

TRANSCRIPT:

INTERVIEWEE: Mitch Sternberg

INTERVIEWER: David Todd

DATE: May 31, 2022

LOCATION: Alamo, Texas

SOURCE MEDIA: MP3 audio file, Zoom MP4A recording

TRANSCRIPTION: Trint, David Todd

REEL: 4110

FILE:

Ocelot_Sternberg_Mitch_AlamotX_31May2022_Reel4110_NoiseFiltered&SignalBoosted.mp3

David Todd [00:00:01] Okay. Well, good morning. I am David Todd, and I have the great privilege of being here with Mitch Sternberg. And with his permission, we plan on recording this interview for research and educational work on behalf of a non-profit group called the Conservation History Association of Texas, and for a book and a website for Texas A&M University Press, and finally, for permanent storage and public access at the Briscoe Center for American History, which is at the University of Texas at Austin.

David Todd [00:00:37] And, aside from that, I just want to stress that Mr. Sternberg would have all rights to use the recording as he sees fit.

David Todd [00:00:46] And I wanted to make sure that that's all agreeable with you.

Mitch Sternberg [00:00:51] That sounds perfect. Thank you.

David Todd [00:00:53] Okay, well, let's get started. It is Tuesday, May 31st, 2022. It's about 11:40 in the morning, Central Time. My name is David Todd, and I am representing the Conservation History Association of Texas, and I am in Austin. And we are conducting a remote interview with Mitch Sternberg, who is based in the Alamo, Texas area.

Mitch Sternberg [00:01:19] And Mr. Sternberg is a biologist with the U.S. Fish and Wildlife Service, who has worked at a number of National Wildlife Refuges in South Texas, including Aransas, Laguna Atascosa, Lower Rio Grande Valley, and Santa Ana. And among other responsibilities, he has been involved in a wide array of work with the ocelot, including monitoring, studying, translocating, building road underpasses, restoring habitat and other tasks that help the animal.

David Todd [00:01:51] So today we will hear about his life and career, so far, and focus in on his work on behalf of the ocelot as an example of the kind of impact he has had in conservation.

David Todd [00:02:06] So with that little introduction, I thought we might ask, might start, rather, by asking you about your childhood and early years, and if there might have been some people or events in your life then that influenced your interest in animals and their protection.

Mitch Sternberg [00:02:26] Okay. Great. And good morning and thanks, David. I appreciate this opportunity. This is wonderful project you guys have. So, I'm honored to get to be part of it.

Mitch Sternberg [00:02:36] So, from my childhood and early years, I grew up in the Rio Grande Valley and I just loved the outdoors. It didn't, you know, if I didn't have a toy to play with, I was outside kicking around in the dirt and playing with sticks and flooding ants in the yard and all those, those typical things. There were a lot more orchards in the Rio Grande Valley when I was growing up, so I spent a great deal of time biking and hiking and playing in orchards, you know, around my house and in between, you know, from my house and going to friends' houses. And just that's some of my earliest days.

Mitch Sternberg [00:03:18] But I think from my, you know, real formative, substantial years and encouragement by other people, I would have to say my family has always been of that same kind of outdoorsy attitude as myself. We were always camping and going to the beach and hunting and fishing. We loved to travel. When we would travel, we tended to camp here and there as well, through the Southwest mostly, and a little bit on the Pacific Coast. Spent a lot of time in the woods and fishing in icy-cold creeks in places like New Mexico and, and Colorado.

Mitch Sternberg [00:04:08] So, that's my really early years. I think as I got older, I had a neighbor that recruited me, apparently. I didn't even know it at the time, that asked me to come to a Boy Scouts meeting and I got recruited into Boy Scouts at the age of 12. And that was a great way to make a whole bunch of new friends from different schools and yet again, more camping. So, I loved it. A lot of cooking over fires and traveling places to go on hiking trips. So I think those are really my, my earliest years.

Mitch Sternberg [00:04:45] I finally achieved my Eagle Scout rank, a little bit slowly - in the end, as a teenager, I wasn't quite as motivated but to finish out getting my Eagle. But my Eagle project was actually improving trails at Santa Ana, which as a typical, at least of the time, Rio Grande Valley teenager, I did not even know about Santa Ana, which hopefully is changed with the generations over the years. But I didn't even know about the place. Someone had, had led me here and said they might need some help. And so we did a project here at Santa Ana. So it's kind of really interesting to come back full circle to working here.

Mitch Sternberg [00:05:31] Yeah, I think, one of the other things in my early years was the, the local television station at the time had a videographer. And I don't believe Richard Moore was the lead person initially. But Richard Moore now does this type of work. And he is a local expert, nature photographer and videographer now. I think he was the cameraman at the time, but I loved those "nature reports", is what he calls them now. And I'll just say that's what those were called back then. It was really my first opportunity to go, "Oh, wow! Someone could really get paid to do this, you know, to be out there observing wildlife and putting these stories together." And I guess those are the things that come to mind that really piqued my interest early on.

David Todd [00:06:24] I think you mentioned it when you were a small person, you went on camping trips and hiking trips and went to the beach. Are there any particular trips that stand out in your mind that you took with your family?

Mitch Sternberg [00:06:44] We loved seeing the Rockies. So we went through the Rockies, oh, probably on average every three years, every three summers, a couple of weeks, just driving in the truck and camping and stopping in hotels here and there. But those were, those were really special trips. Gosh, all the typical touristy places, I think. I remember Silverton and Durango, going on the train ride through the mountains. That was, that was fantastic. Took my family there about five, six years ago as well. So just beautiful country.

David Todd [00:07:25] And, then you mentioned that you got introduced to Santa Ana National Wildlife Refuge when you were working on your Eagle Scout badge. What do you recall from that first encounter of being at Santa Ana?

Mitch Sternberg [00:07:45] Well, it's really interesting because I have a different context. When I came back to work at Santa Ana and I was going through reports. Some of our reports would have pictures, photographs, of the staff. And it all came back together to me going, "Oh, I met this person. That name sounds familiar." And I started to basically put the story together, and it just gave me a new context of everything. Like, "Oh, yeah, that. Oh, that's right. I did my project here, you know, at Santa Ana, 15 some odd years ago, 20 years ago, as a teenager. Let me see if I can find where that trail was and to see if the improvements are still holding up." Of course, those type of maintenance projects require regular, regular upkeep. But it was really interesting to get to know those people by name again through reports, and then meeting staff that knew them and had some context of, "Oh yeah, I remember us having an Eagle Scout project that time of that year, so..."

David Todd [00:08:50] It's nice when that work that you do, especially as a young person, gets recognized.

David Todd [00:09:01] Well, as a, as an older teenager, you got your Eagle Scout badge. And then not too long after that, I gather you went to Texas A&M and in 1996, you earned a B.S. in Wildlife and Fisheries Science and then got a biology master's in 2001 from the University of Texas, Pan-American, I guess, that campus. And I was hoping that you might be able to tell us if there were any classmates or professors, advisers, who sort of took you aside and showed you things, encouraged things, that might have led you to the kind of career that you've taken since.

Mitch Sternberg [00:09:54] Oh, sure. Yeah. Well, before I landed at College Station, we moved. My family moved because my father got a transfer and got a promotion and transferred. So I actually started at Victoria College, and at Victoria College getting some of my, in Victoria, Texas, getting some of my undergraduate work started, was when I met this wonderful lady that was an advisor there. And she put me in touch with a rancher and banker in that area who breathed and talked and slept and everything Texas A&M. And it was through that, that banker in Victoria that I started looking seriously at Texas A&M. He guided me towards the Rangeland Ecology Program, and that's actually the program which I started when I, when I transferred there. And although I had some great friends in I think a semester, two semesters, not very long, that I was in that program, I knew I didn't have quite enough of the agricultural background to to get up to speed. But I was really liking what I was learning, and it was literally kind of blind luck that I realized the kind of burgeoning wildlife program there was growing in leaps and bounds and sounded like exactly what I would be interested in.

Mitch Sternberg [00:11:27] And my initial advisor there was Dr. Doug Slack. One of his neighbors across the hall was Dr. Nova Silvy. Nova Silvy took me under his wing with all his graduate students, and I quickly found myself just loving the camaraderie and interaction with, with the graduate students who were so focused on their career. I was loving what I was learning about science and hearing how they built their projects, basically, how they were conducting the work. And although I had some great colleagues that were undergraduates as well, I really spent a great deal of time with a handful of professors and their students.

Mitch Sternberg [00:12:16] Other professors that were really integral to my time there was Honeycutt, James Dixon, Keith Arnold, Jane Packard. There were quite a few of them and they were all really formative for me. And they all, they all had different topic, focus areas as well that I appreciated.

Mitch Sternberg [00:12:40] But the graduate students under Dr. Silvy were really critical for me. Dr. Roel Lopez and Kirk Feuerbacher - still great friends to this day, were graduate students in that lab, as well as Cliff Griffin, who gave me an opportunity to work with endangered Attwater prairie chickens in their, their captive breeding facility at Texas A&M, Andrew Radomski, who actually works for Fish and Wildlife Service currently as well, Ellen Pederson, and a handful of, of other graduate students from Mexico too. And having grown up in the Lower Rio Grande Valley, I always had a fidelity and an interest and a drive to work in Mexico. And I met some great contacts in my undergraduate too. Arnulfo Moreno was a great contact for me, as well as Felipe Chavez-Ramirez, who went on to try and court me to go to graduate school under his tutelage as an advisor years, years later.

Mitch Sternberg [00:13:50] But yeah, Texas A&M was a great opportunity for me. I learned so much. I made so many contacts. I really just, it really blossomed the idea of what I could do as a career, in the very short time that I was there.

Mitch Sternberg [00:14:08] You know, it's interesting how you you meet people in school and not only do you learn about the topics, and the courses, and disciplines, but you learn like, that this is possible as a career, and there are people actually designing experiments and finding jobs and doing some very real-world things that are far outside of the textbook.

Mitch Sternberg [00:14:33] Mm hmm.

Mitch Sternberg [00:14:36] Yeah, it was, I was really lucky. People, I've, I think now my 25 years with the Fish and Wildlife Service I've had, and I calculated a number of years ago for this volunteer / funding exercise, and at the time, I think it was in the forties. So I think it's about 52 interns and staff that I've hired or directly supervised here. And I've told them, you know, sometimes it's, it's about finding out what you want to do, but sometimes it's almost as much about finding out what you don't want to do for a career, too.

Mitch Sternberg [00:15:08] So I think one of the things that I learned really quick, as I, I probably already effectively painted, was meeting those graduate students really exposed me to more of the science that could be done, and made it very clear to me that I was really interested in that.

Mitch Sternberg [00:15:29] At the time, also, to land an entry-level career that you could, you could kind of build upon, it was becoming clear that you could land that entry-level job more easily with a master's degree, and that you might struggle otherwise. And that was a, that was kind of a turning point. It had not become that common yet. And so I quickly changed my focus on having to get a master's degree, even though I was fortunate to have a couple of job offers as I finished my bachelor's.

Mitch Sternberg [00:16:04] So, as I looked to where that school and that proper advisor would be, I mentioned Felipe Chavez-Ramirez. He was at Kingsville and we were working on project ideas. As we were waiting on those project ideas, I found out about this opportunity to work in South Texas for Fish and Wildlife Service, and that's kind of what brought me back

here, as well as my fiancée and I, who are now married for 30 years, she was still here in the Rio Grande Valley.

Mitch Sternberg [00:16:41] So moved back here to the Rio Grande Valley. Dr. Chavez moved on. He is no longer at that university. As I worked for Fish and Wildlife Service, which was when I, I said, "Well, I just need a master's. A master's in biology would work." And I started looking at University of Texas - Pan-American.

Mitch Sternberg [00:17:01] I, of course, knew about Dr. Tim Brush. He's, you know, a famous ornithologist down here. I had had many conversations with him already at that early stage in South Texas, but my, more of my interest was in mammals. And that's how I came to know Dr. Frank Judd, back in the late '90s. And he ended up taking me on as an advisor for my graduate committee. And that was, that was also a huge turning point for me. And Dr. Judd's dedication to science and his many years of serving as an advisor on scientific journals really spoke for itself. And that was, it was really a perfect pairing for us both, I think. So, that was a great, another great leader in my career, was Dr. Judd.

David Todd [00:18:10] And, when you were working under Dr. Judd, was there a master's thesis that you undertook?

Mitch Sternberg [00:18:19] Yes. Mm hmm.

David Todd [00:18:21] What was that about?

Mitch Sternberg [00:18:22] My focus had been on habitat restoration here in the Rio Grande Valley. My area of interest had been that. And we developed a project to assess the habitat and rodent communities in replanted areas, and fallow areas, and a mature brush or undisturbed area. And so those are the three different kind of habitats that I looked at under his advisement. And he did a great job in doing what a mentor should do. He said, "If you want to study all these species, which at the time I wanted to do - birds, small mammals and reptiles - and, and he said, "That's too much. You're going to have to find other advisors."

Mitch Sternberg [00:19:15] So he winnowed me down really quickly to just habitat and rodents. I, I had had some experience with rodent-trapping as a science when I was at Texas A&M. And from my perspective, I wasn't so much interested in the rodents themselves, but the prey base that they offer for so many other things - birds and coyotes and bobcats and even potentially ocelots, I guess. And so, yeah, that was a focus of, of my project.

David Todd [00:19:48] Well we should probably talk about habitat restoration, but maybe a little bit later in our visit.

David Todd [00:19:56] So, I'm always interested in how people get started in this kind of discipline and career and life. And some people say that it was, you know, early childhood experiences. And some people say, "Well, it was, it was classmates and teachers and during school." But then others say, "Oh it was, it was a book I read, or it was a TV show I watched, or a movie I got to see." And I'm curious if there are of those sort of cultural artifacts that might have gotten you interested in the out-of-doors and conservation, outside of school, and family experiences.

Mitch Sternberg [00:20:38] Yeah. I think in my, my early years, my literary interests were really more science fiction and fantasy novels. But I was also interested in archeology,

dinosaurs (especially in my younger years), the history of the world, the changes of the world, different habitats of the world, early cultures. Early on, I was more interested in North American tribes and cultures and history. And later, I developed more of an interest in the Mayan and Aztec cultures.

Mitch Sternberg [00:21:14] But mostly, I think, and I think that the Native American interest, in large part, had to do with my interest having been piqued from visiting the desert Southwest and then visiting some of those historic places and seeing some of those cultures still today.

Mitch Sternberg [00:21:33] But, but mostly I would attribute my nature interest to my family.

Mitch Sternberg [00:21:37] As far as, like TV shows, any time there was something about nature (you know, my father's a chemist, so he's a scientist by nature as well). I had two older brothers who were very outdoorsy. And, but as far as shows, I think, you know, I'd forgotten until one of my other colleagues mentioned it because I think I was so young when I used to watch it, but "Mutual of Omaha" was a, was a huge, was a serious and popular thing in our house.

David Todd [00:22:11] Wild Kingdom!

Mitch Sternberg [00:22:12] Wild kingdom. Right. Right. "Nature": I think those came along later. "Nature" and "Nova", "Planet Earth", "Blue Planet", things like that, those, more of those type of nature shows, were always of interest to me.

Mitch Sternberg [00:22:31] And there's many a late afternoon with, with, especially with my parents listening to David Attenborough's calm voice kind of lulling us to sleep as you watch these beautiful sceneries and these intricate things happen about wildlife on TV, that we kind of fell asleep. So, but those were the, the big shows at our house, you know.

David Todd [00:22:59] [I might take a break right here to say that I'm getting a little bit of a swishing sound. And sometimes it is the mike rustling against your clothes or your neck.].

Mitch Sternberg [00:23:13] I might have done this right now and scratched my chin a bit. But you're hearing it still right now?].

David Todd [00:23:22] [Not now.]

Mitch Sternberg [00:23:23] [Okay. I had just adjusted, so that's what you heard.]

David Todd [00:23:28] [Okay. All right. Well, good, good. Well, we should resume.]

David Todd [00:23:30] So, you mentioned that you started working at Fish and Wildlife Service, and I think that started in 1998. Is that right?

Mitch Sternberg [00:23:41] Yes, that's correct.

David Todd [00:23:42] Well so, how did you get that first break, to get that initial job - that's such a huge step forward.

Mitch Sternberg [00:23:53] Yeah, I think, I think I just as a matter of of taking to figuring out what I liked, and being in the right place at the right time, and just talking to people and seeing where the needs were. I mean, as I explained a little earlier, when I was trying to get started on a master's project, I think I already had an idea of where my comfort / focal areas would be, and ideally, I was already interested when I was possibly considering going to school in Kingsville, a project on habitat restoration in South Texas.

Mitch Sternberg [00:24:36] And, so while we were fishing around for funds for a project, I found, found out about this AmeriCorps job. And AmeriCorps, at that time, which is kind of like a junior Peace Corps, if you will, was intended to be for kind of Peace Corps, but I think for I would say I think, it's fair to say, for a younger crowd, to get people at service in helping various fronts in the U.S.

Mitch Sternberg [00:25:15] One was like adult literacy programs. There were a lot of urban programs. But at the time, AmeriCorps also served to work at the U.S. Fish and Wildlife Service, at Refuges, and also at the National Park Service.

Mitch Sternberg [00:25:30] And again, while I was looking for funding and developing project ideas, I heard about this AmeriCorps job in South Texas, working with the very people and the habitat restoration program that I was very interested in studying for my master's.

Mitch Sternberg [00:25:50] So, I always had more of a focus, whether I realized it or not, in kind of what I wanted to do, but not being in a hurry. I kind of said, "Well, I might just put my master's project on hold for this nine months of this job, while I meet the people and get to know the environment." And since it was going to be a botanical-focused job, I said it wouldn't hurt me at all to learn all these plants down there - feeling very confident with my wildlife identification and management skills. I thought it'd be good to be more well-rounded and work on a plant-focused job.

Mitch Sternberg [00:26:32] So, I took a job with the plant ecologist down here at the time and basically mapping habitat communities, and also helping them in their habitat restoration program.

Mitch Sternberg [00:26:47] That program had started, I think it's fair to say, in earnest in the early 1990s, although they, the Fish and Wildlife Service, had partnered with Texas Parks and Wildlife since the '80s.

Mitch Sternberg [00:27:02] But that's how I got my start down here was working AmeriCorps. And I think it was just a matter of being in the right place at the right time. People appreciated my work ethic, I think, and that I was really interested in. I'm an all-hands-on person. If someone needs stuff, I'm glad to be there for service and to help people.

Mitch Sternberg [00:27:25] And, as I discovered that the University of Texas - Pan American might be a great fit for me, I started school there. As I started school there, a cooperative education program at Fish and Wildlife Service, a position opened up at the Cooperative Education, through the Cooperative Education Program, with Fish and Wildlife Service. And I interviewed for that job and was offered an opportunity to do that. And basically the way that program worked was that you would have alternating periods of work at the refuge and alternating periods where you went to school. And it was a great pairing for me. It worked wonderfully.

David Todd [00:28:15] That's great. It sounds like it was both an education and also the training in the, in the field.

Mitch Sternberg [00:28:23] Mmm-hmm.

David Todd [00:28:24] Now one of the things that I, I would really like to, to know about is you gave examples of the animals that you worked with, and the kind of habitats that you studied. I was hoping that you could tell us about the ocelot. I know you've spent a lot of time thinking about and working with it. Could you give us a little bit of a primer on the life history of the ocelot and, and maybe its ecological niche?

Mitch Sternberg [00:29:00] Sure. Yeah, I could definitely give it a try. I think my, my early years here with the Fish and Wildlife Service, I wasn't entirely focused on ocelot. Neither am I totally focused on it now. But it has become more, the last ten years, more, more of my job.

Mitch Sternberg [00:29:20] But yeah, so the life history of ocelots. Well, ocelots are pretty flexible in an ecological sense across their range in the Americas. Here in South Texas, they seem like they're been pretty resigned to be in the really densest of the dense woodlands and thorn forest or thornscrub, as we sometimes call it.

Mitch Sternberg [00:29:47] But they're mostly a nocturnal animal, at least here in this part of their range, where we have more obvious winter season than you do in the tropics, where we may only have a couple of weeks, or a month or two, where we have temperatures, you know, below 70 and maybe touching around the thirties to the fifties. But every year we have some semblance of a winter, I guess. And in those winter seasons here, it's quite noticeable that ocelots are out during the day and they do move around during the day. So they're not strictly nocturnal.

Mitch Sternberg [00:30:30] But they are solitary other than when they're breeding. Males, adult males and females don't really come together all that often. And the males will tend to try and occupy as much land as they can, to have as much access to more females. So they may overlap with two or three or four adult females and just continue to patrol that area and try and keep other males out and occasionally breed with those females.

Mitch Sternberg [00:31:01] The females here, probably every year, every other year are having a litter. The litter number is pretty small. It's 1 to 2. I don't know of any realistic record of three, although species accounts will suggest that they can have three. But I've never heard of a reliable observation of that anywhere, other than possibly a zoo.

Mitch Sternberg [00:31:28] And whether they're female or male offspring, they'll spend a couple or three years with the mother and the males will, will kind of get booted out by the mom. And the, sometimes, you know, in a peripheral territory with the mother sometimes they'll be overlapping the mother a little bit. And the female offspring will tend to share part of the home range with the mother. So there's kind of a, I wouldn't call it associative, but it's kind of cooperative areas. But they kind of, they have some kind of truce, it seems, in most cases.

Mitch Sternberg [00:32:15] Let's see, as far as what they eat, they're, they're a, you know, a mid-level carnivore. As long as they're not competing with other predators, they are, they probably eat more items than one would think. In a lot of places like here, South Texas, there's

a lot of bobcats and coyotes around, but a lot of rodents, birds, lizards, snakes. Those are all common fare for, for the ocelot.

Mitch Sternberg [00:32:45] In other areas - the tropics - they eat a lot of iguanas; in some areas, small crocodiles. Any kind of rodent at all is always on the menu. They do not eat fruits. They're not an omnivore, anything like that that we know of. Just strictly carnivores.

Mitch Sternberg [00:33:10] Let's see, what else? Probably live on the order of 18 or so years. The species account says 12 to 15 years. We've actually had 15 year old plus females at Laguna Atascosa that were still having litters. So if we were to write up what we know about the ocelots at Laguna Atascosa, we would be changing the species account quite a bit, given some of the things we've seen there.

Mitch Sternberg [00:33:40] So, yeah, I think, and what I've seen in my work in northern Mexico is that where there aren't a fair number of bobcats and coyotes around, there are a lot more ocelots. And so that's in part where I come from as far as saying that they're, they're kind of plastic in and what they're able to do. They can feed on a broader range of things if they don't have competition. I guess that was my point there.

David Todd [00:34:14] That's really interesting. So they, I guess, fill a similar ecological niche to the coyote and the bobcat. Is that fair to say?

Mitch Sternberg [00:34:27] I think probably the closest would definitely be with the bobcat. Bobcats and even more so, coyotes, are very tolerant of what we call edge habitats, or transitional habitats, or disturbed habitat. So if you take a mature forest or shrubland and you cleared part of it or some other major event happens, maybe in an area that is prone to fire, will set back the level of development of those type of places. And when it's more open, it's definitely more of what we would expect to be used by bobcats and in even more open areas, coyotes. So they definitely fill that niche.

Mitch Sternberg [00:35:14] But they're found in all kinds of habitats. I think the difference is where they can be found, and where they can actually make a living and have populations, are slightly different. They've been found in oak-grassland areas in Chihuahua. They've been found up to about 3000 meters, I think in some mountainous areas. The Sonoran Arizona ocelots: the photos you'll see from them, sometimes they're walking on snow. So they're definitely in areas that that can get quite cold. They look a little bit different out there. They do look a little chunkier, like they've got a little more fat on them to protect them.

Mitch Sternberg [00:35:55] But yeah, they're, they're quite adaptable as a species.

David Todd [00:36:02] Well, and this may be getting a little bit far afield, but I'm curious from looking at some of the reports of ocelots. I think there were some that were seen in Fort Stockton, which I guess would be a really, sort of a desert environment and then some in the Ashe junipers of the Hill Country, in Kinney County, in San Antonio, and then out in Big Bend. So they, they are more flexible than you might imagine, but they seem very kind of disciplined or specialized in the habitat of South Texas and do you think the animals changed or why was their habitat tolerance maybe different in the past than it seems to be now?

Mitch Sternberg [00:37:01] Yeah, I think. I've not really spent a large amount of time delving into the reliability of the historic accounts. I definitely think, I definitely believe that there were ocelots across a greater portion of Texas. I think in my experience, I would say I think as,

as modern humans change this landscape of everywhere where we are on the, on the globe, but in Texas, I think that's probably what changed the situation for ocelots.

Mitch Sternberg [00:37:40] Even in those areas where they might not have been as numerous, well, in those areas where they might not have been as numerous, it would make sense a little bit of perturbation would make it where ocelots couldn't quite survive there. And so they might retract back to places that have habitats, large patches of habitat on the landscape where they can survive as populations through time.

Mitch Sternberg [00:38:07] So some 50 to 80 years ago, I think there was just reached enough of a tipping point of a change where most of those places they probably couldn't survive because as the habitats were opened up, there's just more room, more places, more adaptable habitat for bobcats and coyotes in particular.

David Todd [00:38:30] Well, that's interesting. So in your mind, it may be that the competition with bobcats and coyotes was maybe more of a tipping point, than exposure to people and cars and building activities and ranching work. Is that where you are going?

Mitch Sternberg [00:38:49] Yeah, in part. I mean I think it's a little bit of an issue of scale - scale in both time and size of how much area is converted.

Mitch Sternberg [00:38:59] So, historically I would say they were over-hunted clearly, for the fur trade. But as more and more habitat was removed for agriculture and urban expansion, it became more of a challenge for ocelot populations to survive in those places. And then more in modern times, although we still worry about habitat destruction, habitat that could be used by ocelots, the biggest impact on ocelots in the last, I mean, realistically, 40 years, 50 years, has really been urban expansion and roadways. There's, there is, I don't want to diminish it, there is some issue with habitats that are removed here and there that could be used by ocelots or are being or had been used by ocelots. But roadways, vehicles and roadways, and ocelots trying to, to connect to habitats across roadways. This is the the bigger modern issue, as well as trying to rebuild the habitat to.

David Todd [00:40:13] Yes. Well, so if, if you were to summarize the, the reasons for the ocelot's decline, and I gather they're really at alarmingly low levels in Texas, what do you think the biggest factors would be?

Mitch Sternberg [00:40:32] So the loss of habitat and the, the isolation of populations, and due to that isolation, having to cross roads to try and establish new territories or find mates, have been the biggest ones.

Mitch Sternberg [00:40:49] And then although we talk about a good deal and I do believe it's important, we actually haven't seen any demonstrated issues with their genetics, but they are exceedingly inbred. There are two populations in Texas, and a total of 50 to 80 ocelots that we have in Texas. And both populations are highly inbred.

Mitch Sternberg [00:41:12] Although more is made of it in the literature about Laguna due to its small size and being close to urban development, but each is inbred, and the science is very clear on this. And that, that happens due to that, again, the removal of habitat, therefore shrinking the size of the area that's available for ocelots and isolating the two populations from one another so that there's not interbreeding between them.

Mitch Sternberg [00:41:39] And, then on a larger scale, the, the habitat wasn't just lost on the U.S. side. As part of what was termed in our neighboring state to the south is Tamaulipas, Mexico. And although the area of the Rio Grande Valley began to be populated in the 1710, 1712, 1719, it wasn't until mechanized agriculture took over in this area in the 1930s that vegetation was cleared here. But in the neighboring state of Tamaulipas, by the '60s to the '70s, agricultural cooperatives were really taking a foothold, and a lot of the habitat was cleared there.

Mitch Sternberg [00:42:31] In a time that was termed the *Revolucion Verde* or the Green Revolution, and that term wasn't, as much as we might think of it in modern terminology nowadays, such as calling something, "greening a landscape". Right? In other words, putting native plants back on it. The green was actually referencing the crops that were, that were being planted. So there was huge infrastructure projects on both sides of the Rio Grande Valley from the '30s to the '60s and '70s, putting in ditches to run water away and canals to bring water to all of these new crops.

Mitch Sternberg [00:43:11] And, so the removal of that habitat in Tamaulipas cut off the Texas populations from the Mexican populations and vice versa.

Mitch Sternberg [00:43:20] So, the, the genetics, though, thankfully, has not been exhibited in deformities or things that we've seen with other species like the Florida panther, with them becoming so inbred at one point that they had physical deformities that were very clearly obvious, like tails that were bent, literally the, the, the vertebrae in the bone were growing wrong. There were males that weren't able to take on adult characteristics and couldn't breed.

Mitch Sternberg [00:43:57] So, thankfully, we've not seen that in the Texas populations. But we do know, just based on the genetics, that they're very inbred.

Mitch Sternberg [00:44:05] So, our more, just to recap, our more modern issues are really the lack of habitat, the inability for ocelots not to move across the landscape due to vehicles, and genetics.

David Todd [00:44:20] Okay. All right. Well, that's really helpful. So we'll probably return to some of the topics that I know you're very familiar with, and maybe you could discuss this at a different time, but I think you put the finger on habitat loss and change as one of the problems for the ocelot. And I know that you've been really involved from your educational days in understanding habitat and trying to restore it. And I was hoping that you could sort of introduce us to, I guess, how you, first of all, identify a place that that might be a good candidate for restoration, and then what sort of steps you take to try to move that landscape to a, you know, a better habitat that would be suitable for ocelots and other wildlife.

Mitch Sternberg [00:45:22] Okay. Well, like I said earlier, I worked for a number of years and in my early years of Fish and Wildlife Service, and now I'm back to focusing on it again, in doing habitat restoration. In my earlier years it was just general forest and thornscrub restoration with Fish and Wildlife and some of our other partner agencies. As well as a little bit, and I also worked on some salty prairie restoration on the coast.

Mitch Sternberg [00:45:57] But more in the early years, our focus was forest and thornscrub along the Rio Grande, and not specifically about ocelots, although at times those projects were touted to be possibly helpful for ocelots, you know, a couple of decades ago when we thought we might have some little tucked-away, hidden ocelot population somewhere, or that they

might expand from Laguna Atascosa and end up, if we if we built some of these corridors, tying some of these patches together. But the early focus was really, truly about the reason that these refuges were acquired down here was for migratory birds.

Mitch Sternberg [00:46:38] So, but there's a benefit for this type of habitat for everything that would have used it. So, but so as far as for ocelots, at the same point that we were choosing that we should, as an agency, focus on what can we target to more immediately benefit ocelots. There was also our regional office in Albuquerque said we want to establish priority species for our region and they chose ocelot as one of those species. And so our program moved from doing habitat restoration along the river, or the Rio Grande, to focus on the coastal areas - Cameron County and Willacy County, but mostly on our refuge lands. But if there were partners or even private landowners that wanted some technical assistance, our whole agency was available for those type of efforts.

Mitch Sternberg [00:47:39] And, you know, there's some great science by university researchers and that was published in the early 2000s. And we used that as a starting model: what soils produce habitat that are used by ocelots? The focus was really on what areas ocelots were using, but we basically took that model and said, okay, ocelots need this kind of habitat. This kind of habitat can be found on these soils. Again, great literature helped support this.

Mitch Sternberg [00:48:12] And then, we started targeting where those areas were that had been disturbed. And what are the nuances of those different soil types: is one a little more salty, is one just ideal?

Mitch Sternberg [00:48:25] And then, until 2009, we actually didn't have any hard and fast numbers about what species and at what density. But we went in and sampled undisturbed areas across the Rio Grande Valley and found that the number of shrubs or trees, the actual individuals, not stems, as is sometimes counted, but the number of individual plants in those undisturbed areas was on the order of 3000 to 8000 per acre. So what I can add for someone that hasn't had to work in that, it's maybe hard to assess what that means, but literally it's every foot or so, you should have another bush or a tree coming out of the ground, and that's really dense vegetation. So that became our goal. Finally, we had some numbers about how dense should it be and what species should be where we had some of that, of course, with some of our plant ecologist information before. But to put a metric to it hadn't really been done that I had ever seen.

Mitch Sternberg [00:49:36] And so, we became focused on those, those appropriate soils. And then as, until about 2006, our habitat restoration program had been planting about 300 an acre. We began planting at 1000 seedlings an acre and it's very obvious that that density really helps keep the invasive grasses out, which are the biggest kind of challenge to replanting down here.

David Todd [00:50:15] Super dense.

David Todd [00:50:17] [I'm going to just take a brief moment here. I think that that you may be moving a little bit there, moving papers or...]

Mitch Sternberg [00:50:30] [About a minute ago, I moved, I like scratched my chin again, too. Yeah.]

David Todd [00:50:35] [Not allowed. No, no, you can't do that.]

Mitch Sternberg [00:50:37] [I know. I know. You'd have to tie my hands down. Boy you should be at my house, my wife's Hispanic. We talk with our hands all the time.]

David Todd [00:50:43] [Oh, yeah. It's so much easier to understand.]

Mitch Sternberg [00:50:47] [Right.]

David Todd [00:50:49] [But anyway, you know, to the extent that you can sit on your hands or whatever, it always helps. Sorry to be such a stickler for that, but it does help.]

Mitch Sternberg [00:50:58] [You know, I appreciate, I appreciate the reminder. Appreciate what you're trying to do with the difficulty of, of getting clear sound. So, no problem.]

David Todd [00:51:07] Okay. Well so, you've told us a little bit about this need to get greater density. And I guess part of it is to get the structure that you're looking for. But it sounds like you're also trying to keep invasives out. Is that true?

Mitch Sternberg [00:51:23] Right. One of our biggest challenges with these replanted areas is that the seed bank is extensive for invasive grasses. And when we talk about invasive grasses, that's, invasive is a character trait. Right? Things that fill in really fast? But, from a Fish and Wildlife context, when we talk about invasive grasses, at least here, we typically also mean exotic grasses. So they're not native to the area. They were brought into the general area for increased forage capacity, for more food for cattle. And they are doing quite well. So they are just in every field there is.

Mitch Sternberg [00:52:06] And our most ideal farm, our most ideal replanting situations, are farm fields that we've acquired as part of the refuge and we keep the, usually, the same farmer on as a contract. They can grow crops on the refuge until we're ready to have it replanted. And then, and while they're doing that, they're keeping it weed-free. So they're keeping out the invasive grasses. But all it takes is walking away for a season, in some areas more than others, and the invasive grasses will pop up everywhere.

Mitch Sternberg [00:52:44] Now, if we plant at a good density, with good soil moisture, the right time of year, and the grass pressure, right, the number of invasive grasses wasn't too high, there's nothing to worry about. We can, especially if the density's right. Because at about year three, these shrubs and trees will get to such canopy closure where their canopies are overlapping so that the sun really isn't encouraging the grasses to keep growing. And so we don't have to worry about them.

Mitch Sternberg [00:53:18] But, yeah, the grasses are a big problem. We see a lot of what we call forbs, you know, your early weedy stuff that's native, but also comes into these fields, just like any abandoned yard or a farm field. Sunflowers come in. Those aren't viewed as a problem as much as the grasses.

Mitch Sternberg [00:53:42] Some of the invasive grasses actually have a chemical warfare that's going on basically, called allelopathy, where they're literally producing chemicals that retard the ability of shrubs and tree seeds from germinating, or being successful when they start to grow. And so there's a real, there's a real war going on out there.

Mitch Sternberg [00:54:09] But invasive best invasive grasses are our biggest challenge there. And we best combat that when we're planting high densities.

David Todd [00:54:21] Well, so maybe this is a good time to sort of put a name to some of these species that you want, and the species that you don't want. Could you talk a little bit about these thornscrub shrubs and trees that you're trying to encourage, and then also the invasive, exotic grasses that are a real challenge?

Mitch Sternberg [00:54:44] Sure. Sure. Yeah, some of the, if we are going to focus on ocelot habitat, some of the principal ones that we would see across Cameron and Willacy County would be things like, and I know a lot of them by Spanish names, and so I'll try and cover both though as I go so that for the benefit of everyone that, that from different perspectives might be able to follow.

Mitch Sternberg [00:55:10] Gum bumelia is also called "coma", and that's a really great low, multi-stem, dense-growing shrub/tree. It's actually hard to tell which are trees and shrubs sometimes based on their, based on their growth form down here. And they will grow in mottes, or clumps, much like oaks do in certain areas. That's a great one.

Mitch Sternberg [00:55:39] The other kind of cosmopolitan ones would be things like lime prickly ash. We also refer to that as "colima". "Granjeno", or spiny hackberry, is another huge component. Snake-eyes is a shrub that's found in a lot of the ocelot territories. Let's see, ebony and Texas mesquite do form the larger trees usually. And in natural situations, there's some great rangeland ecology science work that shows that those are probably beneficial as nurse trees - mesquite and ebony - by enriching the soil, fixing nitrogen, and encouraging birds to perch in them and spreading fruits seeds around. So ebony and mesquite are also helpful in certain amounts.

Mitch Sternberg [00:56:37] So those are some of the principal ones. I'm sure I'm missing a few. And these communities, just the shrubs and trees alone, not to mention the native herbaceous stuff, is probably on the order of 30 to 50 different species. And it just depends on the nuances of the area. There's, there's a bunch of other ones, too, that are important.

Mitch Sternberg [00:57:02] For the invasive grasses, our biggest challenge really is King Ranch bluestem. It's such an aggressive plant and it is allelopathic. It also has this dormancy period in the winter where, unless you're a really good range ecologist, you can't quite tell that it's, it's dormant and therefore it's hard to kill. It can be mowed. It can be, it can be burned. The grasses respond relatively well to being burned and mowed unless you do it really often or at the right season to cause damage to the grass.

Mitch Sternberg [00:57:47] But as far as spraying, too, spraying with chemicals, isn't something we want to do if we don't have to. But it's a great way to get rid of these invasive grasses and you really have to pay attention to King Ranch bluestem to know when it's going to be in its growing stage so that the chemical will really take effect. But King Ranch bluestem is a huge one.

Mitch Sternberg [00:58:09] Buffelgrass is another major one, equally important as a problem, but not quite as common as King Ranch bluestem. And guinea grass. Buffelgrass and King Ranch bluestem are both allelopathic.

Mitch Sternberg [00:58:26] But guinea grass, I don't know it to be a little allelopathic, but it's a very aggressive panicum. It's a large panicum species. People might be familiar with blue panicum. It's similar. It's a, it's a clump grass and will grow to five, six foot tall. Some of the areas we're seeing down here now with the rain we've been getting, steady inputs of rain, over the last couple of years and 2021, we have just entire understories of some of these, even these replanted areas, that were planted not as dense as would have been ideal by my, by my standards, are full of guinea grass.

Mitch Sternberg [00:59:09] So, with guinea grass, at least it's not allelopathic, that I know of, but, but it's definitely in competition with those seedlings. So it's sucking up water, nutrients at the ground level. And these grasses are, if they get tall enough and thick enough, they're shading out seedlings. So they're competing for sunlight.

Mitch Sternberg [00:59:30] And, because these forest and thornscrub communities aren't considered adapted for fire, if fire does roll through one of these invasive grass areas, the fire can handle it, but these seedlings can't. These seedlings aren't adapted. This is not a fire-adapted community down here. So they basically change the entire ecosystem, at least on a patch-by-patch level. So, yeah, there's a lot of fighting between us and invasive grasses.

David Todd [01:00:09] [I'm going to make one more pesky request to try to be careful where your mike is.]

Mitch Sternberg [01:00:19] [Okay.]

David Todd [01:00:21] [A strange wah-wah going on and on, and I don't know what it is.]

Mitch Sternberg [01:00:25] [Are you hearing that right now? That last time too, I was going to comment. But I am tilting my head around a little bit, so it could just be that. But the air has kicked on again.]

David Todd [01:00:36] [I think it seems to happen when you're speaking.]

Mitch Sternberg [01:00:41] [Okay. I'm probably bouncing around. I'll try my best. I appreciate it. Keep reminding me.]

David Todd [01:00:48] [Okay. Well, this is never perfect technology. It's not you. It's just our wonky way to try set this up.]

Mitch Sternberg [01:00:56] [It's no problem.]

David Todd [01:00:57] So, I gather that, that these plants that you're putting in are actually seedlings, or saplings. You're not really growing straight from seed, is that right? Do you have greenhouses where you preparing the plants for some sort of a grow area where you propagate?

Mitch Sternberg [01:01:15] Yeah. We, in the past, in the '80s and in the early '90s, we did try and establish sites relatively quickly through using direct-seeded operations. So we literally took (only a handful of species can really germinate this way), but we did actually use seeds quite a bit then, just directly tilled into the ground.

Mitch Sternberg [01:01:44] We found that those were just so low in diversity that we didn't think it was going to really get to the objective that we wanted. It wasn't so much about just cover, as much as it was about trying to be true to what the wildlife community needed in those areas, and that wasn't going to achieve our level of diversity that we wanted. Being like there wouldn't be fruiting species, for example, fruit / mast species that a lot of the migratory birds are going to need.

Mitch Sternberg [01:02:14] So, in the mid-'90s, we moved to seedling operations where we grew the seedlings. We grew them ourselves, and we grow them through contracted growers - local, local, contracted growers that sell to us as part of their market, as well as other wholesale and retail nurseries. So we'll grow, on order, maybe something like 25% to 30 or so percent, of what our given annual objective is. So currently we're shooting for, I believe, it's 100, and let's just say, 150,000 seedlings, for this coming year. And I believe we are growing 30,000 of that ourselves.

Mitch Sternberg [01:03:06] Does that answered your question? Did I?

David Todd [01:03:09] Yeah. No, that's. That's great. That's great.

David Todd [01:03:13] So, what is the process? So, you're planning this in the, in the fall, is that right? And then you're somehow...

Mitch Sternberg [01:03:23] We plant, some species grow faster than others. So, well, they're actually being transplanted, if you want to call it that, to the field in the fall. Yes. So, the ideal timeframe would be when we're going into the fall weather, somewhat moderate temperatures, but a greater chance of rain. So the ideal that I ascribe to, which our program is trying to get back to doing, is to plant between the ideal time of October through January, maybe February.

Mitch Sternberg [01:04:01] At times, just because of delays or weather issues, we don't get all the plants in the ground until maybe April. April is one of the driest records, on average, in our area. And although you can get several inches of rain in any month from April through August, you can also go a month or a couple of months with no rain. And for these seedlings that have been grown in a nursery, even though we don't spoil them, we are, we are watering them. So when they go out there in the field, if they don't get rain for a couple of months, it's pretty rough on them. Again, some species grow are more tolerant, you know, drought-tolerant than others.

Mitch Sternberg [01:04:49] But, yes, it's, it's quite a complicated operation. While we're planting in the fall, we're readying our order of what we want for the next year's sites. So we also have to know where those sites are going to be, and what the appropriate species are for those sites, and the numbers we want. So and then as soon as we can in the spring, we are notifying all the partners that are helping us acquire those seedlings so that they can start growing them, because some of the seedlings are actually quite slow to grow.

Mitch Sternberg [01:05:27] There's ones that we call guayacan, for example. It's sometimes called soapbush. So it is a huge amount of crude protein. So that means it's a, it's a big target for deer, for browsing, for chewing on the little leaves. It's a super slow-growing shrub. And if you don't get it started in probably by April, you're just not going to have them of a reasonable size that they would survive if you put them out in the field in October. So it's a big,

complicated machine getting these things planned and then grown at the nurseries and then established in the fields.

David Todd [01:06:18] Well. And there must be just so many factors here, but I'd be curious about two things, and maybe you can fill me in. One is, is the factors of soil, whether this is clay or loam or sand, and then secondly, how are you planning these for you? This isn't like a no-till operation with seed. You're putting in stems in the ground. Right? How do you go about that?

Mitch Sternberg [01:06:52] I missed the nuance of the first part of your question about soil.

David Todd [01:06:56] Well, I'm just curious, you know, have you found that these plants, and then the ocelots that are hopefully going to use this habitat, prefer areas with, you know, high clay content or more loamy or very sandy. What's that like? I know you've got, this is all very expensive and I bet you have to be really strategic about where you plant.

Mitch Sternberg [01:07:23] Yes. Right. You touched on some really good points there.

Mitch Sternberg [01:07:27] Yeah, the soil characteristics are really important. Too much clay means it's just too tight-packed. It's typically going to be a wetland. It's a, it's a bottom of a wetland, even if it looks dry at the time. That's why we really rely heavily on the USDA's fantastic soil maps for down here. Their data is super accurate. It's very rare that we find any area that doesn't match up with the characteristics that they've listed. But if it's too heavy in clay, it's most likely a wetland.

Mitch Sternberg [01:08:03] But clay loam is the ideal. Clay loam - you can have little bit of mixes of sandy clay loam. That works just fine too, as long as there's some clay and loam in that, there can be a little bit of sand. If it's just too sandy, there's also species that will do well in that.

Mitch Sternberg [01:08:21] But typically areas that are sandy, or bordering on sandy, or too sandy, those typically also have some undulations across the landscape. And so there's, there's quite a bit of nuance there that we've not dealt with as far as an agency and planting in those areas yet. But we're starting to delve into that a little bit, because some of the areas of the northern ocelot population will require that if we're going to plant successfully ocelot habitat, we'll have to figure that out.

Mitch Sternberg [01:08:53] In those areas, the diversity of the brush lands is quite a bit, of the brush species, is quite a bit smaller, maybe more like 15 to 20 key species that we find that can do well in that. Brazil, "blue wood", is another name for that, is another, is another component that comes to mind in those areas.

Mitch Sternberg [01:09:17] So, soil is really important.

Mitch Sternberg [01:09:20] And if the soil is known to be salty, there are Harlingen clay, for example, is a type of soil, soil type, that we have down here that one of the components, or one of the species, I guess, if you will, of Harlingen clay is one type that does have salt in it. That will grow brushlands, but it will grow a great mix of, you know, thornscrub and salty prairie. It's neither perfect for ocelots, neither perfect for aplomado falcons, which would ideally want salty prairie and mostly open prairie. But it's kind of a transitional.

[01:09:59] And then, as far as the, the way that they're grown and planted: so, we don't plant bare root stems as a lot of like pine restoration programs do. We grow these in biodegradable paper (everything's biodegradable, as I was reminded, not a year ago - even plastic is biodegradable), but these are plastic. These are paper, kind of like cardboard, cellulose tubes that come flat. And when we unbind them and stretch them out, they open as a little square tube. And so we pack the soil mix in there. And it's, it's just an amazing horticultural thing that I was never really taught. But we have basically a soil medium and then vermiculite is another component. And then what they call sunshine mix, which is great, got this little mix of kind of peaty-like fibers in it that really helps hold onto the water. That's what we plant the seeds in, in the nurseries and care for them and water for them like that.

Mitch Sternberg [01:11:15] When it comes time to transplant them to the field, those plants are rooted within those plant bands, each one isolated in their own plant band. We pull them out, and our way of doing it is 49 fit perfectly in a milk crate. So we take them out to the field, we mix the species up. So when we go out into the field, there's not 4900 mesquites in a row. For example, there's, you know, two mesquites and then some snake-eyes and then a Brazil and then a mesquite again. So it's a nice mix across the field.

Mitch Sternberg [01:11:54] The way those are planted typically is by hand. In certain soils, one might be able to use what's called a tree-planter, which is an implement that, that follows behind on a tractor. And you would have individuals sitting in seats back there and it would open a furrow and you would drop the seedling into a chute and it would basically drop it into the hole. And then the rolling wheels as you went past it, would push the dirt around the seedlings. And in an ideal soil situation, probably more sandy silt type situation that can work great. But with clay, it doesn't really work from what I've seen here in the Rio Grande Valley.

Mitch Sternberg [01:12:42] So, we're kind of kept to using field, you know, hand crews. We have had our farmers, to pay back their rent to us, hire crews to do that. We have also had partners that helped us hire professional tree-planting crews that do that all year. We had a professional tree-planting crew plant both of our sites this last year. They started at, the, the first week of March, and by the second week of April, I think that's correct, they had achieved 180 acres. And that was, I believe, it was 176,000 seedlings. So these guys know how to do it. This is what they do from here to South Carolina. And they do an excellent job too.

David Todd [01:13:45] Fascinating. And what an interesting change from agriculture of 50 years ago and many of the same farmers are involved. But instead of growing, I don't know, cotton or sorghum, milo or whatever, they're planting these trees they probably earlier root-plowed out.

Mitch Sternberg [01:14:10] Yeah. Yeah, it's quite an interesting turn there. Of course, you can imagine all the different conversations. There are some folks that are almost offended at the idea that brush, as a lot of people call it, is being put back in the landscape after they cleared it, but some people actually find it quite rewarding. I had contracted a farmer about 12 years ago, unbeknownst to me, for them to help us do a replanting operation. They were great contractors. They had helped us at other places and we asked them to come plant this area for us. And as it turns out, the older gentleman who had (there were three generations of farmers in this farming, this farming family), and the older gentleman had planted melons there - cantaloupe and watermelon. They said, "Wow, now we're coming back to this area and replanting." He was actually pretty excited about it.

Mitch Sternberg [01:14:58] We had, we had, after they had left planting their crops in that area, other people had taken over and then let it go. And it had filled in with buffelgrass. And it was a 60-acre field that we had cleared of buffelgrass. And they planted it, did a beautiful job.

Mitch Sternberg [01:15:15] So yeah, you're right. It's quite interesting to note, you know, some 40 years before that, he had been planting melons there.

David Todd [01:15:23] Boy, that's a change. Oh. So I guess this is a trial and error, learn-as-you-go, learn-on-the-job exercise. How do you, how do you sort of monitor the success and failures of different ways of doing this? I know that, I guess when you were first setting out in your master's research, you looked at this whole question of native versus replanted versus natural succession on fallow fields. And so you've clearly been thinking about how this how that comes back or doesn't. Can you talk a little bit about how you monitor it and understand the succession?

Mitch Sternberg [01:16:16] Well, what we've seen, and we typically when we've acquired lands, we've not let them go fallow. So we don't have a whole lot of those experiments, if you want to call them that out there. But from like the site that I know intimately from my master's project and then other sites that were candidates that I had looked at back then, they just won't ever get there. They just simply have way too much invasive grass pressure there. It kind of repeats its ecosystem. It doesn't, it doesn't allow the trees to take over. They will acquire more diversity over time. But it's just, the invasive grass pressure is just too heavy.

Mitch Sternberg [01:16:57] But the way we monitor it is we monitor, first and foremost, seedling survivorship. So we look at seedling survivorship the first few months, and then maybe at six months, but definitely at one year. Usually if they've survived at one year, you're going to get within 5% or so of that survivorship through to the next year. And usually by the second or third year, you can expect that's what you're going to get. That's the survivorship you're going to get.

Mitch Sternberg [01:17:26] Even in the days in the past when we used to plant at maybe 300 an acre, you would maybe get on average 80, 85% survivorship, which is actually quite high. But when you look at a distribution of seedlings that might be 12 to 15 feet apart, you're really planting a savanna. So you're kickstarting it maybe into being a forest or a shrubland, but you're really not kickstarting it too far.

Mitch Sternberg [01:17:54] So we monitor our seedlings for survivorship, and we're finding now, with a little more care in making sure that they're weed-free fields and that even after planting, we can spray grass-specific herbicide to keep the grass pressure down, if we need to. We're getting on the order of 90, 90 to 97% survivorship. So that's kind of the short-term monitoring.

Mitch Sternberg [01:18:22] The long-term monitoring is something that we have yet to really do. As you mentioned, this has been an experiment just iteratively going on and learning as we go. And it wasn't until only 11 years ago out of a 40-year program that we really said, what's the density we're shooting for? And that was that that assessment we did of mature areas where we found, well, our goal should be something in the order of 3000 to 8000 plants per acre. The long-term monitoring for these sites should really assess not just survivorship, but similarity with our our trajectory as it moves along. Okay. Well, we're looking at our site at ten years, 15 years, 20 years. What should we see there? What should we see as a habitat characteristic, but also as wildlife that should be expected to move into those areas?

Mitch Sternberg [01:19:20] And so, for me, that's really exciting stuff. I'm amazed when other people aren't as excited to do the work. That's literally what brought me back here. If there were ten of me, I would keep all of us busy, and I think with a smile on their face doing that, that level of assessment. But, but for now, our main focus has been evaluating seedling survivorship. At least from a, a fiscal responsibility standpoint, one has to pay attention to that. Right? We spent so much growing these things, contracting them, putting them in the ground. We need to, we must, do it in a way that we're not losing money, basically, and wasting time.

Mitch Sternberg [01:20:07] So, we've had sites, as I've kind of alluded to, that were planted densely. Those sites, from a logistics standpoint, to put them right back on the right trajectory. It's almost unimaginable from a logistics standpoint to not just clear the field to start over, because as you could probably imagine from our conversation. To do this effectively on a, you know, 20, 30, 40, 50, 100 acre parcel, you can't be weaving tractors in between the odd tree here and there and really be very efficient. You end up breaking implements, and it's a hazard to the staff. And so we've literally taken sites that were not planted effectively and started over. And that's expensive, too. That's even more expensive. You're usually talking about mobilizing a fire team to do a prescribed burn, mowing, application of herbicides. All of that just to get it back to the starting point.

Mitch Sternberg [01:21:19] So but yeah, hopefully that covers kind of the short and the long term.

Mitch Sternberg [01:21:24] The long term we just, to cover that, we really need to vision that more. We need to say in this community that we replanted, what should be the species that come in on their own? And if not, if they're not coming in after so many years, when will we plant them, you know, for example. Or if we're not seeing this species of bird here, what did we do wrong that we need to correct? So.

David Todd [01:21:56] You know, money is not everything, by a long shot. But I think it might help me understand the value of a native habitat, if I knew kind of the cost of trying to rebuild one, if it's been, you know, plowed and treated and, you know, is a fallow field.

Mitch Sternberg [01:22:24] Yeah. I probably should have looked up my numbers. I should have expected that question. I know for sure I've heard estimates from anywhere around three to maybe even 5000 an acre. Of course, it's, you know, a matter of density, too, because the seedlings themselves, on average, we are purchasing them at about a dollar to a dollar 50 for each seedling. But then there's the cost of the soil, of the plant bands (you know, the tubes that they're planted in). There's a cost to have them installed, which is actually the major part of our costs right now. To get them installed by professional crews is actually one of the major hurdles for us. But yeah, it's quite expensive.

Mitch Sternberg [01:23:16] And I guess another question I'd have is, it seems like there are many ways to estimate how these restorations are going. You can do transects, I guess, on the ground. Maybe you can look at aerial photos, maybe some combination of the two? How do you approach that to try to understand the progress?

Mitch Sternberg [01:23:43] So from a simply statistical standpoint, given what we see for survivorship, we don't, it's not really that arduous of a process. For a typical field, anywhere from 30 to maybe 100 acres, assuming if you're not looking at differences in soil types, which

typically we only have one or two soil types in a field, and typically they're very close in characteristics. So you don't have to stratify your sampling differently in the different soils. But 150 seedlings, you know, from a total of maybe six, so you maybe have six transects that total 150 seedlings, and that gives you everything you need to know about the, the, the average survivorship for the field.

Mitch Sternberg [01:24:29] If we had wanted to break it out by a certain species, that's a lot more challenging. We've not looked into that because we're really looking at a total effective treatment, basically. Did we get woody cover on the ground, basically, whether it's a forest tree species or a shrub species? But if one wanted to look at it on a species-by-species level, we could probably pick the top two or three species in any treated site, and then the same thing would apply. We'd have to have enough transects to have, you know, 150 or so individuals of that species and track those through time to say, you know, the percent survival of spiny hackberry was X percent, you know, within a reasonable, to make it significant or not.

David Todd [01:25:28] Okay.

Mitch Sternberg [01:25:28] Does that help?

David Todd [01:25:29] Yeah. Yeah, sure. And just, again, to sort of quantify what you've been doing these past years with the habitat restoration, how many acres have you restored and where are they?

Mitch Sternberg [01:25:45] Well, great question. One that that starts debates often.

Mitch Sternberg [01:25:50] So the term, terms are used because they're what's, what's the economy of words there? Terms are often used as a, as a definition for a lot of other words. Right? So the term, "restored", is a, is a touchy subject for us. Sometimes we have to fill in database that says how many acres did we restore this year? And many of us have argued, "none". We've restored none, but we've put them back on the trajectory towards restoration.

Mitch Sternberg [01:26:19] So, I guess what I would say is that it's a, it's a slow process. And it's a, it's a series of marathons, not a sprint. And there's a lot of people that don't have the patience to let these things run their course. These things formed over millennia, these ecosystems here. And in the space of, you know, mechanized agriculture, 50 years, you know, to maybe 80 years if you want, to go till now, we've done a lot of damage. And so it's going to take a long time to put those back. So it's not something that everyone has the patience for.

Mitch Sternberg [01:27:05] I'm not sure I tended to the entirety of your question there.

David Todd [01:27:09] Well, I was just hoping that you could give us some sort of order of magnitude estimate of how many acres have been, if not restored, but at least put on a trajectory for restoration.

Mitch Sternberg [01:27:21] Yes. Thank you.

David Todd [01:27:23] That would be good for wildlife.

Mitch Sternberg [01:27:25] Yeah, sure. Yeah. So I think a number of years ago I kind of stopped keeping tabs on it, but it was close enough. And we've been focused on fewer areas but more dense. So I think the order is somewhere around 17,000, 18,000 acres in all of south

Texas, in the four counties of south Texas. Most of our work has been in Hidalgo and Cameron counties over the years.

Mitch Sternberg [01:27:56] And I would say, you know, there's, there's a lot, by far, there's a lot more of these areas that are some degree of successful, versus some degree of a failure. There are a number of areas that are heavily disturbed that have had repeated wildfires maybe from individuals driving along and the muffler sparks something, and catalytic converters sparks something, or a cigarette starts something. So some of those areas, nearer the border towns, those are the bigger challenging areas to reestablish these native forests and shrublands. But there's a lot more of them that are in pretty good standing than, than not.

Mitch Sternberg [01:28:42] And, you know, every one of these sites, whether it's a direct-seeded site that has relatively few fruit-masting trees, still serve a great purpose for all kinds of things, from woodpeckers, to dove, to quail, to an abundance of hawks that come through the area that use them as well. And you'll find through time that some of the fruit masting species will end up in there, whether it's hackberry, or brazil, or prickly pear cactus. They'll usually find their way there. But I think, I think that's, that's about where we're at, somewhere around 18,000 acres.

Mitch Sternberg [01:29:23] For each of the, for the, at least near future, our expectation is that we're only going to do about 100 to maybe 200 acres a year. It used to be a goal of this program until 2008 that they had to plant 750 acres a year. And because the goal was set so high, it just wasn't, did not allow for quality plantings. It was just literally a game of quantity. And so now we're, we've trimmed that way back to where we can focus on quality and fewer acres.

Mitch Sternberg [01:30:02] Which is, which is a curse and a blessing. On one hand, we can do a better job with the fewer acres, but that also potentially means that, especially for focus on ocelots, we're basically building their territories up slower. Right? They're going to be more quality habitat, but it's going to take more time. So it's a, it's a mix. One has to decide what's best there.

David Todd [01:30:27] Not easy. Well, now, this is a great introduction to just understanding what a impressive goal it is and how much of a challenge it is to achieve it. And so there's lots I'd love to talk to you about, but I think that we may hold off on some of these topics till later.

Mitch Sternberg [01:30:53] But I did want to just leave you with one last question, and that is just is there something that you'd like to add, that you feel would be good to discuss now rather than later?

Mitch Sternberg [01:31:09] I'm trying to think if it's a question that we talked about before, or if it might have been something asked today that I didn't get to. But, I mean, so the thing that comes to mind is what's using these replanted areas. And, I mean, it's a, it's a worthwhile question that's asked a lot. And among the many projects I've, I've had, whether they were supervisor or unsupervised. Some of them have been you know pilot projects where we start out, "Okay let's see what wildlife are using these areas." And I can say from those experiences that we've seen a whole host of things using these replanted areas from Texas indigo snakes, to Texas tortoise, hook-billed kites, gray hawks, Altamira orioles, of course, green jays and great kiskadees and golden-fronted woodpeckers. It's just a huge number of things make use of these areas as well as the ocelot.

Mitch Sternberg [01:32:13] We've even we've documented ocelot using a site that was planted in the 1990s at Laguna Atascosa, as part of a master's project out of Caesar Kleberg Wildlife Research Institute. I don't think that their follow-up timeframe, because it was intended as a master's project, was lengthy enough for them to realize it, but ocelots have actually used those replanted areas, including a female. At least one female ocelot has used that that area. In our 2016 replanted site, it was two years later that we had a male ocelot wandering through one of our successfully replanted areas.

Mitch Sternberg [01:32:54] So, I guess that was a point I wanted to make, is that there's, there's a huge benefit for all kinds of wildlife whenever we plant these thornforests and shrublands, you know, from, from potentially ocelots to tortoise (if you don't get it too dense; tortoises don't like it too dense). But tortoises, indigo snakes and a whole host of great birds use these areas. So.

Mitch Sternberg [01:33:20] But, but no I appreciate the question opportunity, David, and it really wonderful talking with you.

David Todd [01:33:26] Well, I really appreciate. I learned a lot. Thank you so much for being generous with your time to introduce us to all this exciting work that you're doing. And I just hope that you will continue doing this stuff and maybe give us another bite of the apple where we might be able to return and talk to you later.

Mitch Sternberg [01:33:49] Absolutely. Yeah, definitely. We can make that happen. I'd look forward to talking to you more in the future.

David Todd [01:33:55] Well, I would appreciate that.

David Todd [01:33:57] With that nice offer, I'm going to hit, "stop recording". And then we will depart and you can go eat some lunch.