

**TRANSCRIPT**

**INTERVIEWEE:** Louis Harveson

**INTERVIEWER:** David Todd

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**Google Voice** [00:00:00] This call is now being recorded.

**David Todd** [00:00:04] This is David Todd.

**Louis Harveson** [00:00:05] Hey, David. Louis Harveson. How are you, man?

**David Todd** [00:00:08] Oh, Dr. Harveson, thank you so much for calling. I'm sorry about the screw-up on my end. Totally my fault. Thank you.

**Louis Harveson** [00:00:15] No worries.

**David Todd** [00:00:15] Patient!

**Louis Harveson** [00:00:17] No worries at all.

**David Todd** [00:00:19] Well, good. Well, I've been looking forward to this conversation, and I'm so glad the time is here. Thank you so much for indulging us. I appreciate it.

**Louis Harveson** [00:00:30] You becha.

**David Todd** [00:00:33] Well, let me, if you don't mind, take a moment to just introduce what we're about and make sure that this sounds good and acceptable to you. With your approval, the plan would be to record this interview for research and education, on behalf of the Conservation History Association of Texas, and for a book and a website for Texas A&M University Press, and finally for an archive, the Briscoe Center for American History at the University of Texas, here in Austin. And you, of course, would have all rights to use the recording for your purposes too. I just wanted to make sure that sounds OK with you, it's what you expected.

**Louis Harveson** [00:01:22] Absolutely. That's perfect.

**David Todd** [00:01:25] Oh, good. Good.

**David Todd** [00:01:26] Well, let's, let's dive in, get started. I'll try to lay out, you know, the time and the date and place and maybe introduce you a bit and then start asking, peppering you with some questions.

**David Todd** [00:01:44] So let me just note that it is March 4th, 2021. My name is David Todd. I'm in Austin. I'm representing the Conservation History Association of Texas. And we're very

fortunate to be conducting an interview with Dr. Louis Harveson, a wildlife biologist, a professor at Sul Ross State University, and the founder and director of the Borderlands Research Institute. And his research, as I understand it, centers on the ecology and management of large mammals, upland game birds and predators. He is based out in Alpine and this interview is being done by telephone.

**Louis Harveson** [00:02:28] Today, we'll talk a little bit about his life and career and then focus in, if you can help us there, to talk about the mountain lion and its natural history and ecological role and, and the efforts that he's seen and participated in to understand and manage it.

**David Todd** [00:02:51] We usually start these interviews with just a question about your childhood. I understood, you grew up in Fort Worth, in Lubbock, and, and spent some good time with your family camping, and fishing and hunting and watching wildlife, and I was hoping that maybe you could tell us about any formative experiences that might have led into this life and career of focused on wildlife.

**Louis Harveson** [00:03:21] You bet, David, and thank you, I was very fortunate as a child, grew up in a big family, two younger brothers and two older sisters, and of course, my parents. And with a big family, I think, in the 70s in particular, you know, they always looked for opportunities to do things, I think, in an economical way, to have experiences and vacations and things like that. And so we we grew up in the back roads of Texas. We we fished and went to the beach and, you know, played at the lake and caught tadpoles in creeks and just did all those kind of things, whether that was with adult supervision, or without.

**Louis Harveson** [00:04:02] But we were we were quite curious growing up, and that was certainly fostered by my, by my folks. I remember, you know, getting a hand-me-down pair of binoculars from my dad and getting a bird guide from, you know, one of his colleagues at work. And, you know, any time we spent time together in the deer stand, it was, it wasn't just about the deer. It was about all the other things. It was about the trees and the smells and certainly the birds. And so I grew up really as a birder, not, not formally, but just, you know, self-birding and he'd encourage and so forth. And he was by no means a birder, but he, he liked seeing that, that passion and interest come from not only me, but my, my siblings as well.

**Louis Harveson** [00:04:54] And even, even when I went into college, you know, I'd started in engineering and jumped into biology and eventually found my way to wildlife management. And I really didn't even know that there were, you know, I'd read magazines and I saw that there were wildlife biologists. I didn't know how you got there, but stumbled across the catalog and, and it was time for a change. And so I made that change. And I mean, that was a long time ago. But it, you know, no looking back. It was absolutely the right move for me. And I feel that I'm very passionate about, and I'm certainly drawn to over the last, you know, 40, 50 years and something I take a lot of pride in, in developing young professionals and just trying to encourage others that have maybe that same passion and trying to fan those flames a little bit to get them inspired about conservation in Texas.

**David Todd** [00:05:52] Mm hmm. Well, you mentioned that after growing up and exploring Texas with your family, you went to college and I just had a brief stint with engineering and biology, but as I understand it, got to a B.S. in wildlife management from Texas Tech, and a Master's in Range and Wildlife Management from Texas A&M in Kingsville, and finally a Ph.D. in Wildlife Science from both A&M in College Station and in Kingsville. Were there any

particular experiences or maybe mentors or just colleagues, classmates, that you met during your academic career?

**Louis Harveson** [00:06:35] Absolutely. You know, when I, when I finally did find the wildlife profession, you know, classmates who were inspiring and just, just forming that, those bonds with those students that shared the same passion and vision that I had, and certainly our advisors, you know. Dr. Fred Bryant was my undergraduate advisor at Texas Tech. And, you know, he actually helped, helped me find my, my master's project down at A&M - Kingsville, working for an old friend of his, you know, beer drinking buddy and colleague, Fred Guthery. And then, you know, coincidentally, Fred ended up being on my Ph.D. committee because he moved from Texas Tech to Texas A&M-Kingsville as the director of the Caesar Kleberg Institute. And so probably, you know, Fred Bryant for sure has had a tremendous role in my career.

**Louis Harveson** [00:07:33] But really, all those academic advisors, Dr. Guthery, Dr. Tewes for Ph.D., Dr. Silvy, I mean, there's just so many that gave so much. And they would, you know, they have different styles in how they taught or how they advised or mentored students. And I just really liked picking up on those things, and I guess in hindsight, it doesn't surprise me, I guess, that those things that I picked up on are really the foundation for some of the the tools that I use when I'm working with my graduate students. So just, just, you know, a lot of people, even, even aunts and uncles and, you know, they, they also were, you know, fishermen and hunters and things like that, there were just so many people that have really played a role in that. But probably Fred Bryant stands out the most as far as just being consistently a mentor through my career.

**David Todd** [00:08:35] It's nice to hear that sort of legacy, that sort of heritage of people that have influenced you and taught you.

**David Todd** [00:08:47] Of course, one of the things that we really wanted to hear about is, is what you learned about one particular animal. I know you studied many, but today I was hoping that you could visit with us a little bit about the mountain lion and maybe, for lay people like me, give sort of the brief 101 course introduction to the life history of a typical mountain lion.

**Louis Harveson** [00:09:16] You bet. You know, the, the mountain lion is just one of those those species that I think, you know, whether you're a sheep and goat farmer, or just a normal citizen, or a hunter, an outdoorsman, I mean, it's just one of those species that has so much mystery surrounding it. So much respect is garnered for this species because they are solitary. There is so much mystery. They're, you know, nocturnal, they're secretive. Just all these traits that just absolutely draw you in more.

**Louis Harveson** [00:09:54] You know, they, and throughout their range, you know, they used to range from the southern tip of Argentina all the way up to the Yukon and Alaska, and then from east to west from, from, you know, the Pacific to the Atlantic. And so this is a species of, truly of the Americas. And in the United States, you know, we're very fortunate to have a lot of good habitat still in the states.

**Louis Harveson** [00:10:20] Again, they are secretive. They spend almost their entire life alone. They don't, you know, form packs or anything like that. They, we are finding out within the last ten years that they probably are a little bit more social than we probably give them credit for with, with technology like cameras and things. But in reality, they really are a

solitary animal. They do get together when they reproduce. The males and females, males will pursue the females, spend, you know, as much as a week together as they copulate and reproduce. But after that instance, you know, they really don't tolerate each other.

**Louis Harveson** [00:10:59] And the female will raise a young anywhere from one to six. In Texas, kind of our more typical litter sizes were more like two or three. But, you know, you do see those, those extremes on litter size throughout their range. And those, those kittens stay with the mother for anywhere from 18 months, up to 36, usually longer the further north you go within their distribution.

**Louis Harveson** [00:11:28] And then they're, they're kicked off. And it's, you know, it's kind of a little harsh, you know, flying from fledgling from the nest, so to speak. The female will take them on a, on a on a big trip, what we've seen in some of our research, and then just kind of abandoned them and let them fend for themselves.

**Louis Harveson** [00:11:46] But over that 18 months, they've been trained. They've, they've, they've followed their mother. They've watched her stalk. They've watched her kill. They may even participate in some kills, especially with small animals like skunks, porcupines, rabbits, things like that. And so they're, they're developing their skills. And that's really what that mother is meant to do, is to, you know, invest their time in them and then let them do their thing.

**Louis Harveson** [00:12:13] After that 18 to 36 months, as they are truly independent of that time, that's probably one of their most vulnerable stages in their, their lifespan, because, you know, if they didn't pick up all those skills or prey is not as available, it can be difficult. And so you do get a fair amount of mortality during those times.

**Louis Harveson** [00:12:35] But as they get into adulthood, they're, they're adult size at that time, but they're not reproductively active. That usually doesn't happen until maybe three, four or five years old. And then at that point, they're, they're adults. They've, they've carved out a territory. Prior to them carving out a territory, a lot of times those animals are transients. They don't, they're a little more nomadic in where they are. And so they travel more. They're again, they're more vulnerable.

**Louis Harveson** [00:13:04] So one thing that mountain lions do, it's, it was coined back in the '60s by Maurice Hornocker, who was really the, the father of mountain lion research in the United States. It's called the land tenure system. And basically animals develop territories and home ranges based on availability of prey. They, they defend that territory to some extent, males more so than females. Males overlap with those females. So you may have a male overlap with three or four different females. The females are territorial also, but nothing like, like the males are.

**Louis Harveson** [00:13:42] And so those transient animals, they're bouncing through hopefully suitable habitat. And along the way, they're going to run into, you know, adult lions that are a little bit more powerful, larger possibly. But they know the habitat better. And they know the prey better. And a lot of times they get beat up. A lot times they die. And so intra-specific strife is actually a form of mortality in mountain lions, where mountain lions kill one another. And it's usually in those kind of situations where you have a young animal coming into contact with an adult animal that, that has a territory.

**Louis Harveson** [00:14:23] You know, they, they make kills. They, you know, they're, they are true carnivores. They, they just, you know, they have huge ranges. And so that really is dependent on where they are, within their distributions. So we know, for example, in West Texas, there's less biomass and prey. They have larger home ranges. Whereas if you go to South Texas, where there's more prey per square mile, those generally have smaller home ranges. And so there's, there's all sorts of variables that play in on how much space.

**Louis Harveson** [00:14:56] But they absolutely use a tremendous amount of of habitat. Their dispersal distances are some of the highest of them, and wolves are probably the two highest that I can think of in North America. I know, well, just as a, as a little factoid, there was an article that documented a dispersal of a subadult animal that dispersed from South Dakota and made it all the way to Oklahoma. And I don't know, remember how many miles that is. But it's a really, really long way. And that's airline miles. And the reality is, you know, mountain lions, and really most animals, don't just travel straight distances. They're bouncing back and forth and making circles and all sorts of things.

**Louis Harveson** [00:15:43] Coincidentally, that lion actually died on, by train collision, of all things. So it's just, you know, there's all sorts of ways that, that mountain lions can can't perish and they certainly do throughout their lifetime.

**David Todd** [00:16:00] Gosh, that's extraordinary. I think you mentioned that a mountain lion is really a true carnivore. And I guess from early days it gets taught how to make a kill, whether it's a small animal like a porcupine or rabbit or skunk, or larger animals. I wondered if you could sort of talk about the mountain lion's ecological role as an apex predator, from what I've heard. Is that true?

**Louis Harveson** [00:16:27] Yes, sir. Yes, sir, I'd definitely consider mountain lions apex predator and even, you know, kind of on the same level, a keystone predator, meaning that they have impact on the trophic levels below them. And most of that is, is favorable. They have a role? They have a niche that, you know, they help control disease, they help keep prey populations down. So they, they have their, you know, specific role.

**Louis Harveson** [00:16:55] But without them, I think, you know, the studies have shown that the diversity of those habitats actually does diminish. And so there's, you know, ecosystems in general are just one of the most complicated things in the entire universe. And so, you know, we're just now finding because of the technologies that we have and the relationships we're able to draw from species interactions, how complicated that really is. And it's more complicated than we even thought. So it's one of these things that we're learning more and more about - really the ecosystem services that they, that they perform, and then just all the interconnectedness of that system and really how those, those apex predators play into that.

**Louis Harveson** [00:17:42] And so, you know, that's one good thing about Texas is we still have viable populations of mountain lions. And that's, that's one thing we've got to kind of figure out is, is how do we, how do we manage that? How do we ensure we have that for future generations?

**David Todd** [00:18:00] Even nice to introduce us to the mountain lion and its, its own life history and also its role in larger ecosystems. But I think you mentioned this earlier, that they are elusive and solitary and spend a lot of time out at night and they're in remote areas. I can only imagine how difficult they are to try to track them and study them, which you've done.

And I wonder if you could talk a little bit about how these animals are captured and tracked and studied.

**Louis Harveson** [00:18:40] Yeah, it was certainly a learning experience for me and taught me a lot of patience, but, you know, this is, this is an animal that occurs, you know, on average less than one animal per 100 square kilometers, 100 square miles, pardon me. And so it really it's, of all the species you see in the wild, it's one of the lowest densities. So it's one of the most rare species out there.

**Louis Harveson** [00:19:06] And then you're as a, as a trapper, whether that's for predatory purposes or in my case, research purposes, you're trying to get that animal to step in basically a pie-plate area when it's encompassing, you know, 150 square miles or whatever that is. You wanted it to step right here, just nothing bigger than an eight and a half by eleven sheet of paper. And so that that that does take a lot of patience. It takes a lot of study.

**Louis Harveson** [00:19:35] It, you start, you know, you try to pattern the animals. So you're, you're looking for any sign of that, that animal being there. So that's, that's looking for tracks. That's being able to discern the scat, how big that scat is based on measurements and things. You know, looking for kills. That's obviously that's, that's kind of a higher level type of sign that gives you more opportunity because you're closer to it. And so you, you start just this whole really old-fashioned mapping process of just putting little pins on a map and trying to figure out how often they may come through an area and, you know, when they may be back.

**Louis Harveson** [00:20:19] And then you, you try to use the technology and tools that you have available. Now, today, you know, the things we do, when I did this, you know, 25 years ago, you know, we didn't have trail cameras. Today we have trail cameras. And, and I will say it makes it easier, but it didn't make it that much easier because you still got to get the cameras out and pick the right spots and ravines to go down.

**Louis Harveson** [00:20:40] You know, mountain lions, just like your, your normal house cat, they're, they're soft animals. They're just like you and me. And so just imagine taking off your shoes and going barefoot through, you know, a canyon or a creek or any sort of habitat. Well it's the same principle and you can, you could kind of guess where they're going to step. And so you work that into your, you know, metric on how and where you put traps. And so you use jagged rocks and you use prickly pear cactus and you use all these other kind of deterrents to sort of don't step on X, but you want them to step on Y, which Y is hopefully your, your trap and you have it step right into that, that trap.

**Louis Harveson** [00:21:30] We used Aldrich snares and Aldrich snares are really designed for bears and they work really well for mountain lions. And, you know, I'll try to describe it, but it's, it's basically a drag, a metal hook that is set aside and maybe tied up on some shrubs or something that's a little bit limber. And then you, you have a spring, and that spring, and you want the spring is basically a coil and it'll, you cock it down. And at the time, the snare is thrown by that spring. And so it's difficult to describe on a, on a, via your voice. But it's a, it's a, tailed, a proven method I guess. But you know, it's still a little archaic but it's very effective.

**Louis Harveson** [00:22:20] And we put in various safety measures like springs and bungee cords so that when they do get in that snare, that it's, it's safe for them. And we usually check those snares on a, you know, on a regular basis, a couple of times a day. So they're not out in the heat of the day.

**Louis Harveson** [00:22:38] Some of the other trapping techniques that we've used over the years is using trained hounds. And just, you know, I don't know what it is about cats and dogs, but there's been a, you know, eons of conflicts between those canids and felids. And, you know, you can train dogs, and people do train dogs for hunting purposes or for capture purposes. And so they, they find scent, so that your best bet is to put the dogs where they can find scent and then they will trail, and they will trail, and as they get closer to that fresher scent, they'll bark and they'll force that animal in a tree. And that's basically the extent of it. A lot of times you chase a lot of dogs and a lot of ghosts, so to speak, and you don't see the lion or, you know, they took, they went the wrong way. They went back trail instead of took it the way they wanted.

**Louis Harveson** [00:23:31] But basically, once you get that animal in a tree or in a snare, from a capture standpoint, where you're going to release the animal alive, then you get out your gear. And so you have dart guns and blow darts and appropriate sedatives all, you know, registered by the DEA. You estimate the weight of that animal. You, you know, give them an appropriate dose. You either climb up in the tree with them after their dose and lower them by a rope. You give them, you know, after the dart, maybe five or 10 minutes, then that animal's, you know, taken a nice little nap.

**Louis Harveson** [00:24:09] And you're able to do what you need to do from a research standpoint, collect tissue, pull off parasites, take some measurements and then in our purposes, we want the data. We want to know what they've been doing and where they go, who they're with. And so we put basically radio collars or satellite-tracking collars on those animals. Then we usually reverse them when we're done, and they're up and moving within ten minutes after that, that reversal. So it's you know, it can be a little stressful for the animal during capture. But the information that we we gained from that and how we're using it for conservation certainly outweighs the nuisance of being caught and radio-tagged.

**David Todd** [00:24:57] Well, and I gather that, given what sounds like just such a complex, difficult task is to capture one of these mountain lions, do you find that you're rely on much information from things like prints and scat, and scrapes and drag marks and, you know, things that are sort of noninvasive, that don't require capturing a mountain lion?

**Louis Harveson** [00:25:26] You know, especially on the, on the scat side, there's a whole, you know, kind of subdivision of wildlife biology that, that is scatology. You know, we, we could get genetic information to look at the population's heterozygosity of that population. We can get diets. There's just so many things that you get from that type of information.

**Louis Harveson** [00:25:48] You know, the, the, the rollout, and the technology associated with, trail cameras has been just remarkable. There's a whole specialization of noninvasive work that we do now that does not require the capture of the animals. And it doesn't give you the detail. I think a lot it's more population-level type of information, but understanding occupancy, habitat preference, you know. Mountain lions are a little difficult because they don't have a lot of distinct marks. But on spotted cats like ocelots or bobcats or tigers, you can actually do population estimates. And so there's, there's a whole new field that is really specializing in this noninvasive approach and trail cameras in particular, you know, play a, play a huge role in how we do that. And that's probably our our future, I think, from a conservation standpoint is be less invasive with the species that we work with. But there are just some things that just require capture. And so it just depends on your question on what, what tools that you'll deploy.

**David Todd** [00:26:57] I see. You know, I may be fishing for, for something that doesn't exist here, but I think I'd read that one of the last jaguars seen in the state was over 60, 70 years ago. Is there any, you know, suspicion that some of the reputed mountain lion reports might be jaguars, or do you think that's unlikely?

**Louis Harveson** [00:27:27] You know, we did. I think I think it was like 1948, if I remember right, the last jaguar mortality, something, you know, something confirmed. You know, watching the New Mexico and Arizona that that, you know, occasionally every couple of years they'll get an actual jaguar come across in from Mexico. And they you know, they, they have cameras, you know, every hunting lease today. And I mean, there's just, there's cameras everywhere. So I'm, I'm a little skeptical that we have jaguars that are sneaking into the state because we have so much border security that have cameras. And then we have so many, again, hunters, ranchers and then even researchers that have cameras. I mean, there's probably a million cameras in the state, you know, along the border.

**Louis Harveson** [00:28:13] I mean, so I'm, as cool as that would be, and even when I was trapping in South Texas, there was a tank, a water tank that was called El Tigre, you know, which is jaguar in Spanish. And I kept saying, all right, we're going to find a jaguar, we're going to find it. Well, we never found a jaguar. But it's always nice to, to think that that can happen. As jaguar populations recover in Mexico, you know, that day make come. So, but I just, I don't think it's happened within the last 20 or so years that we've had good cameras and such a network of cameras across the state.

**David Todd** [00:28:52] I see. Well, I think you talked a little bit, just in passing, about, you know, the, the robustness of, of the Texas population of mountain lions and some of the issues with trends. Can you talk a little bit about the history of changes in the mountain lion's population and range since, I guess, since Western settlement, maybe.

**Louis Harveson** [00:29:22] Yeah, you bet. You know, we, we do know, there's you know, we had a lot of great early explorers and naturalists that did a really good job of documenting interactions with different wildlife species. And so we rely on that pretty heavily as naturalists to just kind of see where they used to be and where they are today. And certainly, you know, David Schmidly's book, A Century of Change, is a great reference for that.

**Louis Harveson** [00:29:49] But we do know for mountain lions in particular that they, they occurred in every ecoregion of the state, historically. Now, they may not have been sustainable populations in most of these areas, but they probably were. You know, some, some habitats just to me don't look like they are as compatible for mountain lions, like the High Plains, for example. But the High Plains almost everywhere in the High Plains in Texas, that's right up against the Rolling Plains and Rolling Plains are really choppy, canyony type of habitat, which works really well for mountain lions.

**Louis Harveson** [00:30:23] And so, you know, through time, through settlement, as man started to dominate that landscape, you know, we started pushing out a lot of our, our apex predators like wolves, jaguars, and even mountain lions, and bears included.

**Louis Harveson** [00:30:40] So today, you know, for mountain lions in particular, you know, we know that they occur in far west Texas, the Trans-Pecos mountains and basins. We know that we still get some pretty reliable sightings and, you know, information that, you know, whether that's mortality or a trail cam, you know, on the western edge of the Edwards Plateau or Hill Country. And then we, you know, my study was in south Texas and, you know, we



caught 20-some odd mountain lions down there. And so those are really the core areas that remain for mountain lions in Texas.

**Louis Harveson** [00:31:19] Whether the population of South Texas is sustainable today, I'm not sure. There's been a lot of changes coming through in the last four or five years with, you know, the ranches are getting smaller, a lot of urbanization. Certainly the Eagle Ford Shale play around the Cotulla area, which has really been kind of the core of that mountain lion population. I just don't know how well the mountain lions have weathered those kind of influences.

**Louis Harveson** [00:31:50] So it's really the core, and I would say over 80, probably 90 percent of the mountain lions in the state of Texas are really in the Trans-Pecos. So we're talking about one ecoregion at this point.

**David Todd** [00:32:06] And then and then also, did you mention the western edge of the Hill County? Is that substantial, or...?

**Louis Harveson** [00:32:12] Yes. And one one good thing, especially in the Edwards Plateau, which, which has really been the core of our sheep and goat ag industries in the state, you know, not so good for sheep and goat producers, but as far as those markets have gone down since, you know, the '70s, '80s, certainly into '90s, there's been really less persecution, less trapping for mountain lions in those areas. And so those probably have the greatest opportunity to increase because it's really good habitat. It's still really what I call a broken country, where there's a lot of slope and elevational changes that are, you know, they're not true mountains, but there are deep canyons and there's a lot of good prey, you know, really high densities of whitetails and, you know, javelinas and even feral hogs. And so that western edge of Edwards Plateau, again, not as reliable a population, but certainly they do come through there and they will, you know, if you get a, the fact that you can get a female with cubs or something like that, that to me is the best indicator of a very sustainable population. If they're reproducing, if you have evidence that they have some, you know, some minimum ability to reproduce and grow. Now, whether they are able to sustain that, that, that, you know, that remains to be seen.

**David Todd** [00:33:48] So it sounds like there are some hot spots for mountain lions this point, in South Texas, the Trans-Pecos and maybe portions of the Edwards. Do you feel like there are connections between those populations, or are they genetically isolated? What's your view?

**Louis Harveson** [00:34:11] We actually have done some research in that arena and certainly the Caesar Kleberg Institute has taken that even further in looking specifically at that, looking at really the, the genetic relatedness between New Mexico, which we kind of consider a source population of the West Texas population and then the south Texas population. And really what, what they, what they found, and what we found earlier on, is that there is a disconnect between South Texas and West Texas. And so it, you know, to me, so that disconnect, if you just geographically look at that on a map, that's really the Hill Country. You know, it's a southern part of the Hill Country, Edwards, Real, Val Verde County, all that area that's kind of along the border. And so those populations have not rebounded enough to provide the connectivity from a genetic standpoint between South Texas' population, and west Texas'.

**Louis Harveson** [00:35:08] Now the question that that comes to mind is, how does South Texas remain viable, if it is indeed, and where, what is their source? So if there's a disconnect,

then they're still getting individuals on occasion. And my guess is that Mexico is probably our bridge between West Texas and South Texas. And then, you know, if you look at the broader range of West Texas population has a whole lot more diversity genetically. And that makes actually a lot of sense, because if you look at the Rocky Mountains coming down, you know, Colorado, New Mexico, etc., they basically tail into the Trans-Pecos region of Texas. And if you look south of there, you actually have the Sierra Madres coming in from the south. And so West Texas is really like an intersection of two major interstates for mountain lion traffic. And so I think the West Texas population is certainly more robust and certainly shows that, from a diversity standpoint, and in a genetic sense, whereas South Texas is kind of on the edge of a road. And so there's just less flow and then less genetic material being shared to that, that population.

**David Todd** [00:36:24] Well, and I think you mentioned that, as compared with some of the other states in the union, Texas is fortunate to have a pretty viable population. Do you feel like that's, you know, a pretty steady conditions looking forward, or do you think that it's not as viable and robust as you might hope?

**Louis Harveson** [00:36:50] You know, it's I think it's viable, you know, compared to other states that are, that have more ubiquitous habitat and have so many other populations surrounding them. So I'm going to pick on Utah. You know, Utah has mountain lions surrounding them as well as within them. And so that is going to be a more viable state-level population than what Texas has, because we're on kind of the fringe of that. You know, the fact that we have lost mountain lions from most of our ecoregions in the state and we're basically, you know, dependent on the Trans-Pecos alone, it does raise, you know, the question on, you know, whether, you know, how do we make sure we hang on to it? Because we certainly don't want to lose this species for the heritage of the state. And so there have to be conservation measures in place for that.

**Louis Harveson** [00:37:43] And then probably the bigger question is because there is a, because they disperse, and because they can colonize such long distances, really, one of the more important questions is, "do Texans want to have mountain lions in the Hill Country? Do they want to have them in South Texas? Do they want to have them in East Texas?" Those are, those, because of the conflict between man and this, this predatory species, those are really probably more pressing than a maintenance mode for West Texas. It's like, what do we want this future look like for mountain lions, and are we you know, I know there's going to be some that certainly want mountain lions in those regions, but is that the best thing for, for Texans and for production and conservation? And I don't have the answers to that. And that's something that, you know, certainly Texas Parks and Wildlife Department and certainly the Texans at large need to, you know, kind of grapple with a little bit.

**David Todd** [00:38:45] Well, when you when you think about the, you know, the risks and threats for mountain lions, do you think that it's, it's sort of a habitat fragmentation. You know, you mentioned the Eagle Ford development and some of the split-up of these big ranches in south Texas, or do you think that it's trapping in west Texas or hunting in south Texas? What do you think the big risk posed to these animals?

**Louis Harveson** [00:39:18] You know, it's a little bit of everything, certainly the, the acute part of that is the causes of mortality right? It's, it's in west Texas that is certainly trapping. That, that's the number one cause of mortality. In the studies we've done, and pretty much every study that's been done in West Texas. In South Texas, where there's only been one study, it wasn't trapping per se. There were some animals that were trapped. And they were

really kind of a byproduct of trapping for coyotes along fence lines. But it was really the incidental take from deer hunters. And so a deer hunter sitting on a stand; they're waiting for the deer to come by, and they see a mountain lion and they have that ability with their lease or their agreement with the landowner, to take that animal. And so I think 75 percent of our mortality in South Texas actually came from incidental take from deer hunters.

**Louis Harveson** [00:40:12] Now, when we talk about kind of more landscape level, you know, urbanization, habitat fragmentation, you know, mountain lions need space. Obviously, they need, they need food. So they need they need deer-like animals. And they can make a living on much smaller animals. But they really need, they evolved with a kind of deer, whether it's down in Peru, you know, with guanacos and all these other things, they need a deer-like animal to really carry them.

**Louis Harveson** [00:40:41] And they need water. Of course, they get a lot of that from the prey that they consume. But today there's so much, there's so much more water out there because of ag production that that's usually not a factor.

**Louis Harveson** [00:40:53] And they need cover and so cover in South Texas, which is just relatively flat, that was from, you know, shrubs. That was screening cover from mesquite, and guajillo, and huisache and sacahuista, all these species that are just that thick thorn scrub that that characterizes South Texas brush country.

**Louis Harveson** [00:41:14] In West Texas, cover is really more topographical. And so they need to hide behind rocks and to you know, they're, they're really an ambush-type predator, so they can outrun prey in the short term. But they're not really built for these long-term, you know, marathon type of chases. And so it's really a quick, it's an ambush. So it's a stalk-and-ambush type of hunting system. And so they need that cover with again boulders and shrubs and things like that. And most of the times they get that from the slope of hills and things like that.

**Louis Harveson** [00:41:50] So they're very used to, you know, south Texas, west Texas, two very different ecosystems. But we also have that. We have that in the Hill Country. We have that really in a lot of our rural areas of the state. So even when you find, you hear about mountain lions in, you know, outside of Dallas or whatever that is, most likely that animal followed some sort of riparian corridor to, you know, an urban situation. And I think once they realize that, it's like, all right, this isn't where I need to be. They, they try to find a way out of it.

**Louis Harveson** [00:42:26] So it's a little bit of everything. And certainly the mortality factors and it's also the habitat and really the land-use changes that are occurring in this state. You know, we are very much an urban state today, as opposed to rural. And so there's actually pros and cons from a land-use perspective. But, but as we start chopping up our really big iconic ranches, that's more fences, that's more roads, that's more people. It just, it's going to put more and more stresses on our resources. And our, our apex predators are going to be one of the first things that probably go in a, a ranchita type of environment.

**David Todd** [00:43:11] So when you're thinking about, about trends in these animals, how much confidence do you have in the numbers, in the data? I mean, given that, as I understand, it's not required to report a mountain lion harvest in Texas.

**Louis Harveson** [00:43:34] That's correct, and, you know, even in the '90s, when I, when I jumped into the kind of the mountain lion world, you know, the Department at the time was really even touting sightings. And, you know, they, they after getting beat up a couple times, they pretty much abandoned sightings. I think they still track it, but they don't show it to the public because it's, you know, one thing I learned is that mountain lion sightings, everybody wants to see one and they're, they're almost contagious. And so they think they see it because they saw a bobcat, or they saw a Labrador retriever. So sightings in general are just really poor indicators of population levels.

**Louis Harveson** [00:44:15] Mortalities can be adequate for understanding trends. But you pointed it out, they're voluntary. So until it is mandatory or it's, you take out that bias associated with that, it's not going to tell us a whole lot. I will say that, you know, I haven't looked at it in the last year or so, but most of those mortality records have maintained for the most part. And again, most of those, again, over 90 percent of those actually occurring in the Trans-Pecos region, as opposed to in other regions of the state.

**Louis Harveson** [00:44:50] You know, they're I'm a, I'm a, I'm a researcher. And so data is my, my fuel. And so I'm a big proponent of trying to get better data for species like this. We have a non-game species that's so secretive, nocturnal, all these kind of things. You need data. And so I am a proponent of, of, you know, instilling some sort of mandatory harvest or reporting system by, by everyone in the state.

**David Todd** [00:45:22] And when it gets into the sort of the politics of predator control or harvest report requirements, what do you see? I mean, it seems like this animal is brings up strong feelings.

**Louis Harveson** [00:45:42] No doubt, I think any, really carnivores in general, it brings out, it's very polarizing any discussions about carnivores and I, I get it. I mean, I work with a lot of ag producers and I'm absolutely sympathetic to the losses that they take. And there's, you know, mountain lions, if you grew up raising sheep and goats, you don't like mountain lions. It is inherent to your being that you don't like mountain lions because, you know, your grandpa or your dad or somebody got hit by mountain lion depredation. And there's, there's accounts in the literature of mountain lion killing, you know, 50, 100 sheep in one night. And they do it because they can. And we have, we've, you know, domesticated some, some, a lot of our livestock to the point where they don't even know to run when a predator is there. So that's, you know, that's not on anybody, but it's just the fact that they, and if that is your livelihood, then I absolutely understand that.

**Louis Harveson** [00:46:51] And so there's got to be a balance to allow take when it is truly a protection of property like that versus the conservation side where we're trying to either maintain 'em or increase their number, whatever that, that conservation future is for from mountain lions. So it's, it's real. I mean, those losses are real. And I'm absolutely sympathetic to that. And anyway, I just I think it's important to say until you walk a mile in their shoes, right, you really don't fully understand that relationship with, with certain species.

**David Todd** [00:47:32] Sure. It sounds like, you know, it can be really costly. One, one bad night, and you know, a bunch of your herd is gone. And I read that... I'm sorry.

**Louis Harveson** [00:47:45] Well, I'll say it too, that I will say that, you know, in south Texas, we had, I don't know, maybe a dozen mountain lions collared at one time. And in this 3600 square kilometer study site, which was just enormous, you know, there were probably only

seven sheep in that whole study site. And I'll be damned if, if a lion, not one of ours that was radioed, but if we didn't have a mountain lion get in and kill every one of those sheep. And so that, you know, that, that probably had more influence on my understanding the ag side of this than anything else. It's like, it's just in one night, you know, one, one bad lion, you know, has an impact and is going to, you know, those were show and, you know, I think they were they figured out they had insurance on the animals, things like that. But it, it just isn't just something that people talk about. You know, it's for me, it was something that I witnessed first-hand. And, you know, again, was extremely sympathetic towards that producer that lost his sheep.

**David Todd** [00:48:53] Yeah. Yeah. I can see that. It probably is a lesson, you learn it once and you never forget it. So I think you mentioned when we were discussing your interview before that this may be a little bit outside of your, you know, interest and scope, but do you know much about the the background of predator control and bounties in Texas?

**Louis Harveson** [00:49:24] Not, not as well as I probably should. Certainly, you know, different counties, certainly state agencies, federal agencies - there, there have been various systems, you know, dating back to the, you know, 1920s or so. And so it's a, it's part of our culture really is the bounty system and predator control. But it's not as rampant as it once was. You know, there are still government trappers across the Western states. There's still some in Texas and in West Texas, out here. But, but it's not nearly as prevalent as it was even, even 15, 20 years ago.

**David Todd** [00:50:09] And why do you think that there's been that change?

**Louis Harveson** [00:50:14] You know, I don't know if that's an attitude change by, that's the, you know, state legislature or Congress or, you know, the funding impact, or if that's just a reflection of the value change that we're seeing in really the societies today. As our, as our populations in Texas, which is occurring, becomes more disconnected from agriculture and natural resources, they have less tolerance for those kind of programs. And so it's all kind of falls up into one big, messy thing. But I think it's several things going on. And so, you know, what that future holds, I don't know. And certainly, you know. I know in Trans-Pecos, for example, you know, 30 years ago, we had twice as many livestock on the landscape as we do today. And so the land use, how, how ranchers, how landowners, are using the landscape is changing. So there's a lot more recreational ranching, not as much livestock production, certainly sheep and goat production in Texas is nothing as what it was back in the '80s. And so that, that changes. And, you know, and anyway, we'll get into some of the diet stuff later, but it's, it's really just all these things changing at the same time and really the values of people and their perceptions and what is important to them if they're not making their, their, you know, living off the land, they're probably more tolerant of having mountain lions.

**David Todd** [00:52:07] Mm hmm. Yeah. Yeah. It's so interesting, you know, people's attitudes and backgrounds and how it affects their, you know, their thoughts about an animal.

**David Todd** [00:52:23] So one of the things I found really intriguing, and I'm sure you know more about it than I do, but is the discussion that I guess has gone on for close to 30 years about the mountain lion's status as a game species versus non-game species, which I understand it's still considered. Can you give me a little bit of insight about, you know, why there's been this resistance to pulling it into a regulated game species with a bag limit and season and so on?

**Louis Harveson** [00:53:00] And I guess just some back story - so I guess clarification that mountain lions in the state of Texas as of today, are classified as a non-game animal. And so, you know, the way you really interpret that is that, you know, they, they can be killed legally in any, any fashion and there's no bag limit. So it's just, you know, they're, they're not, they're a step above varmints, I guess, and which, which I'm not sure if is really a classification at all.

**Louis Harveson** [00:53:35] And so there's a lot of folks out there, and certainly more in urban areas than rural areas, that have really contested that. And back in 1991, I think it was the Lone Star chapter of the Sierra Club made a petition to change the status of mountain lions. And at that time, Texas Parks and Wildlife, you know, took a deep look at what they knew about mountain lions and what they didn't know. And then actually they funded, they prioritized funding for two projects, one in south Texas, which ended up being my dissertation work, and then one out here in west Texas, at Big Bend Ranch State Park, which was a newly acquired property. So those two sister studies went on for three or four years, gathered a lot of really good baseline information about mountain lions in their respective regions and then, you know, made that that data available to the department - information on diets and movements, survival rates and things like that - with the idea that, you know, here's, here's, here's the baseline. This is what we know.

**Louis Harveson** [00:54:45] Now, we're not saying, you know, anything needs to be changed, but there were some things that, you know, brought, you know, got people's attention, especially with regard to survival rates. So, for example, in south Texas, you know, again, we talked about the how, you know, the major mortality factors associated with south Texas versus west Texas. Well, even, even, let me go to west Texas first. So the study was on Big Bend Ranch State Park, which really was a refuge. So it's a, you know, a couple of hundred, or one hundred twenty five thousand acre property. And there's traffic outside of that property. Well, three quarters of the lions that were on that ranch died from trapping off the ranch.

**Louis Harveson** [00:55:32] So that says several things. One is that trapping can be high, trapping mortality can be high. And it also says that even a large property like Big Bend Ranch State Park, isn't large enough, necessarily, to protect, to serve as a true refuge. Now, there is refuge within there, but from a population level, it probably isn't an adequate size to protect that population.

**Louis Harveson** [00:56:01] On the flip side is in south Texas, the survival rates were about 60, 70 percent for, for that population. And so for a population that that is on the fringe of their distribution, that was actually a higher, higher mortality rate than we anticipated.

**Louis Harveson** [00:56:24] So getting back to your question.

**David Todd** [00:56:28] So, I may be a little muddy here. So the survival rate in South Texas was 60, 70 percent of what you're seeing out in West Texas, they were dying in greater numbers, at earlier times. Is that right?

**Louis Harveson** [00:56:42] Yes, correct.

**David Todd** [00:56:43] OK, OK. Got you. I'm sorry to interrupt.

**Louis Harveson** [00:56:46] No, that's fine. I'm trying to think we're where we were going with this, David.

**David Todd** [00:56:52] Well, so you're talking a little bit about, I guess, the whole game/non-game discussion and then Texas Parks and Wildlife had these two studies, one of which was yours, to try to figure out what, I guess, the movements and mortality and diet were like.

**Louis Harveson** [00:57:10] And so, yes, thank you. And so the really the recommendations, I think, that came out of those studies was that mortality was high for both populations. They're both exploited. You know, private, it really comes down to the private landowner, regardless of the public land in west Texas, the private landowner is really in the driver's seat on the conservation future of mountain lions.

**Louis Harveson** [00:57:38] I think some of our recommendations were, you know, mandatory, you know, reporting on mortalities, you know, the fact that they're genetically distinct and they had some different demographic rates that also, you know, we recommended that they be managed differently. And so there's been several different ideas that have been kind of proposed, nothing really formal about what we, you know, how do we want to move forward on management of mountain lions in the state? And that's, you know, whether that's, you know, right now we treat every lion in the state the same as, you know, could you protect mountain lions in some ecoregions and then not change things in others? And so there's, there's, there's, you know, a gamut of options from a management standpoint that, that really needs to be looked at.

**David Todd** [00:58:39] You know, you, you explained, I think, in a really visceral way, the conflicts between livestock raisers who've got sheep and goats where, you know, you lose a score or more in a night. I guess the conflict now, maybe, is more of somebody who's leasing the land for hunting and, you know, or he or she is seeing deer being lost or, is that the endangered species folks that are trying to reimport mountain lion, mountain sheep rather, and who are worried about those repercussions or what do you think the resistance is to, to control and take on these mountain lions?

**Louis Harveson** [00:59:27] You know, the I think the biggest thing from, from a landowner perspective is, is, you know, these are very independent people. And they, they, they want to manage their property in the way that they want. And so, you know, what we, what we hear a lot about is overreaching policies, things like that. And so that's still really at the core to, I think, Texas landowners. And so a lot of landowners choose not to harvest and, you know, they have a moratorium on trapping or shooting mountains and things like that. So there are landowners that do that.

**Louis Harveson** [01:00:07] So it's, it's going to be a challenge, whatever that is, it's going to be painful, whatever that is, if change is coming. You know, I do think there are opportunities. You know, one thing that we found in our West Texas study tracking, you know, 25, 27 different mountain lions is that of all the kills that we documented, over 200, we didn't find any livestock at all. And so that, two things going on: one and I don't know if I can really say this, but mountain lions were behaving well. But the other part of that is I think that the livestock industry, especially in really, really good mountain lion habitat, they've adapted. They know how to curtail their loss by, you know, not having calves on the ground certain times a year, moving out of this canyon, or off this mountain or whatever that is. So, you know, we're, we're kind of coming to a balance a little bit with that. And I think to really commend that the ag producers for, for modifying it.

**Louis Harveson** [01:01:13] Now they're there still is a lot of trapping going on. But, you know, it's really very few individuals that are trapping as a, I guess, as a, as a way of life. There

are a lot more ranchers trapping because you have one trapper that may run, you know, three or four different ranches and things like that. So it's, it's, things are changing. Land use is changing. I think the absentee landowners in west Texas, again, I mentioned this earlier, they are much more tolerant. And so you, you really have these almost organic refuges developing because of the absentee landowners, because they're not producing agriculture.

**Louis Harveson** [01:02:02] But you do have, you know, some of the hunters and ranchers, like you mentioned, are concerned about their deer. But I think that's, I think a lot of that can be dismissed. Now, I will say, you know, when you come up on a mountain lion kill and it's that trophy buck that you were hoping that your son can shoot or something, that's, that's gut wrenching. But the reality is most, most of those mortalities are not of the trophy deer. They're, they are younger deer that, maybe older deer that need to be taken. And as we're growing deer in west Texas with artificial feed, mountain lions actually are our friend, because we're having a hard time, I think, with some properties that are under the management deer permit of keeping our numbers down. And so in that case, the mountain lion is helping you. Now, ideally they would only be killing does and things like that. But they, you know, they're going to be opportunistic. And certainly what we've seen in the literature and even in our own studies is at certain times of year, you know, there is a propensity for mountain lions to kill bucks, like post-rut when they're really weak. They're you're going to find more bucks, generally. But in certain other times of year, it's going to be fawns and yearlings and things like that. So, you know, it's there's nothing more complicated than the politics of predators.

**David Todd** [01:03:27] Well, you know, speaking of predators, I think it's been interesting in my little neighborhood in the center of Austin, there's been a great deal of upset because there's a coyote that is roaming around eating people's cats. And I'm curious if the spread of coyotes or feral dogs is in part due to the control of mountain lions and that these, you know, these animals are coming in as sort of substitute predators, taking the role of what typically would have been a mountain lion's position.

**Louis Harveson** [01:04:08] You know, I've certainly read about similar hypotheses on that, especially like in Yellowstone with wolves and coyotes. And but I, hard to say in Texas, because I really don't think that the densities of mountain lions have ever been really high. We've had a lot of lions, but it's been spread out throughout the state. But I just, I'm having a hard time believing that, you know, we know mountain lions from our studies, mountain lions kill coyotes, but it's not all that common in the study sites that we've worked in, it's, it's still pretty rare. So whether they can help keep coyotes in check or keep feral hogs in check, I'm not sure I'm on board with that yet.

**David Todd** [01:04:59] Mm hmm. OK. Gosh we've covered a lot of ground. I don't mean to use up all your day, but I have a few more questions if you still got some time.

**Louis Harveson** [01:05:13] Absolutely.

**David Todd** [01:05:15] Well, so to circle back a little bit, you talked about the strength of the populations in south Texas, and west Texas and to an extent in the western part of Edwards Plateau. Do you see any signs that the mountain lion is recolonizing East Texas or other parts of Texas, either on a transient basis or a resident?

**Louis Harveson** [01:05:45] You know, you, I'm sure you saw in the paper, what, three months ago or so, the mountain lion that was caught on film or on camera around Dallas, and then



there was a human fatality that I think some sheriffs really (poorly) pointed to the mountain lions, and it was some later it was not mountain lions.

**Louis Harveson** [01:06:07] You know, I think we're always going to experience those kind of outliers. You know, we, we had a mountain lion that was I think it was road-killed in east Texas, you know, probably 15 years ago. And genetically, they were able to track trace that back to a New Mexico population. So that animal dispersed across the entire state, basically. And so the animal has the potential to move far away. And just because you, you find a road kill or somebody catches one on camera, that doesn't mean you have a viable population. That means you have one animal that's in the region and there's a good chance that it's not going to stick around.

**Louis Harveson** [01:06:49] Now, the true indicators of really colonizing in my mind are when you have a female with cubs. That to me says, OK, well, you've got the start of something there. But I think it's been so rare and, you know, if Parks and Wildlife had better data on their mortality, especially kind of those, those obscure records across kind of the eastern part of the state, I think you'd see a lot of those are younger animals that are truly transient. And probably more often than not, those are going to be males because males inherently disperse further than females do. Females usually don't move far from their, their natal birth site. They'll, you know, maybe a couple miles or maybe ten miles. There's nothing like the, you know, hundreds and thousands of miles that have been documented with the males.

**David Todd** [01:07:45] Well, and speaking of moving lions around, I understand that in the past, not too distant past, Texas mountain lions have been trapped and carried to Florida to try to boost the, I guess, the genetic viability of the panther population there and do you know much about that whole story?

**Louis Harveson** [01:08:16] You know, I've read long, long time ago, David, some of the the foundational work on that. But I don't think I can adequately speak to that because I don't even know if it's still on-going or not.

**David Todd** [01:08:31] OK. Well, here's another question that doesn't go very far, but it goes back in time a long way. I understand that there are some pretty intriguing rock art signs out in the Seminole Canyon area, that indicate that there, there was interest by the native people in mountain lions, you know, hundreds, maybe thousands of years ago. And I was curious if that's something that has caught your interest or if there's anything you can tell us about that?

**Louis Harveson** [01:09:09] Well, I, it certainly does. And, you know, the Native Americans are so, well, one of them personally, I'm, it's hard to interpret, I think, a lot of the pictographs that they have left us and so forth. But, it, you know, it does speak to the fact that you have such a wide ranging, I mean, other than man, it's the, it's the widest-ranging mammal we have in the Americas. And if you think about the, the names that are interchanged with, with, you know, scientific name *Puma concolor*, you know, we've got puma, mountain lion, cougar, panther, painter. There's, there's many, many more. It really speaks to the cultures that interacted with, with, with mountain lions.

**Louis Harveson** [01:10:03] And so it's just, you know, obviously the, where I started this conversation about the respect and awe that I think humans have with this species obviously goes even way further back than you and I can even fathom. And just their interactions with those animals and obviously that's, that's an animal of reverence that they, you know, it probably didn't, didn't see, you know, that often. But when they did, it was enough. It was

noteworthy where they put it on their wall. So just, you know, I love that. And it, to me, it really speaks to the, the value that humans and the relationship humans have had for, you know, tens of thousands of years with, with such a beautiful creature.

**David Todd** [01:10:58] And I guess sort of speaking to that, you know, affection or awe, respect that people often have for these animals, I understand that some go so far as to adopt them as pets, and I guess that's a circumstance that doesn't usually end very well, but is there anything you can tell us about, you know, how that comes about and how you resolve those kind of situations where somebody, you know, starts out with a cute mountain lion kitten and ends up with a several hundred pound apex predator?

**Louis Harveson** [01:11:40] Yeah, and I'll be, be honest, I'm taking my scientist hat off and I'll just say that I'm not a fan of that. I you know, wild animals should be wild. You know, there's, there's certainly a trade. It's amazing what people will pay for. And even, even in the '90s and 2000s, you know, there was a lot of question on some of these lions that would pop up in, you know, kind of obscure places like Dallas. Say, well, was that a, you know, is that somebody's pet that just outgrew their owner or got away? And so, you know, it makes it, the biologist's job, difficult to be able to, you know, when you find a carcass, you say, well, does it still have claws? Because it could have been a released pet. Does it still have its canines, because they may have, you know, surgically removed their canines.

**Louis Harveson** [01:12:32] I mean, so there's just so many things that make it more complicated to sleuth some of these sightings and mortalities that shouldn't really be in there. And you know that, that's going to take probably legislative action to curtail having mountain lions as, as pets or as training. You know, there's, there's some hounds people that that do that. They capture live mountain lions and keep them in captivity. And that way they can train their dogs. And again, I'm not a, I'm not a big fan of those practices.

**David Todd** [01:13:10] And, well, we could start to wind down here. You've worked with mountain lions for, gosh, a generation. What do you foresee for mountain lions in, in Texas? What do you, what do you expect might be the major trends for them?

**Louis Harveson** [01:13:33] Well, I'm, I'm the eternal optimist, and I think, I think Texas and the voters and legislators and the department and, and really the landowners, as I spoke earlier, I think people want to keep mountain lions. I mean, I don't think anybody, even the best trapper out there, doesn't want to eliminate mountain lions. And so that's a positive thing.

**Louis Harveson** [01:14:01] But there are, again, those questions that I posed earlier about, you know, figuring out what we want. And, and you touched on it with the bighorn sheep question and the mule deer question. You know, any mountain lion management plan ultimately comes back to the prey and, you know, man's challenge or debate or love / hate relationship, whatever you want to call it, with, with carnivores really comes down to competition. That's really at the heart of that.

**Louis Harveson** [01:14:36] And that's competition for livestock. Mountain lions are killing livestock that we want to eat or is our property. It's competition for the deer that we want to harvest or deer that we, you know, nourish on our properties or whatever that is. So it's, that's been there for, again since, since the pictographs that you described over, you know, tens of thousands of years ago. And so I don't know if that will ever change.

**Louis Harveson** [01:15:02] But I think the state is changing. I think the attitudes, I think, you know, the traditional landowners are finding ways to manage their livestock better, their, their habitats better. They think bigger. The younger generations are challenging them to think a little bit bigger. Certainly, absentee landowners come in with a very different approach to land ethics and land stewardship. And so all these things, I think, are positive.

**Louis Harveson** [01:15:37] You know, the biggest challenges are the ones that are just, you know, they're huge. They're things out of control, like population growth and fragmentation. And those are the things that are really, you know, that's going to be the challenges of the next generation, is how do, how do we deal with that? How do we still have open space and water and dark skies and migratory corridors and all these things that we all cherish in our natural world that we have here in Texas when we have, you know, what a thousand new Texans every day come to the state? So it's just, you know, those, those are the big things. Those are the things that keep me up at night.

**David Todd** [01:16:21] Yeah. I hear you. That's, that's sort of beyond the fence issues that a private landowner, or even a state legislator, can't really control -just the onslaught of people coming and having babies and, you know, growing communities and so on. Well, that's fascinating.

**David Todd** [01:16:45] Well, I guess just a last question: is there anything you'd like to add about your experience in research and study and teaching your students about the natural world?

**Louis Harveson** [01:17:02] Well, just I guess just parting thoughts as just, you know, we do have one of the most ecologically diverse states in the country. Land stewardship is at the core of what we do today. And conservation really does start and stop with the landowners. And landowners, you know, my experience is that landowners are hungry for information. They, they take their, their jobs seriously, whether it's on mountain lions or black bears or hummingbirds or whatever that is. They, it's to their core, their, how they view and cherish the land and the resources that live on that land. And so I think we're, we're in good hands.

**Louis Harveson** [01:17:48] You know, we need to do better. I think as time progresses and all these challenges we just spoke of, we got to do better. We got to do more with less. And that's, that's from a, you know, population level or habitat level, whatever that is. We just, we just got to be a lot more efficient with how we conserve natural resources. And that, that has all sorts of layers there. But I'll leave it at that.

**David Todd** [01:18:16] OK. Well, good, good points. And thank you so much for taking time to explain your thinking about all this. It's a complicated field. I really appreciate your advice and thoughts. So thank you, seriously.

**Louis Harveson** [01:18:32] You bet. David. Any time. And I'm so excited to see what your, what your next chapter, what your next interview, is going to be.

**David Todd** [01:18:41] Well, good. I, I am looking forward to more interviews like this. They're just a joy. So thank you very much.

**Louis Harveson** [01:18:48] You bet. And if there's, as you look through our, our staff, you know, there's somebody else we can pull into the loop or on anything, just let me know how I can help with that.

**David Todd** [01:18:59] That's great. That's a very sweet offer. I appreciate it. And I hope to stay in touch. Thank you so much.

**Louis Harveson** [01:19:05] Absolutely. Pleased do. Bye bye.

**David Todd** [01:19:06] All right