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David Todd [00:00:03] Well, good afternoon, where I am in Central Time. Good morning, where Dr. Elbroch is.

David Todd [00:00:11] My name is David Todd, and I have the privilege of being on the line with him, Mark Elbroch. And with his permission, we plan on recording this interview for research and educational work 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 at the Briscoe Center for American History, which is at the University of Texas at Austin.

David Todd [00:00:41] And, I want to stress that he would have all rights to use the recording as he sees fit as well.

David Todd [00:00:47] And, before we went any further, I just want to make sure that that's okay with you.

Mark Elbroch [00:00:52] Yes. Yes, indeed, it is fine.

David Todd [00:00:54] Great. Okay. Well, thank you. So it is Saturday, February 25th, 2023. It's about 12:10 Central Time, 10:10 a.m. Pacific Time, where Dr. Elbroch is.

David Todd [00:01:12] And my name is David Todd. I am representing the Conservation History Association of Texas, and I am in Austin. And we are conducting a remote audio interview with Mark Elbroch, who is based in the (I'm probably going to mispronounce this) Sequim, Washington area...

Mark Elbroch [00:01:32] "Squim".

David Todd [00:01:32] Near Seattle.

David Todd [00:01:33] "Squim".

Mark Elbroch [00:01:34] We're about 100 miles west of Seattle.

David Todd [00:01:37] I see. OK.

David Todd [00:01:41] Dr. Elbroch is an ecologist and a writer and an animal tracker, among other things. He also serves as director of the puma program at the international non-profit known as Panthera. And there he develops and carries out science-based conservation strategies for mountain lions.

David Todd [00:02:01] Today, we'll be talking about our Dr. Elbroch's life and career, to date, and especially focus on his work with the mountain lion, including some of his recent research and insights about lions status and management in Texas.

David Todd [00:02:17] So with that little preface, I thought we might launch and ask you about your childhood and if there were any family or friends or experiences that might have encouraged your interest in the outdoors, and tracking, and animals, and wildcats, and so on.

Mark Elbroch [00:02:36] Sure. Let me think of some of the things I should mention. So I grew up in a, as a dual citizen. My father was in the U.S. military, and stationed overseas where he met my mother in England. And so I was born in England and sort of had both of those cultures growing up. We moved a lot because my father was in the military. I never lived in Texas, but we did live in Oklahoma for a number of years when I was a child, which is, of course, nearby.

Mark Elbroch [00:03:16] And, certainly there are, there have been folks who've influenced how I perceive the natural world and interact with it. More, I'd say as a child, most importantly would be my grandfather on my mother's side. He was a great natural historian, kind of a hobby poet. He was, you know, had a checkered career in military and other things for the British government.

Mark Elbroch [00:03:47] They grew up themselves, or excuse me, my mother grew up herself while he worked in India, Pakistan and various other places. And so he was a great influence in sort of just learning about birds, plants, animals. And we would take great walks through the British landscape, you know, sort of as he sort of talked about these things.

Mark Elbroch [00:04:16] And then, the other sort of interesting character when I was a young man was my great uncle, again, on my mother's side. He had a position at the Natural History Museum in London. And so it provided an opportunity for access that not everybody had. So we were able to wander some of the back rooms and hallways and see scientists unearthing dinosaur bones and all sorts of things, as well as the exhibits themselves of all the sort of stuffed animals and animals from around the world, etc.

Mark Elbroch [00:04:51] But yeah, I'd, you know, as far as my family tells me, I was sort of born with an interest in wildlife and they just had to minimally cultivate it, you know, it was just already there. And that's sort of what's driven my life since as long as I can remember.

Mark Elbroch [00:05:19] So, other things that I think are kind of worth noting is that I'm a strong believer in that people are programmable and that our world views are really a culmination of our experiences and the people we've met along the way.

Mark Elbroch [00:05:38] And, I think relevant to our discussion today, and into the history of Texas, is that I didn't grow up in a what I would call a traditional American hunting family, where sort of hunting is sort of the, sort of ... The way hunting is discussed in the United States, it wasn't part of my upbringing. And the way I was introduced to hunting was through my interest in wilderness skills and survival skills. And so it's all been about food.

Mark Elbroch [00:06:18] And so, I am a hunter. And but I don't, I really think of it as, you know, as a way of interacting with the natural world. And that, you know, that's sort of the approach that I, that I take with hunting is that it's about participation, and participation in an

ecosystem, and that I also really strongly believe that people are part of the natural world and that we are animals and that we should and always have been participating in nature.

Mark Elbroch [00:06:59] But it is different than, you know, sort of the sort of traditional hunting heritage of the United States. Like, as an example, personally I have, I just don't understand the whole fair chase emphasis. That's a dogma that just doesn't make sense to me because I'm interested in food. I'm not interested in sport. And so, yeah, it's just a different way of viewing the world.

David Todd [00:07:30] Well, I think it's really interesting that your attitude about hunting may have a lot in common with the sort of pragmatic concerns of an animal that may have four legs rather than two. So maybe we could talk about that down the road.

David Todd [00:07:49] So, you had an interesting academic career, going from the elite boarding school of Exeter, to the University of New Hampshire, and then on to UC Davis, where you got your Ph.D. And I was curious if there were any teachers or classmates along the way, that might have, again, you know, inspired your interest in wildlife and conservation.

Mark Elbroch [00:08:17] Yeah, I've had a circuitous path of education and a sort of an academic education and lots of non-traditional teachers along the way. Yeah, I was a scholarship student at a prep school in New England, which was an incredible experience. I feel like the greatest benefit of attending that school, or the two, I'll say, or one is that it exposes you to other kinds of people. You know, we had something like 30-something states and 30 countries represented in my graduating class. I mean, it was a real mixing pot of people. And the other is that it encourages you to learn how to teach yourself something. So if you have an interest, you pursue it.

Mark Elbroch [00:09:10] And, that is something I've carried, you know, sort of beyond those years. And I took a really, yeah, winding path. I left university almost immediately and I didn't, it took me ten years to get an undergraduate degree. I started my graduate work when I was 35. And I just sought all sorts of learning opportunities along the way, mostly to do with, you know, the natural world, learning survival skills and tracking skills and wildlife skills and just reading anything and everything I could about natural history and things like that.

Mark Elbroch [00:09:49] But with regard to your question, I mean, there certainly, I had some some decent teachers along the way in schools. Going back to Exeter, there was one one teacher there who did have coursework in marine biology, ornithology, which is the study of birds, and some other things. And so his name was Mr. Aaronian and so he was passionate about these subjects and certainly that was an inspiration at the time, you know, being young and just easily influenced.

Mark Elbroch [00:10:31] And so from there, I mean, I, my, you know, looking sort of to my later years, you know, in terms of professors at the University of California, you know, one in terms of conservation would be Mark Schwartz, who was a professor that really role-modelled this idea of working on conservation and not just ecology or studying animals, but actually trying to to see how to make a difference in the world.

Mark Elbroch [00:11:06] But, you know, but I think, you know, more importantly, were the folks I met in between, you know, I, with regards to tracking, I think the two folks I would highlight are Paul Rezendes who I was lucky enough to work for for a number of years. And

he's based in sort of central-ish Massachusetts in a very rural part of the world. And he wrote the book "Tracking and the Art of Seeing".

Mark Elbroch [00:11:34] And then, from there, I was lucky enough to kind of again, there were lots of things that happened in between, but to work with Louie Liebenberg, who was a man who studied tracking and worked with lots of indigenous folks in southern Africa. And he was the one who created the system of evaluating field skills. And he's done a number of things, but he also created a software so that folks could gather data on wildlife with visual icons rather than the written word, so he could engage communities that had been, you know, overlooked in terms of their knowledge about wildlife and what they could contribute to conservation.

Mark Elbroch [00:12:17] So, those two people had a great influence on sort of how I view, or at least look for, evidence of wildlife in the field. And, yeah, as I said, you know, lots of folks in between.

Mark Elbroch [00:12:33] And I was a voracious reader, you know, certainly as I transitioned out of high school especially, I just, like, read natural history books forever. You know, just years and years, where if it wasn't a natural history book, I didn't think it was, it should be worth my time.

Mark Elbroch [00:12:51] But, I read lots of, I mean, looking back, they weren't necessarily hard science books. They were sort of people sharing stories about their relationship with nature. But anything that would teach me about animals as well, anything. I loved, you know, I loved Rick Bass and Richard Nelson and Doug Chadwick and Thoreau and George Schaller and, you know, Jim Corbett, you know, sort of the the hunter that talked about hunting man-eating lions and tigers, and Ardie Lawrence and Hope Ryden and, you know, Barbara Kingsolver and Terry Tempest-Williams.

Mark Elbroch [00:13:28] I mean, it just goes on and on. I've got shelves of books. I'm a great fan of books.

Mark Elbroch [00:13:37] But yeah, that's a bit about sort of my early years.

David Todd [00:13:41] That's very helpful. It's always nice to know where people start. You never know quite where it may lead, which is really the great surprise and wonder of it all.

David Todd [00:13:54] So one thing I thought there was was very interesting is that you have learned and practiced tracking and following wildlife, but that you also collected a degree in sign language. And, and I was just really interested in whether there, for you, is a connection between those two skills in trying to read messages that most of us miss - silent messages from those who have hearing difficulties or or animals that don't communicate to us in, you know, human ways.

Mark Elbroch [00:14:42] Yeah, that sort of, I mean, my interest in American Sign Language is, you know, I just was fascinated with the language and I still think it's beautiful and it's a, it's a wonderful, it's just a beautiful way to communicate with people. And I appreciate the language and what it brings, you know.

Mark Elbroch [00:15:04] But I mean, it's, you know, life is strange, right? So when I was at the University of New Hampshire, finally had, like, recommitted to going back to school. And I

needed a degree and I assumed it would be wildlife, given that I'd already been working in the field, joining research projects and, you know, my fascination with following animals and finding animals and catching animals, etc. And, the Wildlife Department was temporarily closed to new students due to a faculty shortage.

Mark Elbroch [00:15:41] So, I, you know, I just, like, just the way things go, right? So I had to pick a degree and, you know, I was, kind of wanted to get it over with, in many ways. So at first I began in the shortest degree they offered, which was psychology. And they, you know, so I took the intro courses in that and simultaneously took any wildlife course I could that they would allow me to enroll in. But I was never allowed to officially major in it. So that limited my ability to participate in the upper level courses.

Mark Elbroch [00:16:17] And, but, along the way I needed a a year of language. And so I had grown up in taking French and I was horrible at it. Seven years of French and I still can't really put two sentences together. And so I, I had seen people communicating with American Sign Language and I was just sort of curious about it, and the school I was at offered, lo and behold, one of the best American Sign Language and sort of sign language interpretation training programs in the country. Again, just, these are the random things that happen to one in life.

Mark Elbroch [00:16:59] And so, I took a year of sign language as my foreign language and just fell in love with it, just really enjoyed it and found that I you know, as opposed to French where I struggled and struggled, I just seemed to naturally, or at least more naturally than some of my classmates take to American Sign Language.

Mark Elbroch [00:17:22] And to get to your question, the connection that I kind of felt about it is that I, I do feel like following animals, in particular tracking, is supported or benefited from a visual way of thinking. So, I often see in pictures or in movies, you know, like sort of cinema in my head, like when I'm following an animal trail and I'm sort of watching the animal in front of me and watching what it's doing based on the tracks.

Mark Elbroch [00:17:57] And that way of thinking, sort of in pictures, of course, is a sort of a natural bridge to American Sign Language, which is a visual language. And the way, and not only is it visual in the sense that, you know, you can see people using their face, you know, there's facial markers for grammar and all of these things, as well as their hands, of course, in conveying language.

Mark Elbroch [00:18:25] But, the way the language operates, sort of the function of it. So, you know, there's a, you know how to describe this to you? So there's two things that are important: like in English, when you want to add information, you add words. So it's sort of the line gets longer. So you think of this linear communication style in which you keep adding elements to it so that you can convey more information. Whereas, American Sign Language allows you to kind of add depth without length, so that you can convey more information by doing something simultaneous while you're doing, you know, a hand movement or a facial expression, etc.

Mark Elbroch [00:19:08] And so, you could, you know, sort of pack information in a really deep way that is difficult to do in a linear language. And so that, again, it sort of speaks to how a picture conveys a thousand words, you know, as the expression goes. And there's a reason for that because it conveys lots of information at the same time.

Mark Elbroch [00:19:30] And then, the other way is that, it's when you sort of set up language, like in English again, you might say the cup is on the table. Whereas in American Sign Language, you would say, you would create the setting first, and then place the cup in it. So you'd say, you know, there's a table and there's a cup on it and that is really a much more visual way of thinking because you kind of describe what's there. You know, you set - everything's in a setting rather than just hanging in, you know, without a setting.

Mark Elbroch [00:20:07] And again, that sort of natural link to visual thinking, as I used to call it, to wildlife work was, was really natural for me.

David Todd [00:20:19] That's great. I can see how the context, and the setting, and the landscape for an animal would be very similar to the, you know, the table sitting on the floor and the the cup sitting on the table and, you know, the lighting and the windows and the doors and the room. It's ... I think I can follow you.

David Todd [00:20:40] Well, so let's talk a little bit about about this, you know, work that you've done in tracking animals. And, I've read about your efforts using videos and telemetry and analyzing kill sites. It seems like you use all the tools in the toolbox to understand animals that I guess are often out of sight.

Mark Elbroch [00:21:09] Yeah. I mean, I like to tell folks it's, you know, I'm just super lucky. I mean, me and everyone is sort of in the similar cohort as I am. And I use cohort sort of meaning the scientific group of folks studying mountain lions and other cryptic species, ones that are hard to see.

Mark Elbroch [00:21:29] But, you know, as I was sort of launching into the research world, initially, I was, you know, paid to be the person who found things and caught things, and but not really the person driving the research or the questions. And that's what really brought me back to school, was I felt like I kind of wanted to ask my own questions.

Mark Elbroch [00:21:50] And so, in the early 2000s was just an amazing time to sort of launch into that world because you had GPS technology becoming much more reliable and much more widespread, at least with regards to wildlife work. So you suddenly had, you know, before that there were what's called "VHF" or "Very High Frequency" collars, which are, they're like a radio station. You know, they play a tune, but the tune is boring. It's just beep, beep, beep. But you have to tune into it on your receiver and you can use an antenna and you could go in and listen for that animal.

Mark Elbroch [00:22:29] And, the only way to get a location on that animal is to triangulate it. So you'd have to get multiple directions from your antenna and sort of draw on a map where the lines crossed and you'd say, okay, it's approximately there.

Mark Elbroch [00:22:42] And, the only way to get that location is to go look for the animal. So you could do that in a plane: that was the easiest way with mountain lions, because they are wide-ranging, especially if you're in mountainous terrain where if you're holding an antenna, you can only really listen to what's in the same draw as you. You know, you can't listen up and over a a mountain to the next draw.

Mark Elbroch [00:23:06] And, but then, there was this revolution into GPS technology. And, you know, that technology has continued to evolve. So, in the beginning, it was just something that the animal wore. And then you would get the collar back and you could download

location data and be like, "Wow, check it out. Look where this cat had gone." And we could get more locations per day. You know, I mean, with VHF, I was lucky to get a location a week on a mountain lion, whereas with GPS you could get multiple locations per day.

Mark Elbroch [00:23:38] And now, I'm getting 24 locations a day, generally every hour.

Mark Elbroch [00:23:43] And then it transitioned to new satellite technology, and it's sort of pay-to-play, but you pay these private systems. There's Argus in the beginning. Now there's Iridium and Globalstar that trends, they're essentially like a vehicle. They bring the data from the collar, while it's still on the animal, up into the sky, send it down to a processing lab, and then bring it to you on your computer, so that I can see where the animal is, as it's moving on the landscape, without ever going to look for her. And it just, it plots it on a map for me.

Mark Elbroch [00:24:19] So, that's a, that's a revolution. And so, you know, suddenly we know where these animals are. Whereas before we spent most of our time just looking for them and, and it gave us new opportunities. Right?

Mark Elbroch [00:24:32] And then, simultaneous with all that, was all this new technology with motion-triggered cameras. So, you know, early on there was these TrailMaster systems where you could attach to these 35-millimeter cameras and you could put in, you know, a roll of 36 and you'd hope to get something and that the wind didn't just shake everything. And you get 36 pictures of wind.

Mark Elbroch [00:24:58] And now, you know, you started to see the digital versions coming out that could get more photographs. And they were developed and they're getting cheaper and cheaper. And suddenly they're available in every sports store in the country. And then they started doing video, capturing sound. I mean, it's just incredible what you can do with these super, relatively cheap, very available cameras that you can get in any store these days.

Mark Elbroch [00:25:27] And, it provided us, you know, you can see the link. I knew where mountain lions were. And now I could place cameras strategically to see what they were doing.

Mark Elbroch [00:25:39] And so, we went from, as you know, at least in the United States, from being... I'm just talking collectively about how we studied mountain lines. You know, generally, we would catch them and that was our only interaction with them. And, you know, you'd see them either in a cage or up in a tree if you're using hounds to chase them up to a tree. And then, you know, you put the GPS collar on them, you get your samples, you measure them, you interact with them for 45 minutes, and then you set them free. And then most of the time you never see them again. And unless you catch them again.

Mark Elbroch [00:26:16] And now, you know, that new technology, a combination of using these motion-triggered cameras and knowing where they were because they're wearing GPS collars is we were suddenly witnessing their sort of private lives, or until then, private lives. And it just opened up all sorts of questions in my head, but also provided insights that previously were really difficult to get.

Mark Elbroch [00:26:47] You know, nowadays, it's funny to talk about it this way because now people can go to Patagonia and you can sit there and watch a puma or, you know, mountain lion, for much of the day. And so, you know, that just wasn't occurring here. And so we needed all this technology to kind of recreate that opportunity here.

David Todd [00:27:09] You know, I think the difficulties of tracking lions may be clear to, you know, those of us who are listening to you, if you could explain some of the difficulties in tracking mountain lions over the years in Texas, where I understand there's always been a lot of mystery to exactly how many lions are out there and and where are they, and, you know, the the problems of relying on voluntary reporting and kills.

David Todd [00:27:48] Could you maybe give that as an example of some of the vagaries of trying to track animals, especially in the past?

Mark Elbroch [00:27:56] Sure. I mean, it's a, this is a species who makes its living from remaining invisible. And so, they can slip in between us, around us, through the forest without being seen. I mean, that's the goal, right, for a mountain lion is to be able to place itself in the right place, to either take down a deer or elk or other type of prey before it's seen, or to be able to move so quietly, they can see it from afar and then sneak to within a close striking distance that they can leap forth and take their prey down.

Mark Elbroch [00:28:37] So, everything about it is about stealth and invisibility. So, they're hard to find just in general.

Mark Elbroch [00:28:45] And then, you take the fact that they wander huge distances, some of them hundreds of miles. And, you know, you put that on a landscape with topography where there's canyons and mountains and, you know, thick forests and dense bush, brush in West Texas, or actually in south Texas.

Mark Elbroch [00:29:03] And it, just, you know, the chances of encountering one, you know, just get lower and lower first. They're really good at hiding. And second, you know, they only pass through a particular spot of land, you know, once every so often because they're wandering big areas, and females much smaller than males, but still big areas, for considering what we do in a typical day.

Mark Elbroch [00:29:30] And then, the third factor is that they aren't as abundant as some other animals. So there's there's not as many of them out there as, say, coyotes or bobcats or foxes and things, other carnivores.

Mark Elbroch [00:29:47] And so, again, you add that in, and so you've got an animal that's really good at hiding, one that wanders super far, and so the chances of encountering it in a particular place at any given moment is small. And then there's just not that many of them.

Mark Elbroch [00:30:04] It just makes them really tough to study and even tougher to count.

Mark Elbroch [00:30:10] And, much of traditional wildlife management in the United States is about counting animals. We, you know, there's been an evolution of sort of management practices in the United States. But one of the sort of pivoting points was this obsession with maximum sustainable yield, which is this idea that, you know, wildlife, are, number one, resources for us to utilize. And, number two, that there's some sort of ideal number that could exist out there. And that beyond that, are sort of extras and that we can harvest that extra, without impacting the number on the landscape.

Mark Elbroch [00:30:54] And so, to get to understand that pivoting point of what is maximum sustainable yield for deer, elk, salmon, whatever you want, you kind of have to

know how many are out there. And so counting animals becomes sort of a fundamental component of any management plan implemented by any agency, whether it's state, federal, and sort of their plans for wildlife.

Mark Elbroch [00:31:22] And so, yeah, mountain lions are tough to find, tough to encounter, tough to count. And in Texas in particular, there's been very few efforts to try to do any of those things. Certainly not to count them at scale.

Mark Elbroch [00:31:40] And so, historically, there's been some use of, well we'll say "some", because it hopefully is kind of stopped at this point, of voluntary reporting of sightings in addition to, you know, say, for instance, if they hear that one's struck on a road, or killed because it had just taken livestock and was killed as a response.

Mark Elbroch [00:32:06] But, you know, all these sort of voluntary reporting things, they've ... there's, I mean, I won't go into it too long. I think the take-away with voluntary data is that the state itself no longer supports utilizing that data to estimate the abundance of mountain lions in the state because it is completely unreliable.

Mark Elbroch [00:32:30] You know, as early as 2003, they stopped using it in their own reports to the federal grant system. You know, there are these federal grants that support wildlife agencies. And as a part of that process, they have to report sort of numbers and what's happening with each species, etc. And they just stopped utilizing that data because it's not defensible. They know it's not grounded in science. They know it's completely unreliable. You know, that sightings can be incredibly misleading, especially if voluntarily provided and just should never be used as a grounds for estimating the abundance of a species, especially a cryptic one.

David Todd [00:33:12] I see. Well, a difficult animal to study, but I know you've thought about mountain lions for decades, and I was hoping that you could give us, as laypeople, just a very basic introduction to the behavior and lifecycle of mountain lions. And I'm particularly curious, I think, some of these indications you've found that they may be more social than we were led to believe over the years.

Mark Elbroch [00:33:51] Sure. All right. Let me try to give you a short course in mountain lions. So they're a large carnivore. They are a cat. And so if you've had any experience with domestic cats, you know, quite a bit more than you think about mountain lions, because they're very similar in the way they move, the way they hunt, their postures, their sort of behaviors, the way they present themselves.

Mark Elbroch [00:34:19] And, you know, I think importantly right from the start, I would emphasize that especially here in North America, that mountain lions have never been the top, top carnivore. They are a top carnivore, but they have others above them. And I think that has really impacted their personalities, how they live, how they hunt, how they hide, how they move in so many ways. And so I refer to them as like a subordinate top carnivore, meaning that they are subordinate to other species, and, in particular, that would be wolves and both bear species, black and brown bears, grizzlies.

Mark Elbroch [00:35:06] And so, you know, what you often hear is you know that they are a solitary hunter. And that is, that's absolutely true. And, you know, in terms of biology, the word, "solitary", actually carries a slightly different definition than, say, in everyday language. In everyday language, if I called an animal, "solitary", you would assume, probably, I'm don't

want to assume for you, but probably that, you know, it's an animal that spends all its time alone. And the biological definition of a solitary animal is one that forages, looks for food, alone.

Mark Elbroch [00:35:51] And so, mountain lions definitely are solitary animals in the sense that they are solitary foragers. They don't hunt in packs. They don't strategically team up with other mountain lions to create ambushes like African lions do, or some other species. So in what I, like you might envision in your mind, you know, there's never a mountain lion hiding in a bush and another mountain lion chasing deer towards it. So that doesn't occur in the mountain lions' societies that we're aware of at this point. And so for that reason, they're considered a solitary carnivore.

Mark Elbroch [00:36:26] But that doesn't mean they're antisocial. And one of the things we've really learned is that there is regular contact among neighbors and overlapping mountain lions. And the way I sort of paint this picture nowadays is that, you know, we used to kind of view mountain lion populations as these like, you know, just uniform sprinkling of mountain lions across the landscape. They were all much the same. They were kind of just distributed. There were more females than males, because males had bigger territories and kind of, you know, defended those territories. But in general, you know, sort of sprinkled across the landscape.

Mark Elbroch [00:37:08] But now, I would describe them as that these, if you take a landscape, say the Trans-Pecos, you know, to keep it in Texas, that that's not just one big community or population of mountain lions. It's actually a subset. There's lots of smaller communities within that. And the community that I sort of focus on is the territorial male, because these males establish a a boundary on the landscape. And within that boundary are generally a number of females, and that male may overlap with another male, slightly, and the females in his range may actually extend into another male's range as well, or some of them.

Mark Elbroch [00:37:58] And, within the bounds set by one territorial male, those lions are interacting pretty regularly. The females are meeting up with each other. That male is seeing the female, meeting up with them frequently. And most of the interactions, which in the past we would have described as, you know, generally either aggressive or mating, that was the assumption: is that when mountain lions came together, it was to fight over territory or some other resource, or to mate, and that was it.

Mark Elbroch [00:38:32] But, you know, what we've learned since is that most interactions are around food and so that, you know, a lion will come in and feed from the carcass of a prey animal killed by another mountain lion, and that they are interacting with each other around these carcasses and checking in on each other very frequently.

Mark Elbroch [00:38:50] And so, that, you know, kind of completely challenged everything that we used to think about them. And so, now we're kind of viewing them as these sort of smaller community units that build up these populations.

Mark Elbroch [00:39:06] And then the relationships among these lions is also interesting because, you know, in terms of food-sharing, one of the things we found in our work in Wyoming was that there was a reciprocity occurring. And "reciprocity" is a word that has been applied to very few animal species, mostly to do with how we define it. And it probably biases the word towards what we consider higher-level thinking. And so we've assigned it to primates and we've assigned it to ourselves. And then, you know, there's been a couple of

other cases, but this idea of reciprocity is that an animal can have an experience with another animal. And based on that experience, make a decision about interacting with them again in the future.

Mark Elbroch [00:39:57] And, what we did is we found evidence that when one animal shared food with another, that there was evidence that that animal that had received the free food was much more likely to share food in return to that animal who had shared with it.

Mark Elbroch [00:40:16] And so this idea of sort of, you know, a food-sharing or a food-based system, you know, that's sort of supporting the social system of lions was, again, just kind of mind-blowing, you know, just a very different way of perceiving a species that we had been calling solitary and viewing as just, you know, never getting along with its neighbors and only fighting or mating. There's far more happening.

Mark Elbroch [00:40:45] And then, the other, you know, in terms of social life, I'll you know, there's a couple other things that I'll mention.

Mark Elbroch [00:40:52] One is that, you know, these family units are really important to mountain lion society. So these the females, they give birth to young. The young generally stay with them, you know, anywhere from, say, 14 months to two years, to the average is probably somewhere, you know, 14 to 18 months is pretty normal. And I think, you know, based on working in lots of places, that in areas where there are more mountain lions, they tend to disperse younger. And I think it's probably due to the fact that the females have opportunities to breed more often.

Mark Elbroch [00:41:36] And but, you know, it's a serious commitment that these females make to raising young. And again, to just envision that these females, some folks have estimated that about 82 to 84% of their lives are spent in the company of kittens. So again, you can't really call a female mountain lion antisocial if the vast majority of her life is in the company of other mountain lions.

Mark Elbroch [00:42:04] So, that's one part of it.

Mark Elbroch [00:42:06] And then, just when these, what these cameras have revealed, is how these families interact with each other - just incredibly intimate, lots of physical contact, lots of vocalizations, you know, just constantly sort of checking in with each other, very supportive, until the moment when dispersal occurs.

Mark Elbroch [00:42:28] And then, we've seen things, you know, since like kittens from a previous litter coming back and visiting their mom. We've seen generations of mountain lions kind of meeting up, so a grandma might meet a granddaughter. We, you know, these, these things are occurring, you know, in this, what we're witnessing in these just last few years is, again, just beginning to challenge us to look deeper at the social lives of mountain lions and kind of how they, how they interact with each other on the landscape.

Mark Elbroch [00:43:00] And, I won't pretend to know everything about their social systems. I think we're just getting started, really, in uncovering how complex it is.

Mark Elbroch [00:43:11] And, the last little piece I'll mention is, you know, sort of a vital part of their natural history is that mountain lions, they give birth to young, and then these young

disperse. They call them, "dispersers". Some people call them, "transients", but they're young animals that leave their mom, and they set off to find a territory to call their own.

Mark Elbroch [00:43:33] And, these animals, as they navigate the landscape, it's a really important part of, again, their natural history. They're unfamiliar with where they are. So, they're suddenly challenged with finding food when they don't know where it is. You know, that's the difference between a resident animal, like their mom. She knows where the deer and elk are in her home range. She knows where the roads are. She knows where the people's houses are, if there are people's houses. You know, she knows the risks, the benefits, the, you know, sort of best places to hide, the best places to hunt. That's the benefits of having a territory, is you get to know it, it's her home.

Mark Elbroch [00:44:11] And, a transient, a disperser, doesn't know any of those things. And so, they're making decisions based on imperfect knowledge, and they have no idea what's around the next corner. So, they're often eating whatever they can. They are running into potentially dangerous situations much more frequently. And they're not able to sort of, in their mind, balance the sort of risk-taking and the benefits of potential risk-taking as easily, because they just don't know what those risks and benefits are, as compared to the rest of the area around them.

Mark Elbroch [00:44:49] So, this is why there is evidence that young mountain lions often end up in places they, you know, we would consider either bothersome or troublesome.

Mark Elbroch [00:45:00] And, but, the other part, I'll link that back to their societies is that, you know, again, this is something we know it's a really dangerous time for young mountain lions. They're running into people. They're running into difficult terrain. They're hungry. They don't know when the next meal is going to come or where it's going to come from.

Mark Elbroch [00:45:24] But, they also run into other mountain lions. And the assumption is that this is always a bad thing: that these young mountain lions run into residents and that these residents either chase them off or in extreme cases, fight with them and kill them.

Mark Elbroch [00:45:43] And, absolutely that sometimes happens. But what we're also learning is that it's sometimes the exact opposite: that we've seen these young mountain lions utilize the kills of residents, as sort of a, like a transition period, you know, months of feeding with residents until they somehow make that transition to be able to hunt large prey on their own.

Mark Elbroch [00:46:06] And so, yes, there is conflict and occasionally a resident can fight and even kill a youngster. But I think more common is that this, the community of mountain lions is actually supporting these youngsters as they transition to become independent animals of their own.

Mark Elbroch [00:46:27] So yeah, that's a lot about their social lives, and sort of social structures, and all of that.

David Todd [00:46:36] That's great. Thank you.

David Todd [00:46:38] You know, while we're on the topic of, of diet and eating and could you give us a little bit of an introduction to what lions typically eat? I know that part of the the reaction against them has been, "Oh, they are killing trophy mule deer and white-tails or

they're taking livestock". And I was wondering if there's truth to that or if you have doubts about that.

Mark Elbroch [00:47:14] Sure. Yeah. They are carnivores and they are obligate meat-eaters. So they are not even like a coyote or a fox that's mixing fruits and other sort of vegetation in with their diet. They eat meat and only meat.

Mark Elbroch [00:47:30] So, it is, of course, and they, a natural concern on what they're eating, but also the fact that they're large and they have big teeth, means that we're naturally sort of worried about them or fearful of them. Totally normal.

Mark Elbroch [00:47:46] What do they eat? Mountain lions across the range, my goodness, so many kinds of animals, everything from salmon to beavers to porcupines to squirrels to, you know, anything in between - birds of other kinds, geese and grouse and rabbits, and etc. But in general, we, they tend to gravitate to primarily eat the most common hoofed animal in the area. So whether it's deer or an elk, you know, in South America, other places, some sort of llama species, of vicuna or guanaco or something like that. Peccaries - they like peccaries, you know, they'll eat peccaries, etc. So that's generally what most of their diet is, is some, the most-common hoofed animal, wherever they live.

Mark Elbroch [00:48:45] And, in terms of which ones they're eating? That again, I think recent research has really begun to change the way we perceived it, although, you know, historic research has shown this as well, is that they are not out for bucks and bulls. They're not looking for big antlered animals at all. And in fact, they generally avoid them. They are most interested in the youngest age class, so up to a one year old. So that's true of deer, elk and others, because that's the vulnerable age class. It's probably the most easiest to kill, the most easiest to stalk up on. And that is what they disproportionally feed upon in every population that we've really kind of looked at that closely.

Mark Elbroch [00:49:32] So, yeah, I think it's a great misconception that they're out there targeting bulls and bucks. That is, absolutely, there's no evidence of that at all.

Mark Elbroch [00:49:42] So, in terms of livestock, you know, they are a large carnivore. They will take livestock, absolutely. It's generally a very small problem in the U.S., as compared to other carnivores or even natural causes of death for sheep, cattle, etc. So they're not, you know, big livestock killers. You know, even looking down to South America where, you know, you get these vast sheep ranches that have thousands and thousands and thousands of sheep. The reality of what percentage of sheep are being killed by mountain lions every year is so much smaller than what you hear about in the news, etc. So, you know, on the order of like 0.5 to 2, 3% of the herd, rather than, you know, some folks will stand up and say they lose 20%, or something like that. That's generally not true.

Mark Elbroch [00:50:40] And so, yeah, I mean, again, there's a lot of emotion behind these accusations, a lot of misconceptions. And in general, mountain lions are of little concern for livestock as compared to other causes of death.

Mark Elbroch [00:50:58] So and even if you talk amongst folks who manage carnivores in, say, the Rocky Mountains, you know, mountain lions are generally the least of their concern, when they've got brown bears and wolves and other animals which have much more frequent interactions and conflicts with livestock on the landscape.

David Todd [00:51:22] That helps. Thanks very much.

David Todd [00:51:25] So, one of the potential conflicts that I've heard of in West Texas in particular has been between mountain lions and these bighorn sheep that have been introduced over the last 40, 50 years, you know, and each one of these sheep is, of course, enormously valuable. Do you see that as being a real risk and threat or not so much?

Mark Elbroch [00:51:55] Yes and no. It's a real risk because of the stigma surrounding any event of a mountain lion killing a bighorn sheep. And so. You know, much of even when you were referring to livestock and deer and elk and all of these sort of perceptions, whether look, I mean, mountain lions do occasionally kill a trophy buck. You know, that happens. Is it frequent? No. Is it what they target? Absolutely not. But it does happen. And just that one incident spreads negativity because it starts into, you know, the phone tree and that person tells their neighbor and that person...

Mark Elbroch [00:52:34] And it builds a negative sentiment about the species. And it's the same thing with bighorn sheep. You know, any death of a bighorn sheep, when they're very few and they're very valuable, just leads to that negative sentiment. And so, what's the loss that someone is willing to allow before they get upset or a game agency? What are they, what is the Elephant Mountain Wildlife Area willing to suffer in terms of mountain sheep losses to mountain lions before they feel it's too much?

Mark Elbroch [00:53:07] You know, there are those who believe that just one is too much.

Mark Elbroch [00:53:12] Are they a threat to the local bighorn sheep? Yes and no.

Mark Elbroch [00:53:16] Again, you know, it's a complex story because it peaks to the history of our, of the American West, in that, you know, what was historically areas with few deer and were true desert ecosystems with many more bighorn sheep, have really changed. As we moved west, our cattle trampled the grounds, changing soil structure. Plant structures changed. So we saw much more shrubs, more woody material growing in these desert ecosystems, making it much better habitat for deer. As deer recovered in our country once we started to control hunting, they moved into these desert ecosystems. And as carnivores recovered in the United States, when we began to offer them some protections as well, they followed their prey into these desert ecosystems.

Mark Elbroch [00:54:18] And so, what we see today in the desert, are smaller populations of bighorn sheep, larger populations of deer, and mountain lions in places where densities where they just, it wasn't like this 200 years ago. And the reason is, is that the number of mountain lions is, of course, supported by the number of deer. So if you have 50 bighorn sheep living on a mountain and it's surrounded by a thousand deer, and the thousand deer are supporting X number of mountain lions, those mountain lions may encounter a bighorn sheep in between.

Mark Elbroch [00:55:03] They're, when you look at how they hunt bighorn sheep, there's two things that can happen. And this is, you know, you might, it really has a parallel with livestock as well. Most of the time when a cat takes livestock, it's just you can view it either way. It's either in the wrong place at the wrong time or the right place at the right time, depending on whether you think it's a good thing to kill the livestock. But, it's opportunistic is the point. It wasn't pre-planned, pre-meditated, it just was in a place and suddenly there's,

you know, a sheep in front of it and the sheep was there and the mountain lion's there and the mountain lion decides to kill it. It's not looking for that sheep.

Mark Elbroch [00:55:46] And, with bighorn sheep, there is a difference too. There are mountain lions that occasionally kill a bighorn sheep. And that is probably the more common. And then there are what we would call a specialist, and where they decide to actively pursue bighorn sheep, just as you might say, there's a livestock specialist. And those are generally called problem animals. You know, when they start to look for sheep rather than look for deer.

Mark Elbroch [00:56:18] And, there is evidence that you can get mountain lions to start to look for what is the rare prey in their system rather than the abundant prey. And they can have a big impact on a rare prey. So if there's only 50 bighorn sheep and one decides like, "Hey, this is this is good eating. And they seem really easy to find and I know where to look for them." And so, they start coming back and hunting bighorn sheep. They can kill, you know, what if they just killed ten in a year? That would be 20% of the herd, if there's 50. So that's a big deal.

Mark Elbroch [00:56:53] And so, how we manage and think about mountain lions, in my opinion, you know, it's really important to think about mountain lions opportunistically, and unfortunately, take a rare prey - we'll call it a cow or a sheep or a bighorn sheep - and those that are actively pursuing those prey.

Mark Elbroch [00:57:18] Now, many would argue that one leads to the other, like, well, they have to have an opportunistic encounter for them to become a specialist. And that is true. But at least in terms of livestock, there's no evidence that that is a natural evolution. It seems like many animals opportunistically take livestock and that's it. You know, it's just, that was it. They go back to eating wild prey.

Mark Elbroch [00:57:46] And, with bighorn sheep, we know that there are cats that will live in and amongst the bighorn sheep and either never kill them or only kill them once. And so we just have to be aware that there are these different kinds of mountain lions and that we, in my opinion, it would be strategic to address those kinds of mountain lions differently.

Mark Elbroch [00:58:17] So, you know, as an example, we know that California used to have this three-strike rule with their bighorn sheep. And so a mountain lion could kill a bighorn sheep and remain in the population, but once it had killed three (and I can't remember exactly how they did it, but there was a certain number of ewes and they had to be from the same herd and blah blah, blah, but once it had shown that it it might be potentially becoming a mountain lion that is specializing on bighorn sheep), they would remove it. And this was to help the Sierra Nevada population and the desert bighorn populations that were really struggling.

Mark Elbroch [00:58:53] So, yeah, I mean, I don't want to ramble on too far because I think that kind of got to what you were looking for.

David Todd [00:59:00] Yeah, No, that's so helpful. Thank you for explaining that.

David Todd [00:59:05] You know, I think this might be a good time to talk about what happens after there's a kill and there's a carcass on the ground. I think, as I understand it, you've done a lot of interesting research about the kind of cycling of nutrients they go out into the landscape. And you had some insights about mountain lions as acting like a kind of

ecological broker or engineer. And I was hoping that you might be able to enlighten us about that.

Mark Elbroch [00:59:43] Yes, indeed. I mean, mountain lions, there's just increasing evidence that they are major players in ecosystems in many, many positive ways that benefit us. You know, that they are supporting the distribution of nutrients across different kinds of animals, plants and flora. And just that by spreading nutrients, they are reinforcing ecosystems, making them more resistant to disease outbreaks, wildfire, disruptions of any kind. And by increasing these linkages amongst different species and the way that energy moves in ecosystems, I mean, all of these things are making ecosystems stronger.

Mark Elbroch [01:00:30] And, since we are dependent on these systems for our own lives, that only benefits us. And that, again, that they are major players that they aren't they are playing a a larger role than other animals in these ecosystems in terms of their contributions to ecosystem health, and in my opinion, human health.

Mark Elbroch [01:00:54] So, you know, once they kill an animal, say a deer, they eat a portion of that carcass, and then so many other animals come to feed, from tiny birds like chickadees and woodpeckers, to jays to, you know, the large scavenging birds, which we're familiar with, you know, hawks, eagles, vultures, condors, as you move further south or further west. There are skunks and possums and other animals coming to forage as well. Foxes play a huge role generally when they're present. Coyotes, bobcats, bears and others. Wolves, you know, depending on where you where this deer was killed. And they're all spreading these nutrients further and further into the system.

Mark Elbroch [01:01:47] And then, a portion of it goes into the ground and impacts the whole soil chemistry there, you know, the nitrogen-fixing processes in the soils, and some of its uptake by the plants surrounding these carcasses, making them a, you know, in many ways a richer resource for future foraging deer.

Mark Elbroch [01:02:10] And so, the way that carcass plays out on the landscape is just incredible. It's just like a, it's the starting point for a network of relationships that spread out in positive ways to support that ecosystem.

Mark Elbroch [01:02:26] And so, you know, one of the interesting things, and it kind of gets back to something I mentioned at the very beginning is that mountain lions are not the top, top carnivore. And so they have adapted to kill more than they need, because they're often pushed off their kills, and so many other species feed from them. And so, one could view that negatively, if that's your decision to say, "Oh, gosh, they kill more than they need". The other is to say, "Look at the benefits of all that extra killing, because they're supporting the ecosystem in so many diverse ways".

Mark Elbroch [01:03:01] And, but it's interesting that like cats that are these subordinate carnivores - cheetahs, leopards, mountain lions - that play like this kind of similar role in different systems, they've all evolved to kind of kill more than they need, because they get pushed off by a bear or a wolf, or even a pack of coyotes can push a cat off a kill. As well as the fact that they're sharing that kill with so many other species even while they're there. I mean, foxes are feeding on these kills even while the cat is sleeping 50 yards away.

Mark Elbroch [01:03:33] So, it's just a really interesting thing about their ecology.

David Todd [01:03:41] Well, speaking of the ecology of the lion and the whole landscape that it's sitting in, can you talk to us a little bit about the history of the mountain lion's ecological status in Texas, both in the Trans-Pecos and down in the southern tip of the state?

Mark Elbroch [01:04:03] Sure. So, Texas is unique in the United States. It is the only state that offers no protection to mountain lions at all.

Mark Elbroch [01:04:14] And, protection can be, I am certainly including in that word, "protection", a hunting season. Animal advocates will say that's no protection at all. And the fact is that's tremendous protection when you only have a certain amount of lions that can be killed per year and a certain season in which you can kill them, there can be additional regulations on hunting, for instance, females are often protected if they have kittens. Kittens are generally protected fully.

Mark Elbroch [01:04:42] None of those things are in place in Texas. You can kill them any time, almost any way. And you don't even have to tell anyone you did it, which is, you know, incredibly bizarre that you wouldn't even have to report taking the life of a mountain lion in the state of Texas.

Mark Elbroch [01:04:59] So, it's, you know, historically, the you know, the mountain lion experienced what most of the large carnivores did in in North America with the arrival of European colonists and Spanish colonists to the south. And, you know, that there was a wave of sort of extreme resource extraction in North America. Right? So we were, I mean, we hunted deer to near extinction on the East Coast. There had to be huge laws and regulations placed in to bring back deer on the East Coast.

Mark Elbroch [01:05:38] But, you know, simultaneously, we viewed these carnivores as competition with us for resources we wanted, but also as risks to us. And so, there was wide scale eradication of these species everywhere.

Mark Elbroch [01:05:51] Everyone everyone's generally familiar with this story. I don't need to harp on it too much.

Mark Elbroch [01:05:58] But, what's interesting with mountain lions, in particular, was that there was a movement in sort of the mid-20th century to offer them protections, so, to stop treating them as vermin, to stop the wide-scale use of bounty systems, which were federal, state, cattlemen's associations, sporting clubs. There were there were bounties paid by so many folks at different levels for mountain lions and other carnivores. But to stop that process and to establish the initial sort of regulations to protect the species.

Mark Elbroch [01:06:40] And, in general, that was a transition to some being some sort of game animal species, or a game animal status. So there'd be a hunting season, there'd be a limited quota. You know, only a certain number would be able to be harvested, etc.

Mark Elbroch [01:06:54] And, what's cool about mountain lions is that much of that transition in the Western states occurred at the prodding of everyday people, that it wasn't a decision made by a government agency, it was generally a decision made by a community of people, and they started to promote the idea, to advocate for it, to lobby for it and to organize, and to convince legislators and state wildlife agencies to make that change.

Mark Elbroch [01:07:24] And so, by the time, it was sort of like 1965-ish was really when this was all occurring in Western states that still had mountain lions. And, you know, Texas was the lone state that stuck to its guns and did not make a change.

Mark Elbroch [01:07:41] And so, by '73, I think it was, one of the last Western states to kind of establish its own regulations. And Texas instead decided to dismiss proposals to make that shift to game species or to offer any protections at all.

Mark Elbroch [01:08:03] And so, Texas still remains the only state where, you know, there's essentially no regulation for mountain lions.

Mark Elbroch [01:08:11] It's also the only state right now that allows trapping of mountain lions. And trapping is something generally has been dismissed in other western states for a couple of reasons. One is that it's really difficult to manage trapping, and that you get non-target species, or non-target classes of animals that even if you're aiming for a species. And because mountain lions occur at such low densities, it's really hard to defend your management plan as a state agency while allowing trapping because you can't say, "Yep, we do not permit kittens being killed, when it's just as easy for a kitten to step into a trap as it is their mother."

Mark Elbroch [01:08:58] And so, these kinds of things. It's also really hard to kind of really check in on the harvest as it's occurring, which they can generally enforce in other states.

Mark Elbroch [01:09:09] In Texas, for instance, you don't have to report. There are trapping regulations in Texas, if we were to align mountain lions with other trapping regulations, they could at least report take, you know, within three days of take. And that would be similar to say, sort of other harvest techniques in other Western states. So you could account for it as it's happening.

Mark Elbroch [01:09:28] But, it's also harder to stop. Let's say you have a quota system that, you know, let's say, for the Trans-Pecos, there's a limit of 15 lions. And what if the 15th lion is killed on October 12th and so they no longer want any harvest beyond that, but there's traps out all over. How do you get the message to everybody to pick up their traps? How long does it take for them to pick up their traps? Blah, blah, blah.

Mark Elbroch [01:09:58] And so, again, it's just, it's just a much more difficult process to manage than, say, traditional on-foot hunting or hound-hunting, both of which, like, you could just have an announcement. Hound-hunting is closed. And, you know, many states have these call-in lines. So you call in in the morning, make sure your unit's still open before you go hound-hunting.

Mark Elbroch [01:10:22] So, that's, you know, these are the reasons why other states have sort of given, you know, stopped trapping completely of mountain lions. It's just, it's, you can't defend your management plan and say it is science-based and that it's going to be number-based and defensible, while allowing a technique that it doesn't control for, you know, kitten harvest, versus female harvest, versus male harvest, and also catches all sorts of other animals in the process.

Mark Elbroch [01:10:56] So, yeah, why don't you ask me a question?

David Todd [01:10:59] Well, so given the, I guess, sort of loose or lax or nonexistent set of regulations for mountain lions, how has this left the ecological status, the population counts and so on in Texas? Are you familiar with, you know, how many or how few are in the landscape now?

Mark Elbroch [01:11:27] Noone knows how many mountain lions live in Texas.

Mark Elbroch [01:11:30] So, we are left to complete speculation. There, there has, in my understanding, never been an attempt to do a statewide estimate of the species. So this is like a major hole. For the state agency, which is charged with knowing the status of mountain lions, and ensuring their sustainable survival in the state, so they don't even have the information they need to make that sort of call on like how are they doing.

Mark Elbroch [01:12:01] And so, all we have are these individual studies which are from a particular place at a particular time. And there have been a handful of those, mostly in West Texas, one in South Texas. And all of the studies indicate the same trend, that mountain lions are dying too fast and too frequently and that there are not enough of them to sustain a population over time. And that message is clear.

Mark Elbroch [01:12:29] So, and, that research is strong and it's consistent, and it's been conducted by private individuals, by universities and the state agency itself. And so that part we understand.

Mark Elbroch [01:12:41] What we don't know is whether those patterns are true everywhere in the state, which of course, would be impossible to know unless you study mountain lion survival everywhere. But we certainly have no idea how many are in the state because there hasn't been any sort of discussion about how to scale up what's been learned in local areas to the state population as a whole.

Mark Elbroch [01:13:05] What there has been done is some genetic, initial genetic work, and it shows a couple of things that are really important. One is that the South Texas population is not connected well to the Trans-Pecos, so it's a sort of its own little world. Recent work, which is not, you know, was not strategically designed to sample or estimate the abundance of mountain lions, but is more just sort of general species set for coyotes or bobcats, etc., shows that they're, the mountain lions are essentially gone out of South Texas already. So, I mean, if Texas doesn't act now, they could be gone forever.

Mark Elbroch [01:13:45] The other thing is that the Trans-Pecos population includes genetic diversity representing areas beyond Texas. And this is really important. So that what we believe is happening, again this year, there is some speculation, but this is scientifically based: we know survival rates are not sustainable in West Texas because of trapping, because of other human-caused mortality. And yet we know there are still mountain lions there.

Mark Elbroch [01:14:15] So, the only logical explanation for that is that there, we still are seeing immigration come in, meaning mountain lions are coming into Texas from New Mexico, from Mexico, etc.

Mark Elbroch [01:14:25] And then the genetic diversity of the West Texas population also speaks to this as well, that there is we call, "admixture", that there's other mountain lions coming in to support diversity over time.

Mark Elbroch [01:14:38] And so, both of those speak to this idea that the West Texas population is still there, not because of any strategic work done by Texas Parks and Wildlife. It is only because there are mountain lions coming in from elsewhere to sustain the Texas population, which I would emphasize is not sound management.

Mark Elbroch [01:15:04] You know that, again, if Texas wants to defend its approach with mountain lions, it cannot say, oh, our approach is depending on Mexico and New Mexico providing us mountain lions, that that is not a, that's not sound conservation at all.

David Todd [01:15:23] You know, one of the things I thought was really interesting about your recent Wildlife Society article is that there seems to be sort of a (this is probably not a good term for it), but a kind of a schizophrenic attitude about the lion, that it sounds like there are a lot of internal discussions at Texas Parks and Wildlife that support the notion of, you know, that these cats are rare and declining and that the management system isn't really working well. But, the sort of public presentation of the agency is not really consistent with that.

David Todd [01:16:05] And, I was wondering, you know, in a presumably science-based agency why you think there's that disconnect.

Mark Elbroch [01:16:14] That's a really, really great question and one that we can only, again, speculate about, that we, I don't know all of the discussions within the Texas Parks and Wildlife, of course. No one does, except perhaps those who participate in them.

Mark Elbroch [01:16:32] And but what we can say, based on the public records that we've seen, is that the agency has been discussing creating protections for mountain lions for 30-plus years, and yet they haven't. And even state biologists have been involved in some of the research calling for it publicly. You know, for instance, the genetic work that came out, you know, more than ten years ago saying that we better act now if we want to protect the South Texas population. But still, nothing has happened.

Mark Elbroch [01:17:04] And again, we can only speculate on why.

Mark Elbroch [01:17:07] What we found in public records, and, you know, we don't have every public record. We don't have every email exchange. But what we were able to glean, you know, through sort of an assessment of what's being discussed, at sort of the mountain lion focused meetings that the Texas Parks and Wildlife has convened among its senior staff and other biologists, is that there's tremendous concern about private landowners and the political sway and power that they have in impacting the way the state agency functions in the state of Texas.

Mark Elbroch [01:17:43] And so, you know, I think there's a couple of things worth emphasizing. Wildlife management is, you know, we like to think of it as science-based, but it is tremendously impacted by human interest. And so science often plays a much smaller role in the decision-making processes driving wildlife management than maybe some people think.

Mark Elbroch [01:18:17] And, or, you know, and so I think it's just best to think of wildlife management as a human enterprise rather than a biologically-based enterprise. And that will help folks gain insight into why things can happen.

Mark Elbroch [01:18:35] So, yeah, the science is quite clear. Texas mountain lions are in trouble. We know this. We've known this for years. It's, from a biological standpoint, there's, it's absolutely a clear path forward. We put protections in place. We begin to, you know, manage the species. We need to estimate their abundance. We need to create the data for a defensible management plan.

Mark Elbroch [01:18:58] That's easy. That would be easy.

Mark Elbroch [01:19:00] But the problem is that people are involved. And so then, you have special interests. You have political powers. You have power brokers. And all the interface of all of these human challenges make for, well, a less clear and also difficult to predict path forward.

Mark Elbroch [01:19:25] And so, that's why we just have no idea what Texas is going to do, and what's the next move, and why they do what they do. If it were just biology, it would be easy.

David Todd [01:19:39] Well, you know, I see that we're running close to the end of our time with you, and so maybe I can just jump to path forward, that you mentioned just a moment ago, and I'm curious what you think would be effective ways to argue for a more sustainable management of the mountain lion. You know, it seems like you could talk about the scientific appeal, you know, the ecological role and importance that you mentioned, or maybe ethical principles about their independent right to exist, or humane concerns about canned hunts, heritage arguments about their, you know, their legacy on the landscape.

David Todd [01:20:26] There just seem like lots different ways to go. And I was wondering if you could just kind of go through some of those and tell me what you think are some of the more powerful arguments.

Mark Elbroch [01:20:38] Sure. You know, I'll, I'll start there with what you've suggested. You know, I try to be evidence-based in my opinions, you know, as I can. And there is evidence that, you know, sort of emphasizing the ecological importance of a species can help change people's opinions about them.

Mark Elbroch [01:20:58] There's stronger evidence that sort of moral or ethical argument can have an impact on what people do or say about animals. So, for instance, like, you know, we have, we are the reason there are so few. So, it is our obligation to support them, protect them or bring them back. That that argument seems to be more powerful with the general public. That's in terms of evidence.

Mark Elbroch [01:21:25] But, all of the things you outlined, heritage-based, you know, ecological role, ethical role, balance, I mean, many of these things are, in my opinion, beneficial.

Mark Elbroch [01:21:37] But, I guess what I would emphasize is that, you know, I think one of the issues is that people think of mountain lions in Texas, and really anywhere in the U.S., as a mountain lion issue. And I honestly think that the solution for mountain lions is in addressing the human issue, which is helping state agencies manage people rather than wildlife, because that's really what we're talking about.

Mark Elbroch [01:22:14] And, what I'm trying to get at is that right now, Texas Parks and Wildlife, like every agency in the West, caters to certain kinds of people, and believes they are the people they need to listen to. They are the customers that they need to serve, and that if there was a transition to Texas Parks and Wildlife listening to all people in Texas, these issues will be gone, at least in terms of conservation of mountain lions, because we know that the vast majority of people in Texas want to conserve them. We know that the vast majority of people in Texas believe they're an important part of Texas heritage and of healthy ecosystems. We know this.

Mark Elbroch [01:23:03] And so, that's the change that I think I would make, would facilitate the conservation of mountain lions, and lots of species along the way, more easily is to address that human issue. Is that if we can broaden the base of people served by Texas Parks and Wildlife, and indeed state agencies pretty much everywhere, that the conservation of large carnivores and sort of less charismatic species would be much easier. It would just happen.

Mark Elbroch [01:23:40] And, this is not to belittle or to oust the folks such as the traditional hunting community, anglers, livestock owners, agricultural community. These sort of powerful communities of folks which right now dominate discussions with state agencies about wildlife. It's not to say that they don't have a role. Of course they do. Absolutely. Hunters and anglers and others are vital components to any healthy wildlife management plan, but they, we shouldn't be including them, while excluding everybody else. We should be including them with everybody else. And that change in and of itself would be a revolution in terms of wildlife management across the United States and beyond.

David Todd [01:24:45] That's a wonderful insight. Thanks a lot.

David Todd [01:24:49] Well, I think you told me that you have other obligations. And so, I just wanted to ask one last question, and that is, is there anything that you feel we didn't do justice to, something that we may have skipped over, that you would like to mention before we close?

Mark Elbroch [01:25:09] Um, let me think here. No, I think we've covered the main, you know, we've covered a lot of natural history. You know, we've covered a lot about, you know, sort of the, in my opinion, the sort of bird's-eye view on the management issues of the species and how to perhaps see a conservation agenda move forward a bit more.

Mark Elbroch [01:25:47] And yeah, I think that, you know, here we are on the sort of eve of the, this new Texas stakeholder working group for mountain lions, which is an amazingly exciting moment in Texas history. And so I'm optimistic that this could be a pivoting point for changing things for mountain lions.

Mark Elbroch [01:26:14] And I'll and I'll balance that positive message with the fact that I was slightly disappointed in the lack of diversity in the stakeholders invited to participate, that it was an opportunity to have a broader representation of Texas people there. And instead, we see the same powerbrokers disproportionately recognized as the stakeholders that needed to be present to discuss mountain lion management, or the potential for mountain lion management in the state of Texas.

Mark Elbroch [01:26:52] So, we'll have to see. I mean, I'm holding my breath. I can't wait to hear the outcome of this stakeholder working group. I remain optimistic because I have to be, that we can see Texas make a change. And to me, it would be one of the most exciting

moments in my career to see Texas begin to move towards greater protections for the species, to establish even minimal first steps in the management of the species.

Mark Elbroch [01:27:33] Yeah. And the last thing I'll mention is, I do think this is important, too, for folks who listen to this and both critics and supporters of mountain lions and change is that, I, one of my main messages I would like to emphasize is this idea of inclusion, because one of the things that really is wearing on me as someone constantly in these discussions about mountain lions and carnivore control, etc., is the constant emphasis of "us versus them".

Mark Elbroch [01:28:14] There's "u" and then there's the "opposition", and you can be on either side of that. And that I would encourage us to begin to really move towards a collaborative approach to wildlife management. We can hunt mountain lions and protect them. It's not us versus them. It's not one or the other. That, you know, that we can find common ground amongst all the stakeholders and we can move forward to protect the species, and still provide opportunities for those who want to hunt them. But we can do it in a way that really ensures that mountain lions are part of Texas heritage for years and years to come.

Mark Elbroch [01:29:01] So, I just want to close with that idea that, you know, I'm really pushing for greater collaboration. We need to dissolve this division that separates an "us versus them" in our heads, because that is not helpful, and we need to get beyond it to kind of build true conservation strategies that are inclusive of the interests of all people.

David Todd [01:29:28] Okay. Well, nicely put.

Mark Elbroch [01:29:32] Thank you so much for taking time out to give us some sense of the history of not only your life and career, but also the mountain lion. And to give us a little bit of a look into the future as well.

David Todd [01:29:49] So, thanks a bunch. Have a good day. And I hope that our paths cross soon.

Mark Elbroch [01:29:55] Yeah. Yeah. Well, thanks for the opportunity and best of luck with your project.

David Todd [01:30:00] I appreciate it. You take care.

Mark Elbroch [01:30:02] Take care. Bye bye.

David Todd [01:30:03] All right.