp [00:54:48] So, it's nice to be able to have a prescription to share with landowners because most of these things take time. So, remedies like prescribed fire or thinning of woody vegetation or reseeding with native grasses and forbs. Those are multi-year efforts, and it's really important to be able to give people good guidance early on if they're willing to embark on a journey like that.

David Todd [00:55:25] You mentioned this GIS map of the possible locales for these horned lizards and it made me want to ask you maybe two questions about monitoring that I guess was sort of the basis of that map. One is that I've heard that it's a kind of uncertain thing to know what the trends are, the historical trends are, for horned lizards, because they were so ubiquitous and commonly seen that folks didn't really go to great ends to monitor them in past years. So there's not a great baseline. And I wanted to hear if that's true, or if that's just something that is kind of a myth.

Andy Gluesenkamp [00:56:15] Yeah, it's true. And there are a lot of reasons for it.

Andy Gluesenkamp [00:56:19] So historically, museums were populated with preserved specimens, many of which were obtained by professional collectors or just the fields of study that herpetologists were involved in, right, just in terms of morphology and looking at, you know, diet and things like that, they required vouchers of physical specimens.

Andy Gluesenkamp [00:56:47] And so if you if you look sort of a chronology of specimens being deposited in Texas museums, you'll see this golden age from, say, the 1940, '50s, '60s, and tapering off in the '70s... These museums were not full, but maybe overfilled. But we have a lot of material. And for a lot of researchers, their field of study did not require having animals in jars, which was typically the way you would document that species X was at location Y, on this date. It's called a voucher.

Andy Gluesenkamp [00:57:28] Nowadays we have smartphones in our pockets. We can take photo vouchers. We could take a cloacal swab and gather DNA from an animal. You know, we have these wonderful tools that are available to us that allow us freedom from having gallon jars of animals in preservative and then large buildings with fire-suppression systems and trained staff. Right?

Andy Gluesenkamp [00:57:51] So, natural history museums ... were, are and will be incredibly important repositories for biological information, especially here in Texas. We now have these other tools that we can bring to bear, and those are being combined with those collections as well. So, you know, digital vouchers will never replace physical vouchers, but they're not necessary in all contexts, if that makes any sense.

Andy Gluesenkamp [00:58:26] So let me let me give another shorter, simpler one. Historically there is a lot of collection for Texas museums and that documenting the occurrence of a species at a particular site generally was done through a voucher specimen that was collected and then archived at a museum.

Andy Gluesenkamp [00:58:56] We don't do that so much anymore. So, by the time horned lizards started to decline, we had this this gap in horned lizard material.

Andy Gluesenkamp [00:59:06] And during that same time period - this is sort of a perfect storm - during that same time period, molecular techniques were being developed that required material preserved in different ways. So, all the old specimens that were fixed in formalin, they're unavailable for genetic studies, which is why we have this sort of data gap between Waco and San Antonio. What were the lizards that were there genetically? We're not really sure.

Andy Gluesenkamp [00:59:43] But we have a pretty good idea that the Colorado River served as a biogeographic barrier for the species and that the southern form ranges that far north and the northern form came as far south as Austin. We don't know because that material does exist.

Andy Gluesenkamp [01:00:04] It's true that horned lizards were so abundant that most collectors didn't bother picking them up. It would be, "Why did you pick up another one of those? Like, go look at the big jarfull."

Andy Gluesenkamp [01:00:21] Horned lizards were so abundant that they weren't really a target for any collectors for museums after those initial vouchers have been made. So, there's a long period of time when horned lizards were declining, but there wasn't any active collection or study being done on that species.

Andy Gluesenkamp [01:00:50] That's okay. We're here now.

David Todd [01:00:53] I see. So there might have been a whole spate of collections made from the 1940s through maybe the early 1970s when these populations were pretty stable. And then when they started declining, you know, museums said, "We have just plenty. Thank you." And so there haven't been enough samples in more recent years to create that baseline that would be more current. Am I following you?

Andy Gluesenkamp [01:01:23] Yeah, well, the horned lizards don't exist in those places anymore. So yes, lizards still exist, but I will not find a horned lizard in San Antonio, nor will you in Austin to figure out who was who.

Andy Gluesenkamp [01:01:41] I don't know if that answers your question or not, but we have a data gap that corresponds with the time period that the final decline of horned lizards in a lot of these areas. And it's just an unfortunate coincidence that those two aligned, so that we don't really have information from that period of time when we think the decline was really settling in.

Andy Gluesenkamp [01:02:10] And as with declines, we tend not to know that something is missing until it's gone. Right?

David Todd [01:02:20] Course. Yeah. I'm being sort of dense about this, but the data gap - try to fill me in on why there is this, you know, uncrossed bridge there between I guess the earlier days when there were horned lizards in formalin and then later not.

Andy Gluesenkamp [01:02:46] Let's talk about for a minute if we come up with something worth recording. Okay? So, because it's complicated. There are a few factors. One, the nature

of, so museums as an integral core part of zoological research - they still are, but the field has grown much more complex than specimen-based work. Okay.

Andy Gluesenkamp [01:03:14] That said, museums by the 1970s or '80s were likely pretty full of common species like green anoles, red-eared sliders, bullfrogs, Gulf Coast toads and horned lizards. So, there wasn't anybody actively seeking more information or specimens about horned lizards. And unfortunately, that coincided with the period when horned lizards were declining. So, we don't have genetic material for horned lizards that would have occurred in urban, you know, central Texas nor north Texas nor south Texas.

Andy Gluesenkamp [01:04:01] But there's enough evidence of natural hybridization amongst those groups that we're not particularly worried about working close to the margins.

David Todd [01:04:15] Okay. The second time was a charm. Thank you.

Andy Gluesenkamp [01:04:19] That worked. Okay.

David Todd [01:04:20] I understand better now.

Andy Gluesenkamp [01:04:22] Sometimes it takes a lot. So, like, we don't. Nobody knows what, you know, what lizard belonged there. But I'm using some basic information. Like the Colorado River is a major biogeographic barrier. Let's start with that. That's a fair assumption. It kind of runs on the southern part of the Hill Country.

Andy Gluesenkamp [01:04:43] Others have said, "Oh, no, it's got to be the bottom end of the Edwards Plateau. That's the barrier."

Andy Gluesenkamp [01:04:49] But I don't see a good fit with that either.

Andy Gluesenkamp [01:04:52] And none of us see any particular harm in, if we were to error by some five or ten or 20 miles and put a lizard with a South Texas accent in the Hill Country.

Andy Gluesenkamp [01:05:09] What we don't want to do is move South Texas lizards to North Texas lizards, or vice versa. Or if we identify an area with unique genetic structure amongst its populations, we certainly don't want dabble with that.

Andy Gluesenkamp [01:05:24] But at this point, we're fairly confident that we're dealing with three genetic groups in Texas. And this is thanks once again to research by Dean Williams at TCU. And within those general areas, there isn't a whole lot of population structure, which means we can comfortably breed animals from different populations and we can release their offspring in a third site. And we're not messing up nature's plans that way.

David Todd [01:05:55] Okay. Well, I would love to talk about that whole release strategy. That seems so fascinating and valuable.

Andy Gluesenkamp [01:06:06] I would just say that there's so much more that goes into releasing horned lizards than making babies in the lab.

Andy Gluesenkamp [01:06:15] I mentioned the remote habitat assessment using satellite imagery and high-resolution vegetation maps. There's always time spent boots-on-the-

ground. Every single site is different. I spent two months on one site treating fire ants. So, it's a big job.

David Todd [01:06:37] Well, we should get into that. Okay. Let me just see if I can mooch one more thought from you about.

Andy Gluesenkamp [01:06:46] I will talk all day.

David Todd [01:06:47] Monitoring. Oh, no. Well, I don't want to take all day for you. I know you've got other things to do, but ...

Andy Gluesenkamp [01:06:54] I cleared my calendar until 6 p.m., when I have to be at a banquet. So, yeah, let's enjoy this.

David Todd [01:07:02] Okay. And I am.

David Todd [01:07:05] So, one other question about the monitoring that is interesting to me and I think would be for many of our listeners, and that is this Horned Lizard Watcher program that I think started in 1997 at Texas Parks and Wildlife. And I, I think you had a tenure there, as State Herpetologist. So, I was curious, you know, what you thought about that program, and then citizen science in general as a way to understand horned lizards, but also other kinds of wildlife.

Andy Gluesenkamp [01:07:40] Sorry. Let me get a drink of water. I had my uvula removed a year ago and a bunch of my soft palate, and you'd be amazed how much saliva they produce. You don't realize it till they're gone. It's bad.

Andy Gluesenkamp [01:08:02] And the question was, Horned Lizard Watch. And, its Horned Lizard Watch program, not Horned Lizard "Watcher". So, you might want to restate the question.

David Todd [01:08:15] Okay. Sorry.

Andy Gluesenkamp [01:08:17] I should have called you on that the other day.

David Todd [01:08:19] Absolutely. No. I apologize for my mistake there.

Andy Gluesenkamp [01:08:22] It's okay. That's why I love audio.

David Todd [01:08:25] Yeah. Good medium.

David Todd [01:08:29] So, I was curious if you could tell us a little bit about monitoring horned lizards and in particular, this strategy that Texas Parks and Wildlife started in 1997 called the Texas Horned Lizard Watch Program. And I guess it is an example of citizen science, and so I thought it might be a good opening to talk about citizens as partners in research.

Andy Gluesenkamp [01:08:58] Absolutely. The Horned Lizard Watch program, that was a really innovative approach by Lee Ann Linam. And she put together a packet that ... This information, by the way, it all exists. All the materials from the Horned Lizard Watch program are still available at the Texas Parks Wildlife website. If you look under their Nature Trackers

program, all of that is still available, although the Watch itself is defunct. But that's okay. They've replaced that.

Andy Gluesenkamp [01:09:32] So, the Horned Lizard Watch resources that they have online - there's a great packet there for landowners. There's information on monitoring techniques, on how to identify horned lizard scat, and there's also information on their life history.

Andy Gluesenkamp [01:09:52] I don't think it's part of that packet, but another document that Texas Parks Wildlife produced around the same time is on harvester ant management. And I highly recommend that document for anyone interested in managing for horned lizards, because obviously the two go hand-in-hand.

Andy Gluesenkamp [01:10:28] Although the Texas Horned Lizard Tracker program is defunct, except for those documents, it's been replaced largely by other programs within TPWD's Nature Tracker, and specifically the Herps of Texas project on iNaturalist. So that's an iNaturalist project. If you're not familiar with iNaturalist, that's a citizen science platform that allows individuals to upload images, video, sound recordings of native or exotic wildlife, whatever. And not only is there a strong community of individuals who will aid with identification, but the platform now also incorporates AI, which I've found is really helpful in identifying plant specimens.

Andy Gluesenkamp [01:11:22] So, basically, if it lives, iNaturalist would love for you to take a photo of it and share it.

Andy Gluesenkamp [01:11:29] The project that Cullen and I started called "Herps of Texas" was basically exactly that. We encouraged people to submit observations of reptiles and amphibians in Texas. And then once those observations were approved by curatorial staff - so we weren't so vain to think that the two of us held all the herpetological knowledge necessary to curate such a grand project - so, right out of the bat, we invited additional curators who happened to be the curators of reptiles and amphibians at Texas A&M and UT-Austin. And since then, the project has added several other expert curators.

Andy Gluesenkamp [01:12:12] So I think they can John Henry that AI. These guys are really good.

Andy Gluesenkamp [01:12:18] But it's been an incredibly powerful tool because we actively curate observations and there's this respectful database platform.

Andy Gluesenkamp [01:12:28] The number of observations for things like horned lizards has grown exponentially. Parks and Wildlife uses that raw data for their Texas Natural diversity database, which is basically their understanding of where rare, threatened, and sensitive species are so that they can help development and whatever land use things might go on make minimal impacts. Right?

Andy Gluesenkamp [01:12:56] So, I tell people a photograph of a horned lizard taken today could literally move a pipeline alignment tomorrow.

David Todd [01:13:09] Well. So, you have a Ph.D. and professional life that spans a couple of decades in agencies and nonprofits that are, you know, are very professional. Do you feel like the contribution from ordinary general public contributors is worthwhile?

Andy Gluesenkamp [01:13:35] I wouldn't be here without them. And thank you so much for giving me this opportunity to thank our donors and those who have provided grant funds for this work and others.

Andy Gluesenkamp [01:13:47] 100% of San Antonio Zoo's Texas Horned Lizard reintroduction project is funded by grants and donations. And I'm proud to say 100% of grants and donations go directly to that project.

Andy Gluesenkamp [01:14:05] It's going well. The project is growing. We have just quadrupled our laboratory capacity, which is amazing to think that we'll be able to put more and more horned lizards on the landscape. And it's entirely due to support from individual Texans and their love for this species and what we're doing, trying to bring them back.

Andy Gluesenkamp [01:14:29] So I am not kidding. I am not buttering toast a little bit. We literally could not do it without everyday people.

David Todd [01:14:39] So...

Andy Gluesenkamp [01:14:39] Oh, no. I got more.

Andy Gluesenkamp [01:14:43] It's not just donations. We work closely with Master Naturalist chapters. In fact, the Hays County Master Naturalists chose our project as their class effort during 2020. So that's been great.

Andy Gluesenkamp [01:15:05] ... And don't forget that we work very closely with every landowner that we interact with. So their friends and family and colleagues have been involved in volunteering to help with a lot of that boots-on-the-ground work.

Andy Gluesenkamp [01:15:17] But every single bit of this, and I'm quite proud of it, is due to generous donations from regular old people.

David Todd [01:15:27] Well said.

Andy Gluesenkamp [01:15:29] Please put a plug at the end of this for donations for me. ... It's true, man. It's how I pay the bills. So, if you want to tell them you can click on our conservation web page and they can click a "donate" button. Just some little thing.

David Todd [01:15:48] Yes. Yes.

Andy Gluesenkamp [01:15:49] My overlords. My overlords would like that.

David Todd [01:15:54] Okay. All right.

Andy Gluesenkamp [01:15:55] I was able to get this conversation with just you and me and not a third party sitting next to me.

David Todd [01:16:01] I'm glad they trust both of us.

David Todd [01:16:05] Well, let's start at the beginning, because I think that some of our listeners may not be familiar with the full scope and origins of what we're talking about. And that, I think what you're describing is the Texas Horned Lizard Reintroduction program at the

San Antonio Zoo. And maybe you can start us with how it was begun and what the goals were for it, and maybe some of the activities we could get into in a bit.

Andy Gluesenkamp [01:16:38] Yeah. San Antonio Zoo's Texas Horned Lizard Reintroduction project was started in 2017, and it was the first project that I began when I came on board with the zoo in 2016, started getting ducks lined up for a horned lizard reintroduction effort. So, I was formerly state herpetologist for seven years, so I was actively involved in horned lizard issues and worked closely with other zoos and resource managers and researchers on Texas horned lizard conservation. And so, I felt that it would be a great project for us to start with out of the gate. Building on the network of Texas conservation work that was being done, and then also using resources from outside the box, like our friends at Parks and Wildlife who developed the high-resolution vegetation maps to the other end of the spectrum where we work with volunteer canines to detect lizards on the landscape.

David Todd [01:17:56] Right.

Andy Gluesenkamp [01:18:00] Wait. I didn't tell you about the goals.

David Todd [01:18:01] Yes, please.

Andy Gluesenkamp [01:18:02] Right. So, the goals of this project are two-fold.

Andy Gluesenkamp [01:18:06] So, first is to develop replicable means for effectively reintroducing the Texas horned lizard into areas of suitable habitat where it's disappeared. The second goal of this project is to share those methodologies, to develop protocols, strategies and guidebooks ... so we could share this with other zoos and other conservation NGOs, so that they can help work on restoring horned lizards to their native range.

Andy Gluesenkamp [01:18:48] Because honestly, we're a very small program and logistically we have a fairly small geographic influence. But what we can do really well is develop the methods that will help other people do this.

Andy Gluesenkamp [01:19:06] So it's two-fold. We want to see horn lizards back on the dirt, and we want to be able to hand a nice big fat notebook to somebody that says, "Here's how you do it".

David Todd [01:19:19] Well, I gather that this reproduction program starts with collecting and then breeding horned lizards. And I was hoping that you could talk about the place, I think it's alternatively called the Lizard Lab or the Lizard Factory.

Andy Gluesenkamp [01:19:37] I like Lizard Factory. Yeah.

David Todd [01:19:40] How do you first, you know, get a corpus of horned lizards to work with you, your breeding colony? And then how do you breed these creatures?

Andy Gluesenkamp [01:19:51] Yes. ... I'm fortunate that Texas Parks Wildlife has granted privileges on my scientific research permit that allow us to collect Texas horned lizards for our reintroduction program. And in addition, when we are out obtaining lizards, we focus on lizards that are on public roadways. So, we have a permit that allows us to collect lizards from the roadway itself.

Andy Gluesenkamp [01:20:34] And there are two reasons why these are the lizards we focus on. One, it's easier to cover a lot of ground in a truck, and on public roads, you could cover a lot of territory without having to make a lot of arrangements with separate landowners, for example. So one, we can cover a lot ground on public roads.

Andy Gluesenkamp [01:20:57] And two, those individuals, they're playing in traffic. Horned lizards that we encounter on the road surface, they're literally playing in traffic. And we feel that those individuals would be safer and longer-lived, perhaps contributing to our reintroduction efforts.

Andy Gluesenkamp [01:21:19] Overall, we obtain lizards from throughout South Texas. We try to collect no more than ... I have to avoid using that word. So, there are two words I can't use - "collect", "collection", "captive". It's hard because these are real words. So, I try and say "obtain".

Andy Gluesenkamp [01:21:45] So our strategy is to obtain horned lizards from different sites around South Texas. We don't collect from any one site. See? So, our strategy is to obtain horned lizards from different populations throughout South Texas. That minimizes pressure on any one population. And also, that is how we're going to maximize the diversity of the little baby horned lizards that we're producing in the Lizard Factory.

Andy Gluesenkamp [01:22:13] So, horned lizards are not particularly easy to keep in captivity, nor are they easy to breed in captivity. So, I'll warn anyone that thinks that they'd like to keep one as a pet. Don't. Just don't. Breeding requires conditioning the season before. So, it's very important that we provide, especially our males, a proper overwintering environment where they're able to cool down and get ready for breeding in the spring.

Andy Gluesenkamp [01:22:42] So, we have an entirely climate-controlled laboratory with natural light cycles that mimic the seasons outside. And then what we do for these South Texas lizards during winter dormancy is that we basically turn off the heat and we allow that room to simulate the outside temperature. And our lizards love it. So, as you know, there are plenty warm, sunny days in December and our lizards will pop up every now and again and grab a bite to eat, a drink of water, bask in the sun for a minute, then go back and take a nap until January.

Andy Gluesenkamp [01:23:20] So that relaxing cool-down period is really important for the health of our lizards the following year. And then once we brought them out and they're kind of at full operating temperature in the springtime, we will select healthy males and females to pair up, by introducing the male to the female's enclosure. Usually, if she's receptive, successful mating will occur very quickly, like before the song ends.

Andy Gluesenkamp [01:23:49] If not, we don't leave those individuals together. We separate them and we'll try maybe that male with another female or try those two on another day.

Andy Gluesenkamp [01:23:58] I can't show it to you because this is radio, but we have a big whiteboard in the laboratory that I call, "the mating game", and it's got everybody's name and number and who they've been dating and who's gravid with eggs. And it's a lot of fun. It's a lot of fun seeing all that young love.

Andy Gluesenkamp [01:24:22] So, if everything goes right, the females, after several weeks, will lay a clutch of eggs. It ranges in size anywhere from a dozen to, whooo, over four dozen

eggs. These eggs are about the size of a jelly bean, and we incubate them in special digitally controlled incubators for about two months before they hatch.

Andy Gluesenkamp [01:24:47] And when they hatch, they are the size of a quarter, maybe the size of a nickel. And they're comprised of nothing but adorableness. They're adorable. They're super cute.

Andy Gluesenkamp [01:25:03] But at that stage, we call them, "nature's popcorn". Right. They're not spiky. They're not spiny. They're just little, little bits of popcorn. They're anything from a wolf spider to a mouse might find tantalizing.

Andy Gluesenkamp [01:25:19] And so, the next step with our lizards is that we headstart them. We grow them up in the lab under the best conditions we can possibly provide to get them to as large a size as possible, healthy size, before we release them in the early fall.

Andy Gluesenkamp [01:25:35] At that point, ... these little baby lizards that couldn't eat harvester ants when they hatched are now able to not only eat harvester ants, their primary prey, but they're able to take advantage of the full menu of prey items that are out there on the landscape, while being a little bit bigger, a little smarter, a little spikier, they're less likely to fall prey to predators.

Andy Gluesenkamp [01:26:05] So, that's our general strategy on how we obtain, breed, produce and rear horned lizards in the lizard factory.

David Todd [01:26:17] So, you touched on this earlier and maybe you could just return to it briefly. And that is that there are these different genetic groups that I guess you need to be conscious of when you're breeding and releasing. Can you talk a little bit about that and how you, you know, remain conscious of that and try to work around it?

Andy Gluesenkamp [01:26:40] Yeah, yeah. And I mentioned it probably poorly earlier. So, I'll just give you a clean statement on it. And let me roll back the clock.

Andy Gluesenkamp [01:27:01] While I worked for Texas Parks and Wildlife, we funded a research project by Dr. Dean Williams at Texas Christian University... And the project was to obtain genetic information from Texas horned lizard populations around the state. And so, Dr. Williams started this multi-year project where they gathered cloacal swabs and received samples of horned lizards from all over Texas.

Andy Gluesenkamp [01:27:38] And the results of their analysis was that there are basically three genetic groups. There's a northern group, a Southern group, and then a different group out in far west Texas. And that within each of these three regions, there wasn't a whole lot of population structure. Lizards over there weren't that much different than lizards over there, although they're all different from lizards, say, in the other region.

Andy Gluesenkamp [01:28:14] ...With this knowledge that we could breed lizards from different populations and release their offspring in a third population while respecting those greater genetic boundaries, that set the stage for horned lizard reintroduction projects at Dallas Zoo, Fort Worth Zoo, then San Antonio Zoo, and now other cities are getting on board.

Andy Gluesenkamp [01:28:37] So, that critical piece of research set the stage for the current widespread efforts to reintroduce Texas horned lizards.

David Todd [01:28:51] Okay.

Andy Gluesenkamp [01:28:56] ...

David Todd [01:28:59] Got you. And again, I apologize for going over old ground, but just want to make sure I get this straight. You have a pretty good feel for where you should be releasing these horned lizards to get the best results, the best, I guess, most suitable release sites. How do you figure out what the best place to go with these very precious headstarted horned lizards.

Andy Gluesenkamp [01:29:31] Yeah, we have several criteria in selection. We use several criteria of selecting potential release sites. The first issue is that we cannot promise a quid pro quo that we will ever be able to ... provide lizards for any particular site. We're still figuring out how to bake the cake, so to speak. So, we're not ready to start catering weddings.

Andy Gluesenkamp [01:30:00] But. Sorry, man. I lost it. I had it.

David Todd [01:30:11] You were talking about selecting release sites and just no guarantees at this point.

Andy Gluesenkamp [01:30:18] So we have several criteria. You know, one is that it's within the historic range of the species and that it generally represents what we would consider suitable horned lizard habitat.

Andy Gluesenkamp [01:30:29] The other is that the release site needs to be of sufficient acreage to support a viable population and preferably not an isolated population, but a population with adjacent suitable habitat. Because the goal here is to bring horned lizards back to the landscape, right? Not just one spot here, one spot there.

Andy Gluesenkamp [01:30:52] So, in my view, the successful, viable population of horned lizards is one that's also going to disperse and metastasize back into those areas.

Andy Gluesenkamp [01:31:04] Another component is this remote vegetation assessment that we do with our friends at Texas Parks and Wildlife, because even if the plant communities that exist on the property in question are not suitable for horned lizards, depending on what the specific communities are, they can be managed. And you could put a timeline on those efforts to go from this to that.

Andy Gluesenkamp [01:31:36] And of course, another obvious, but I have to say it, a requirement is that we have a commitment from the landowners that they're going to manage this habitat in perpetuity.

David Todd [01:31:56] Okay. Again, something that you mentioned kind of in passing, but I would love you to elaborate a bit. And that is your work with dogs that have been trained to help you with your recovery efforts with horned lizards. What's involved there?

Andy Gluesenkamp [01:32:18] I love this project. What you're referring to is the Texas Horned Lizard Canine Detection Network. ... The Texas Horned Lizard Canine Detection Network is a group of volunteers and their human owners who have agreed to go through

training to specifically to identify horned lizard scat, horned lizards themselves, horned lizard shed skin, horned lizard eggs, to identify anything horned lizard out in the environment.

Andy Gluesenkamp [01:32:57] And this network, ... we're very fortunate that several years ago, after an article about our project ran in Texas Parks and Wildlife magazine, an individual reached out to us named Paul Bunker, who is a professional conservation dog trainer. He has a company called Chiron K9, and he offered his services in helping to train lizard detection dogs.

Andy Gluesenkamp [01:33:28] And so, we started with a single pilot student and her owner, and that effort was very successful. And this dog is very good at finding horned lizard scat in the wild. And we've, since then, we've graduated our second class - I think a total of seven volunteers and their human companions.

Andy Gluesenkamp [01:33:50] So the idea behind that is that, yes, dogs are extremely low-tech, but we all know that they have an incredible sense of smell and a dog that has the right attitude and personality for it can be trained from zero to deployable in 45 days. Of course, that's also training the human, because they work as teams.

Andy Gluesenkamp [01:34:15] But this, to me, this is really rewarding because part of our commitment from the beginning is that there are humans that want to participate in this, but their dogs don't meet the criteria, or they don't have a dog. We will source a dog from a shelter if they promise to provide a forever home for that dog, we'll train them both up.

Andy Gluesenkamp [01:34:39] And so, I just love the idea of saving dogs to help save horned lizards.

David Todd [01:34:49] That's wonderful. To save both. So, I know there's probably 45 days of really intense instruction here, but how do you teach a dog to identify and want to follow horned lizard remains or parts?

Andy Gluesenkamp [01:35:10] Yeah. Yeah, it's, it's simple. It requires diligent practice. You start simple with whatever the dog's favorite reward is, whether it's a squeaky toy or a ball or or whatever it is, and work on that identification and returning it.

Andy Gluesenkamp [01:35:30] And then cut a little piece off of it and work on identification of that. Right.

Andy Gluesenkamp [01:35:37] And so the dogs (and I'm not a conservation dog trainer and really I would mangle this entire process if you ask me to go through it). So let me start over.

Andy Gluesenkamp [01:35:49] It's actually a really simple process. It just requires diligence on the part of the owner to work with their dog regularly and to be consistent. But ... it starts with training them on the target, some toy that they like and eliciting when they find it that they will sit, or they will point, or whatever their cue is that's comfortable for that dog and that trainer. And they're rewarded when they do that.

Andy Gluesenkamp [01:36:17] Then you switch to maybe smaller chunks of that target, that object, because the dog can still smell it, and continue playing the game and further abroad. And it moves on from there until eventually you're using scent samples or scat from zoo lizards for the dog to detect.

Andy Gluesenkamp [01:36:37] And so it's really taking a very natural, comfortable behavior for the dog that works well working with humans and just shifting the focus of it from some rubber object to this other very distinctive smell.

Andy Gluesenkamp [01:36:53] It's amazing.

David Todd [01:36:56] And so the role here is either to find horned lizards that can go into your breeding colony, or to just find out here's well-populated horned lizard habitat that we can do successful releases to?

Andy Gluesenkamp [01:37:14] Yeah. We've used the dogs a couple of times out in the field looking for horned lizards and also testing the dogs' ability to find them. And they can certainly find the scat. None of us found horned lizards those days.

Andy Gluesenkamp [01:37:28] So, I'm not blaming the dogs.

Andy Gluesenkamp [01:37:31] So ... the dogs have a role in three parts of this project.

Andy Gluesenkamp [01:37:40] Like you mentioned, dogs are helpful in identifying horned lizards and finding horned lizards that we may want to bring in to the breeding colony.

Andy Gluesenkamp [01:37:49] Also, one of the criteria that we have for release site is that there are no horned lizards present. If you already have horned lizards, ... you're already ... sitting where we're trying to get to. And managing existing horned lizard populations, that's a known science and that's a thing that they can do. They're many, many steps ahead of the landowners who we're typically working with who don't have any horned lizards.

Andy Gluesenkamp [01:38:19] So, the dogs are very helpful tool in doing a pre-release survey to make sure that we haven't overlooked existing horned lizards, because the last thing we'd want to do is dump a bunch of horned lizards on existing population.

Andy Gluesenkamp [01:38:36] And then third, the most important role that the dogs have played so far, and this is very important, is when we're conducting our post-release monitoring. So, one of the main reasons why horned lizards still exist on this earth is that they're very difficult to find. That crypsis has served them well.

Andy Gluesenkamp [01:38:56] And we're not very good at finding horned lizards, even experts.

Andy Gluesenkamp [01:39:00] So, I'll give you a great example from Dean William's lab at TCU. They're studying horned lizards in a kind of semi-urban population in a site where it's pretty easy to find them. And groups of horned lizard researchers go out and survey for horned lizards, collect all the lizards that they found, and take a little cloacal swab and collect all the scat that they found, and put that in a vial, send that back to the lab and run the genetics on it.

Andy Gluesenkamp [01:39:31] And they found that the scat, the horned lizard poo that they found, came from ten times more individuals than they encountered.

Andy Gluesenkamp [01:39:42] So. Right? You're maybe going to find one in ten lizards that are on the habitat in really great habitat with a team of professional lizard hunters.

Andy Gluesenkamp [01:39:55] So, we're hoping the dogs really help us change those odds. And they're really, really effective in finding scat on the landscape, which is golden for us because we do the same thing. We'll pick that scat up, we put it in a tube, we send it to Dr. Williams' lab, and he could tell us which of our lizards that scat came from.

Andy Gluesenkamp [01:40:16] And at this point in the release, after having conducted three years of releases, we may be finding scat that comes from lizards that were born in the wild. And we can identify who their mama and daddy were because we have a genotype library for all the animals that we've released.

Andy Gluesenkamp [01:40:35] So, I get very excited about lizard scat. It's also very distinctive. It's easy to identify horned lizard scat, and it doesn't look like most other lizards'. So it's a great way for citizen scientists to get involved and, you know, photograph that, scat, post it to iNat. The nice thing about scat is that it's there all day. Lizards keep banker's hours and they have more holidays than any other organism. But the scat's there all day, it'll be there tomorrow. It might even be there a week from now.

Andy Gluesenkamp [01:41:13] And once it starts to degrade and fall apart, it's still really identifiable because ... it's still readily identifiable as horned lizard scat because you can easily see all the ant body parts in it. So horned lizard scat's usually full of ant heads and ant legs and little bits of thorax.

David Todd [01:41:40] So, I think you mentioned that that one of the things that these trained dogs help you with is identifying a habitat where these horned lizards are actually already successful. And I was wondering if maybe through that strategy or others that you've figured out what kind of advice to give landowners about how to promote whatever horned lizards might already be on their land? What are some good tactics that they can use to manage their land in a way that's supportive of these horned lizards?

Andy Gluesenkamp [01:42:23] That's a great question. It's a bit out of my field of expertise, and I'm not willing to step too far in that field because we have such incredible experts here in Texas that work on these things. So, I can direct you to a Texas horned lizard management guidebook that was produced ... by the Cesar Kleberg Wildlife Research Center in Kingsville. And also, we mentioned earlier, Parks and Wildlife has that Texas horned lizard watch packet. Those documents are available online, and that's also got information for landowners.

Andy Gluesenkamp [01:43:23] My favorite and most important, I think, is our own Texas Horned Lizard Advocacy Guide, which ... is available if you go to the San Antonio Zoo's web page, click under Conservation, click under Horned Lizard Reintroduction project, and you'll see a button that will allow you to download our 20-something page advocacy guide. And that guide also includes links to landowner-specific content, like questionnaires for landowners who are interested in participating in the program. This is a way that we can gather that information from them. Anyone who's interested in becoming a Texas horned lizard advocate, this is a great way for them to learn more about horned lizards in their lives or horned lizards writ large.

David Todd [01:44:23] Okay. Well, let's move on to maybe a new chapter here. And that is sort of the public perception of horned lizards. I think you've pointed out that horn lizards have many common names. They've been adopted as pets. They just seem to be the target of a

lot of affection. And I was wondering, what is it that you think makes them so appealing to people?

Andy Gluesenkamp [01:44:58] You mean horned frogs?

David Todd [01:45:00] Yes.

Andy Gluesenkamp [01:45:01] Horny toads?

David Todd [01:45:02] Yes.

Andy Gluesenkamp [01:45:03] Horned lizards.

David Todd [01:45:05] All the above.

Andy Gluesenkamp [01:45:05] Phyrnosoma. Chamaleon.

Andy Gluesenkamp [01:45:11] I marvel at the fact that no other Texas reptile enjoys so many nicknames and terms of endearment, mots d' affection, as this species does? Sorry, I don't speak French. But it's true. People really love the species, even if they've never seen one. They love it. They love the story of Texas horned lizards.

Andy Gluesenkamp [01:45:40] It's been captured in popular media with the story of old Rip. I won't go into that, but Warner Brothers picked up on that. And, you know, if you ever wondered why Warner Brothers has a dancing frog, believe it or not, that was inspired by the story of old Rip the horned lizard. Yeah, it's a long, long tale. Another podcast.

Andy Gluesenkamp [01:46:03] But this love and affection for the species is deeply ingrained in not just Texans, but certainly in Texas. They love them.

Andy Gluesenkamp [01:46:12] And part of it is, is because, you know, historically, this is an abundant species. It's a approachable species. It's not going to tear you up if you touch it or look at it. And it was something that was close to home, literally close to home for kids playing in the back yard.

Andy Gluesenkamp [01:46:28] So, this is an introductory animal for so many people to the world of backyard reptiles.

Andy Gluesenkamp [01:46:36] And then also they're just incredibly charismatic. I hear from people all the time: "They look like tiny dinosaurs." And they mean that in a really good way.

David Todd [01:46:50] Well, and I guess Texas Parks and Wildlife and the state of Texas recognized that they were appealing. And I think that the animal got named as the Texas State reptile. And then later was recognize on license plates. Can you talk at all about how that happened?

Andy Gluesenkamp [01:47:10] Yeah, I think it was in 1993 that Texas Horned Lizard was listed. And that was well after declines and disappearances had been underway. And I think Texas Parks and Wildlife wanted to get out ahead of this one, because there's no question that this species is important to TPWD and Texas in general. And they really want to respect and honor this symbolic reptile.

Andy Gluesenkamp [01:47:44] The license plate: that's a great story. So, a lot of people have seen these horned lizard license plates around. They've been around for a long time. There are other wildlife-related license plates you might see. Those are all part of the conservation license plate program under Texas Parks and Wildlife. When you purchase those plates, I think \$18 (it might be more now) goes directly to wildlife conservation.

Andy Gluesenkamp [01:48:11] So, it is a way that people can make a direct contribution to things that they care about. And you get some bragging rights with that on the back of your car. Right?

Andy Gluesenkamp [01:48:24] The Texas horned lizard plate was the very first design that they released. And so most people know this program as the horned lizard plate program. I don't mind that that's it. But once again, that just speaks to how popular and charismatic and how iconic this species is, because they could have put any non-game wildlife as the poster child for those plates. But I think it's just wonderful that they chose the Texas horned lizard.

Andy Gluesenkamp [01:48:51] And it's, I see them all the time. It makes me so happy. Keep buying them, friends!

David Todd [01:49:01] So, I think you pointed out that these horned lizards started to decline or at least retreat from their old haunts, you know, 40, 50 years ago. And so, I'm curious how you at the zoo now, or before when you were at Parks and Wildlife, connect with a new generation who may not be familiar with horned lizards, may never have seen one. But, you know, you're hoping to, you know, share the experience and get their enthusiasm and support.

Andy Gluesenkamp [01:49:37] That was a real concern for me because, you know, it's that generation that we're doing this for. Our generations are going to be the ones that that can hopefully maintain these species in abundance. But, it's going to be future generations that we would hope reap the reward.

Andy Gluesenkamp [01:49:57] Yeah. Kids these days, most of them, they've never seen a horned lizard. If they have elderly grandparents, they know all about them. Maybe not.

Andy Gluesenkamp [01:50:08] But this is a place where perhaps our incredible connectedness with the world is an advantage, that 30 years ago, if a kid didn't know what a horned lizard was, a kid had no clue what a horned lizard was. Now a kid has probably seen four or five photos of one and maybe even some phone conversations about them so the level of connectivity.

Andy Gluesenkamp [01:50:32] And even things like, oh, the film, "Rango", you know, where you've got these things popping back up into popular culture. A co-worker of mine collects beer bottles with horned lizards on them, and they have quite a collection now. So, they're popular. And, I don't really see a challenge, to be honest, in connecting younger generations with horned lizards, because, just like their parents or their grandchildren, you just put them in front of a horned lizard and you don't have to explain.

David Todd [01:51:11] So the horned lizard is interesting in the kind of appeal that it holds for folks but I think maybe most dramatically, because so many other reptiles have the absolute opposite effect and there seems to be this intuitive, instinctual feeling, you gotta

wallop any snake or other reptile you see. Can you tell us a little bit about what where that comes from? Is it just genetic? Is it taught? What's your speculation?

Andy Gluesenkamp [01:51:47] I can't answer that question. It's true that most people have an innate fear of reptiles, especially snakes. It's not your fault. We're actually hardwired for it. If I see a snake-like thing out of the corner of my eye while I'm hiking down the trail, I will jump in the air. I will probably recognize why I'm jumping before I hit the ground. But I will jump in the air like anyone else. We have a really cool reflex I won't go into, that basically makes us jump when we see a snake.

Andy Gluesenkamp [01:52:21] That said, isn't it nice that horned lizards have four legs? They're clearly not a snake. Most people know they're not that fast. You know, a lot of the affection that people have for horned lizards comes from the level of interaction that people enjoyed generations ago. It's unfortunate, you know, we don't have lizards in everyone's backyard anymore, and it's not legal to pick them up and play with them and show them to your friends or take them to class for show and tell.

Andy Gluesenkamp [01:52:55] But their docility and, you know, ease of handling endeared them to generations of Texans.

Andy Gluesenkamp [01:53:04] And although you're not gonna be able to play with them like you could before, I think, by and large, people have a greater appreciation and respect that, "Okay, I can love it without having to catch it, or hypnotize it, put it to sleep."

Andy Gluesenkamp [01:53:22] Frogs and toads and horned toads as wild pets. That'll be my book.

David Todd [01:53:34] So I've heard this term, "herper". And I was wondering if you could describe what is a herper, and what is the community of herpers like in Texas?

Andy Gluesenkamp [01:53:51] Ah, Texas is a great place to be a herper. So, Texas is the most herpetologically diverse state in the U.S. We have, I think, close to 90 listed, threatened or IUCN species. So, it's also an area of intense study.

Andy Gluesenkamp [01:54:16] But we're really fortunate that we have several species of snakes, in particular, in Texas that are absolute living jewels. And people travel from all over the world to see these snakes.

Andy Gluesenkamp [01:54:30] By and large, herpers are the reptile and amphibian equivalent of birders. The difference is, is that birders never, ever touch birds. Herpers, some herpers keep and breed snakes and lizards and other things. And there's a captive trade in reptiles and amphibians.

Andy Gluesenkamp [01:54:52] Thankfully, with several rounds of thoughtful legislative change and discussion and conversations between the reptile and amphibian community and state agencies, there's less concern about the specter of herpers as poachers, and more a recognition that herpers are wildlife enthusiasts who have an incredible amount of knowledge. Right? These are people who spend, you know, every night of their vacation time driving the back roads somewhere. They've learned a lot that we can learn from them.

Andy Gluesenkamp [01:55:33] And so, one of my first goals when I was State herpetologist was to really work on building that bridge between herpers and Parks and Wildlife, because I saw it as hugely beneficial to both.

Andy Gluesenkamp [01:55:48] And I'm proud to say that with the efforts of a lot of really great people on both sides, there is a beautiful bridge established between those communities with data-sharing, with collaboration, with funding being exchanged between those communities. So.

David Todd [01:56:12] Okay, well you mention...

Andy Gluesenkamp [01:56:13] Wait, I'll give you one more.

David Todd [01:56:15] All right. Please.

Andy Gluesenkamp [01:56:17] I'd like to give you an example of how much things have changed between the herper community and Texas Parks and Wildlife, largely the law enforcement community. In the past, there was always a lot of tension there. When I started at Parks and Wildlife, several individuals from the herper community reached out to me and they they wanted to start a ... conference series that would build this bridge.

Andy Gluesenkamp [01:56:47] And from that, began the Sanderson Snake Days event, which I believe this last year was held in Alpine, but it's called Snake Days, and it's a really great event. I think they're on their maybe seventh or eighth year of it, where folks come from all over the world and listen to lectures during the day on a variety of reptile and amphibian topics, mostly focused on West Texas. And then they take off in the evening and they explore the public roads of West Texas, looking for snakes and insects and things, and then come back the next day and another day of lectures.

Andy Gluesenkamp [01:57:27] It's really great because it combines the academic research, agency, hobbyist, enthusiast communities under one roof.

David Todd [01:57:44] So, speaking of agencies, you have spent time at both Texas Parks and Wildlife as the state's herpetologist, and then more recently, as the conservation director at the San Antonio Zoo. And these are...

Andy Gluesenkamp [01:58:06] There's no "the" in front of San Antonio Zoo.

David Todd [01:58:10] Oh.

Andy Gluesenkamp [01:58:11] I know.

David Todd [01:58:13] My apologies. Drop the article, so ...

Andy Gluesenkamp [01:58:17] It's okay, but I catch you when I can.

David Todd [01:58:21] Thank you. Thank you. I stand corrected.

Andy Gluesenkamp [01:58:24] Just correct me if you hear me say it, because seven years on. Please continue.

David Todd [01:58:32] Yeah. So, I was curious if you could talk about these two entities, the Parks and Wildlife agency and then San Antonio Zoo, that both probably have similar goals but they have very different structures and processes. And I was wondering after your experience of both, if you could compare the two.

Andy Gluesenkamp [01:58:52] Yeah, they are very, very different. And my job, my role and the things that I do now as director of conservation at San Antonio Zoo are very different than when I was the state reptile and amphibian biologist.

Andy Gluesenkamp [01:59:07] What I loved about that job was the opportunity to interact with researchers and resource managers from around the state and around the country and help find funding, identify researchers that could do the work, and combine those two to answer questions that we needed answered. So, I found that very, very rewarding.

Andy Gluesenkamp [01:59:33] And then also with the opportunity to interact with the public on a daily basis. So my phone rang all the time with common reptile and amphibian questions from, you know, any old person. And I learned so much from those phone calls.

Andy Gluesenkamp [01:59:51] And also, coming into that job as a sort of wide-eyed, passionate conservation biologist, I felt that there are a lot of black and white issues out here that, you know, we just need to sit down and systematically knock them off the list. And I realized there is absolutely nothing black or white in state politics, conservation - everything is a shade of gray. And that everything, if it hasn't been resolved already, is extremely complicated. And that was a big life lesson for somebody in their forties to discover that.

Andy Gluesenkamp [02:00:28] Moving to the zoo - I love working with the zoo and being able to use the skills and share the network I developed earlier in my career in a much more focused way. ...

Andy Gluesenkamp [02:00:48] Here at the Zoo, in the Center for Conservation Research, we select projects based on three basic criteria. One is conservation need. Is it something that we really need to do? Or is it a high research need - some exciting discovery right around the corner?

Andy Gluesenkamp [02:01:05] The second is, is it logistically feasible? I don't work on Maine amphibians. They probably have great amphibians up there, but it doesn't make sense for a guy in Texas to work on species in the Northeast. They've got experts up there.

Andy Gluesenkamp [02:01:23] And also, it's important that we lead the work that we do. One, because I feel that we have a lot of academic integrity, but also, we have a very diverse skill set. My supervisor and I both have backgrounds in herpetology, ichthyology, and cave biology. Our staff are trained in the husbandry and study of some of the rarest species in North America. We have world-class vet staff right next door. So, it's a really great environment for us to do certain kinds of things really, really well.

Andy Gluesenkamp [02:02:02] And horned lizards is one of them.

David Todd [02:02:09] Yeah, I can see. So, you need to match the project with the place and the need and the skill sets that you all have.

Andy Gluesenkamp [02:02:19] It's not a zoo thing. It's a global issue. In conservation research, there's never enough time, money, staff or other resources. And so in order to be effective, we need to maximize all of those and optimize our skill set.

Andy Gluesenkamp [02:02:40] So, for me, without access to a laboratory, I try and maintain very strong, productive relationships with people who run labs.

Andy Gluesenkamp [02:02:54] And I go get dirty. So, we trade off.

David Todd [02:02:58] So, I have two more questions. One is because I think that you're a word guy, I was curious about our reluctance to use certain words that I think are part and parcel of like normal, I think, wildlife research and that is "captive" and "collect", and that "obtain" is better. And I'm wondering if there's some baggage to that that you're trying to get away from.

Andy Gluesenkamp [02:03:38] Yeah. It's a zoo thing. And it's because, you know, there are organizations out there that don't feel that zoos should exist. And the specter of animals in cages is no longer accurate, but it's still out there.

Andy Gluesenkamp [02:03:56] And so, reference to those sorts of terms serves to perpetuate the misunderstanding that a lot of people have about what zoos actually do.

David Todd [02:04:11] That is fascinating. Yeah. And so, it's trying to change minds about the perception of what zoos currently are.

Andy Gluesenkamp [02:04:20] I would love if everybody could just come visit the zoo, and then they would see for themselves. But, our reach extends far beyond the gates of the zoo, and actually my work as well.

Andy Gluesenkamp [02:04:40] ...It's important to use the correct language out there that accurately reflects the current state of zoos.

David Todd [02:04:49] I follow you. OK.

Andy Gluesenkamp [02:04:50] I also point out that San Antonio Zoo ... was the first zoo in the world to go with cage-less enclosures. So, they're the first ones to provide the opportunities for humans and animals to interact across a moat or a barrier that wasn't an enclosure. Something like that.

David Todd [02:05:15] Wow.

Andy Gluesenkamp [02:05:16] Yeah. Yeah.

David Todd [02:05:17] Good pioneering to do. So, I think we are probably winding down here and and I wanted to just ask one last question, if you don't mind. And that is just an open-ended question. Is there something that we may have missed in terms of horned lizard research or conservation or recovery that you'd like to just share some thoughts about, or wildlife conservation in general.

Andy Gluesenkamp [02:05:49] Well. ... Give me a moment.

David Todd [02:05:57] Yeah, sure, sure. Of course.

Andy Gluesenkamp [02:06:02] You know, horned lizards are a wonderful species. They're an incredible poster child for the concept of conservation actions close to home that reap great rewards. Right? The idea that by managing and maintaining suitable habitat that we can restore horned lizards to our environment is pretty darn cool.

Andy Gluesenkamp [02:06:25] That puts people in the driver's seat. We're not talking about far off insurmountable problems, like if the Arctic was on fire or whales are 72% plastic by weight. These are problems that are, yes, they're close to home, but we can tackle them.

Andy Gluesenkamp [02:06:46] And it goes straight to simple things like manage what your cat does. Be careful what kind of chemicals use in your yard. Don't persecute wildlife that you don't need to.

Andy Gluesenkamp [02:06:57] But talk to your friends and your family and your co-workers about these concepts.

Andy Gluesenkamp [02:07:02] A lot of people are going to want to talk about horned lizards. Great. Other folks really want to hear about pollinators and native plants. Those are a critical component of the same landscape that we're trying to get people to work towards.

[02:07:17] I mentioned earlier ... in the conversation that horned lizards are something of a Trojan horse for me. They're really agreeable. Everyone's going to let them in the gate. But horned lizards are the way I start that conversation with land managers about sort of the deeper, longer-term goals here. That horned lizards are are a great example of what we can do working close to home.

David Todd [02:08:02] Sounds good. Well, I wish you the best with horned lizards and all the other creatures that I know you have interest in.

Andy Gluesenkamp [02:08:10] I know. Call me sometime. I'll talk to you about blind salamanders or blind catfish that live in the Chihuahuan desert. Or this crazy mud turtle that's the rarest turtle in North America that I'm working on.

David Todd [02:08:24] To be continued.

Andy Gluesenkamp [02:08:26] To be continued. Yeah.

David Todd [02:08:28] Thank you so much, Dr. Gluesenkamp. I really appreciate your time.

Andy Gluesenkamp [02:08:32] Thank you so much.

David Todd [02:08:34] You bet. All right. Have a good day.

Andy Gluesenkamp [02:08:36] You too. Bye.