

TRANSCRIPT

INTERVIEWEE: Nova Silvy, Ph.D.

INTERVIEWER: David Todd

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

David Todd [00:00:03] This is David Todd.

Nova Silvy [00:00:06] And this is Nova Silvy.

David Todd [00:00:08] Dr. Silvy, so nice of you to call.

Nova Silvy [00:00:11] Thank you. Yes. Just here to answer your questions.

David Todd [00:00:14] Well, I really appreciate the opportunity to pepper you with some questions. I look forward to learning more about the Attwater prairie chicken and also about your own life and career. So thanks for taking some time today.

Nova Silvy [00:00:32] OK. Glad to help.

David Todd [00:00:33] Well, thank you. I thought just for the record and make sure that you understand where we're coming from, that I would lay out what we're planning on doing today. And, and I think our intention is to record this interview for research and education work on behalf of a nonprofit group, the Conservation History Association of Texas, and for a book and a website for Texas A&M University Press, and then finally for an archive at the Briscoe Center for American History that's based at the University of Texas here in Austin. And of course, you have all equal rights to use the recording as well for your purposes.

David Todd [00:01:18] I want to make sure that that's OK with you.

Nova Silvy [00:01:21] That's fine, that's fine.

David Todd [00:01:22] Oh, good. Good.

David Todd [00:01:24] Well, let me get started then. We'll dove into it and I'll try to set the place and time and so on, and then we can open it up for some questions.

David Todd [00:01:36] It is January 15, 2021. My name is David Todd. I am in Austin. I'm representing the Conservation History Association of Texas today. We are fortunate to be conducting an interview with Dr. Nova Silvy, who's a Regents professor and senior faculty fellow in the Department of Rangeland, Wildlife and Fisheries Management at Texas A&M University in College Station.

David Todd [00:02:03] Since the mid-1970s and for over three decades, Dr. Silvy did extensive research on the Attwater's prairie chicken, as well as a host of other species, and in the course of doing that, also trained many undergraduates and graduate students, some who went on to work with the prairie chicken as well.

David Todd [00:02:24] I understand that he's based in Florida now and this interview is being done by telephone.

David Todd [00:02:32] So today, I hope that we might talk a little bit about his, his life and career and also his, maybe focus in on his research on the Attwater's prairie chicken, its decline and the efforts to, to understand more about it and then to breed it in captivity, to release it to the wild and gradually restore the bird.

David Todd [00:02:56] With that little introduction, I was hoping I could ask you a question just about your childhood and if there might have been any people that you could point to or experiences you had who, or which, had a big influence in your interest in wildlife study and education.

Nova Silvy [00:03:17] OK. I was born in Missouri only because my parents were back. My Uncle Nova was dying and he was my dad's older brother. And anyway, I ended up getting the name, Nova, before he passed away because I was born when they were back visiting. My parents lived in the state of Washington, where my dad was a, worked for the railroad. He was an engineer on the railroad and was transferred several times between Washington, Oregon, and Idaho. And that's where I grew up for about 10 years of my life. I'm the second oldest of 10 children. My mother always had a big garden. We left, before we moved to Kansas, when I was about 11 years old, we ran a dairy farm, milked cows, etc. My mother always had a large garden. My dad was a hunter, not a trophy hunter, but a meat hunter to feed the family. My mother at one time was offered by a game warden, asked her to raise a pet fawn whose mother had been killed. So I grew up around wildlife. My mother was also very much interested in plants. She really loved also hummingbirds.

Nova Silvy [00:04:28] So anyway, at eleven years old, we moved to Kansas and there I went into finishing my grade school and high school days and then went on to Kansas State and the Department of Zoology, where they had just started a wildlife science background. And there was one professor there by the name of Dr. Robert Robel, now deceased. He was basically the only wildlife person. Now there were ornithologists, mammalogists, and things like that. And basically, in those days, you had to do both - the fisheries and wildlife, the litter. So I have a background in both Wildlife and Fisheries from Kansas State.

Google Voice [00:05:15] But I really got interested in wildlife and went to Kansas State to get that degree from a game warden. I used to fish with my dad and some family friends on the Missouri River, mainly for channel catfish, and the game warden would come around all the time and talk to us. We knew we'd better have our fishing licenses. He never asked for 'em, but we knew we better have them. And anyway, I spent a lot of time talking to him. He was a Native American. I was impressed with what he did.

Nova Silvy [00:05:47] And when I first went to Kansas State, I wanted to become a game warden because I was really impressed by this gentleman. But after I got there and got to meet biologists, I wanted to become a biologist, and anyway, between my B.S. and master's degree there, I took a year off and I worked as an apprentice electrician in St. Joe, Missouri. And it was because of that Dr. Robel contacted me. He was starting a radio telemetry study on

greater prairie chickens in Kansas. And he knew because of my electrical background that putting me on radio transmitters on these birds for the first time in Kansas that I could be helpful. So I was hired on this project to do the first study on those, greater prairie chickens there in Kansas.

Nova Silvy [00:06:37] Dr. Robel had a great influence on my career, mainly from an educational standpoint. He taught all the wildlife courses back then and not only did you, now people have an ichthyology course, study of fish, herpetology course, study of reptiles and amphibians. When I took the courses, ichthyology / herpetology was one course. And he thought that; he thought all the wildlife course, etc. So he was a great influence education-wise on me and I'm very appreciative of the fact that he asked him to stay on as his graduate student.

Nova Silvy [00:07:10] Then after my Master's, Dr. Robel took a sabbatical to Scotland and asked me to stay on as an instructor to handle his courses with my master's degree and the main's office graduate, Ph.D. students. So for a year, I taught general classes, all the classes, program, birds, and different things. And during that time I was applying to, I liked what I was doing. So I applied for a Ph.D. at several places. And Dr. Robel had asked me to go to Scotland to work on black grouse. So there for for the taking. I was also contacted by Texas A&M University to work on the endanger Attwater prairie chicken for a PhD. project. And also I was contacted by Dr. Willard D. Klimstra, Southern Illinois University - Carbondale, to work on the endangered Key deer in the Florida Keys. I made up my mind to do the Key deer project because I didn't want to be totally tied to grouse. There may have been a limited opportunity for employment if that was what I did, although it was a lot easier to go to Scotland and maybe more glamorous, but, or go to Texas A&M to be able to work on Attwater prairie chicken.

Nova Silvy [00:08:30] So, I chose a Ph.D. to work on the Florida Key deer. And Dr. Klimstra was a big influence in my life. He got me involved. He was president of the Wildlife Society. He got me involved with the Wildlife Society, although I'd been a past-president at the Kansas State student chapter. But he really gotten me involved nationally.

Nova Silvy [00:08:52] And then once I graduated from Southern Illinois University, there was about two job openings in the country at that time. One's at University of Miami and one at Texas A&M University. And at that time, that had several deer people there, including Dr. James Teer and others who worked on deer. And so he asked me, he was head of the department at the time, what I'd prefer to work on? I said upland game birds, knowing that there are a lot of deer people there. Anyway, I ended up being hired.

Nova Silvy [00:09:28] And Dr. Teer was a great influence on my career. He would take me to meetings. We'd room together. He introduced me to all the people they knew, which he knew almost everyone. And then he helped me get grants, cetera. And until the day he passed, he and I were very good friends. In his later years, he'd moved back to College Station. We'd have lunch together every Wednesday. And I was there the night before he passed away during the night, at his home.

Nova Silvy [00:10:00] But, you know, during your lifetime, you have these mentors and Dr. Robel at Kansas State, Dr. Klimstra at Illinois and Dr. Teer there at Texas A&M, really helped me immensely in my career.

David Todd [00:10:19] There's sort of this, there's this change of influence from one generation to the next, from professor to student. It's really striking.

Nova Silvy [00:10:29] Yes, it is. And I've tried to emulate that with my graduate students also. So I've really enjoyed, as I said, I came to Texas A&M in 1974 and had a great career there teaching and doing research and, you know, I was always interested in Attwater's prairie chickens. Go work on Key deer or to work on the prairie chicken and not to take a, which would have paid about 134 a month than I got to work at Key deer, but I knew my career would be better served if I broadened my education. So I've always been interested in prairie chickens and Attwaters to this day.

David Todd [00:11:16] And so how did you, the first studies that you did with the Attwater's prairie chicken, where did that take you? What, what did you focus on?

Nova Silvy [00:11:23] The first study? I got involved right away. I went to the first, at that time, they just had a prairie chicken advisory committee. We didn't have a federal team, but a recovery team. But at that time, I got involved. I asked around - Texas Parks and Wildlife people, Royce Jurries, Bill Bradley, who's now deceased, and others about where'd be a good opportunity. And I wanted to work on an area where there were a lot of chickens, not an area that were declined at the time. So everybody told me that Refugio County and some of the big ranches there in Refugio county were the places to go. Several people wanted me to go to work at Aransas National Wildlife Refuge. There were a few chickens there. But, you know, what I can learn from a, from a thriving population would help me understand what was going wrong with those populations that were declining. But I worked on the O'Connor ranch, Mr. Tom O'Connor's ranch there in Refugio county, where we did radio telemetry studies. Several students worked back to back on those particular studies. And we learned a lot about increasing population at that time. Later on, they did decline and went extinct.

David Todd [00:12:49] And so some of this early research, I understand you used to radio telemetry that you had, I guess, practiced with at Kansas State as well. Can you tell us a little bit about how that technique might have helped you understand the movements and behaviors of the prairie chicken?

Nova Silvy [00:13:08] Yes, without a prairie chicken, they're very, they blend into their environment. They got markings. Most people observed them on their display grounds. Locals call them booming grounds for leking species. But that's where people go observe them and watch them display and mate etc. Usually the dominant male does most of the mating, same as the grouse. Subdominant males are on the outside. But with telemetry, we could find their nest. We could determine survival movements, ranges of the birds, et cetera, how many times they nested.

Nova Silvy [00:13:47] So with, with telemetry, after I did my work on prairie chickens in Kansas, I would never do it again. So much work. But once you've done it, you find out that they offer so much more information you can gather and return to it. So I've done a lot of radio telemetry studies on various species in my career.

David Todd [00:14:06] And for those of us who really are just laypeople, can you give us a quick primer on the life history of an Attwater's prairie chicken?

Nova Silvy [00:14:18] OK, usually a hen will come into the grounds to mate with with the Attwaters usually in March, they'll come in, toward the end of March. They'll mate with the dominant males. They'll go off and they'll lay about 14 eggs in their first clutch. The male has nothing to do with the brood or anything else. So she'll be on that next for 27 days until the

hatch, and then she's got to take those and find food for them. And initially for the first several weeks of life, they eat insects only. And so basically trying to find enough insects for a brood of 14. So you tend to lose a lot of them during that time and so more stronger ones will survive. Now, if she has a nest destroyed, she will come back in after maybe about seven days after her nest is broken up, she will remate again and have a clutch maybe of about 10 eggs at that time. And if that nest gets destroyed, some of them will come back and even for a third time and if it's a third nest, there'll be about seven eggs in the clutch. And so they keep trying to bring up that brood and then trying to find enough insects to feed them, so they can begin to survive to adulthood.

Nova Silvy [00:15:41] And once they get about, after the first four weeks, five weeks, then they begin to eat vegetation. Unlike quail and a lot of other birds, they tend to eat like flowers, plants or leaves on a lot of the forb species enough. And they'll eat seeds and adults will eat insects, mainly they'll eat plant material. So they got along a long seca, which is an extended blind sac which would be like on a, where they have the bacteria and stuff to digest these plant materials, and that's how they do well, by eating the plant material. High energy if they eat bugs or flowers on plants in the prairie.

Nova Silvy [00:16:35] Usually, the average lifespan would probably be less than a year. Some birds have been known to live up to seven years, but that's a rare exception.

David Todd [00:16:47] And can you tell us a little bit about this, this lek display that I think you mentioned briefly in passing earlier? It's pretty striking and maybe you can tell us about your experience witnessing that.

Nova Silvy [00:17:02] Yes. Usually what happens there. When I sent my first Ph.D. down to Refugio county to work on this, I said, well, we need to figure out the various vegetation types down there because it's all grassland, it's all the same. Once we got down there, we found out that there are eleven different vegetation types. There's some short grass area, buffelgrass, etc. There's very tall grass areas, maybe big and little bluestem, et cetera. And there are other types in that area.

Nova Silvy [00:17:31] But anyway, the lek of the display ground, the booming ground, is in the short grass area. That way males can see one another. They can see females coming in. They get all excited and they start whooping.

Nova Silvy [00:17:43] By the way, I believe to this day that's where Texas A&M gets that whoop from, from the prairie grouse. The Native Americans because the prairie chickens dance and display. They got it from prairie grouse, their dance and display.

Nova Silvy [00:17:58] So, anyways, the males blow up yellow-orange air sacs, put what they call the neck feathers that go up over their head, which looks like, they're called pinnae, the feathers that come. So, the Indians adapted that too, for a headdress. And they fan their tail out. If you see a lot of Native Americans dancing, they imitate prairie grouse. Because they got the head feathers, they got the tail feathers, and they dance similar to the prairie chicken or the sharp-tailed grouse, close relatives, where they spread their arms out and, and move around and the chukar spreads its wings out, does the same thing. So a lot of that dancing, Native Americans were copying from the prairie grouse.

Nova Silvy [00:18:48] So anyway, the dominant male will be in there and the female comes in and they'll come in about three or four days before, they estimate. They observe which is the

dominant male. And they usually when they're ready to mate, they go directly just about at, even before sunrise, actual sunrise comes, and they'll mate and then they're off and they won't come back unless they've lost their nest.

Nova Silvy [00:19:11] And so that display ground's the place where we would go to trap the birds. And when I worked in Kansas on greaters, we used rocket, I mean cannon that's back in those days, which are three cannons that fired a net over the birds. Later on, they developed, A&M did, a rocket nest which was on posts and launched a net over the birds. Both of them were due to explosives and they made a lot of noise and they scared the bird and if you fired over that dominant male with a female, which you were trying to get (you could catch males they hung in the same spot all the time) but the females come in, well if you keep firing explosive over that male, he'll move. And so then you never know where he's going to be the next day when the females come into mate.

Nova Silvy [00:19:58] So basically, I and my students developed a drop net. Now A&M developed an explosive drop net where they had the dynamite fuses that would blow a rope apart and drop a leaded net down. We developed one on a pole string where, held up by tension on the back post around the front posts. We'd tie it to a blind and we'd just cut the string and drop them, so there wasn't any explosives. And so they would come back many times easier.

Nova Silvy [00:20:29] We also had a recording of them displaying, making their booming sounds and cackling, make the whooping sounds with females on the ground. So if you played that recorder with a lot of whoops, all the males would come because they didn't want to miss a female. So in that way we could, while we're were either working up birds in the blind, we'd have birds come back in to the recording and we could get set up and trap another, maybe three or four in the same morning. Where if you fired up a rocket net or cannon net at one time, you're done for the morning.

Nova Silvy [00:21:02] So anyway, we've developed some of these techniques for trapping. Once we trapped them, we'd come in, we'd band them and put the radio transmitters on the birds, and then turn them loose immediately.

David Todd [00:21:15] That is fascinating and I think it's tremendous that you, you know, developed some of these techniques that you know, were useful for these really elusive quarry, I mean rare and likely to hide pretty easily in the grasslands. So interesting to hear.

David Todd [00:21:34] Well, so, one thing I wanted to ask you is it seems like these birds were at the turn of the last century, the 19th to the 20th century, they were common, from what I've read, you know, a million birds on some six million acres of Texas prairie - 1900. But then really started to drop. I think I've read 8700 in 1937 and then by the early 90s, down to less than 400, 500, I guess. And, and I was hoping you can maybe help us understand why the bird declined so, so dramatically. What might have been some of the major causes?

Nova Silvy [00:22:16] Probably the major cause was a lot of the coastal prairie was turned into rice production, which is, if you know anything about rice production, is that they flood it, to grow the rice. And that means it's unavailable for prairie chickens.

Nova Silvy [00:22:29] The other thing is that they used to be all over Houston and Houston covers a million acres of former bird habitat. So basically urbanization, but primarily agriculture or overgrazing (you have to have cover for those birds). So if you got overgrazing

on your pastures, you're not going to have the cover. Those birds, they have to be able to fly into higher, to escape raptors or other predators.

Nova Silvy [00:22:56] So basically, what happened through those years when there were, you know, a million birds or more in Louisiana and Texas, and probably down into Mexico and along the coast south of Brownsville, there are some records of that, that I found that there probably were down there. Val Lehmann who gave you that 1937 data of 8700 birds - he had a record of a bird being taken down in the Brownsville area. He didn't believe the record. But some later data from some Spanish explorers that came up all the way from Mexico, all the way up into near Victoria, were talking about this large grouse and, and, but they also talked about quail, etc. So I believe that they knew what that bird was even in the very northeastern part of Mexico. And again, that was all farmed. They lost the bird there also.

Nova Silvy [00:23:59] But mainly if you go down, you know, it's either been overgrazed, or brush invasion because of lack of fire, fire suppression. You just lost the habitat for those birds. So if you look on areas like the Attwater's Prairie Chicken National Wildlife Refuge where they're managing the bird, they do frequent burns to keep the vegetation where they want it. They also use grazing because remember, the prairie chicken eats forbs, that's a weed, not, not grass. So basically by trampling with cattle, eating, but, you know, not overgrazing. So you still have a lot of bunch grasses like little bluestem that they nest in or hide in, but also open areas in between. And cattle passed, et cetera. And we lost that a lot, due to rice farming and urbanization. You take all those cities along the coast, everything from Corpus Christi to Houston to, who were probably all prairie chicken habitat at one time.

David Todd [00:25:07] I see.

Nova Silvy [00:25:08] So lack of habitat is the problem.

David Todd [00:25:11] I see. OK, so overgrazing and rice farming and then this brush invasion, fire suppression. Well, I've heard some people point to another factor, and I'd love to hear what you think. And that is that, you know, pretty aggressive hunting in the last part of the 19th century and into the early part of the 1900s. Do you think that was significant or kind of marginal?

Nova Silvy [00:25:40] It may have been significant in local areas, but basically most hunters will give up when, when our population gets low and they would come back down then. And these birds, with 14 eggs, they can come back quick. So it's like other birds that are called Janebirds and they have that great reproductive chance to come back, so they can take turn. But yeah, there probably were some of that, but I would guess not so much with Attwaters. Moreso in the Midwest and some of the greater populations, etc., because back in the earlier days it was more, you, you had large ranches in Texas. And I don't think they were so much worried about hunting a lot of birds. They were interested in managing their cattle herds etc. Not that there weren't a few selected areas that had overhunting, pressure around some urban areas.

David Todd [00:26:41] Was there any market hunting for Attwater prairie chickens?

Nova Silvy [00:26:46] Not that I know of, no. Not that I'm aware of. Never anything about market hunting for Attwaters.

David Todd [00:26:56] Well so, given the problems that the prairie chicken was facing with overgrazing and rice farming and fire suppression, can you talk a little about some of the strategies that have been used to try to bring these birds back?

Nova Silvy [00:27:14] OK. Yeah, well, the first was the Attwater refuge, that started out small, with small acreages of maybe like 5000 acres and managing that for prairie chicken. The first manager almost put them into extinction because he took all the cattle off and the vegetation got so high that you can imagine a little prairie chicken the size of a little, of a little, small chicken trying to get through 10-foot tall big bluestem. And so basically they found out real quick, you've got to have some grazing to open that habitat so they have trails, etc. And of course, with cattle, you got all kinds of flies that are on cattle, sitting on their horns, et cetera, and those are insects that get eaten by chicks, etc.

Nova Silvy [00:27:59] So, you know, so basically, trying to manage lands, even private lands, just get people to manage them. But once the Attwater prairie chicken went on the endangered species list - it was one of the first birds to go on there, as was as the Key deer in the Florida Keys that I work on. Even before the Endangered Species Act was finalized, they were considered endangered birds. So basically people from the very beginning, like Val Lehmann, who worked in the '30s were trying to get ranchers to, you know, do more for the prairie.

Nova Silvy [00:28:38] Now, the prairie chicken did use rice land back in the days when they had a four-year rotation. They plant rice one year, harvest it. They'd let it fallow for two years and then on the fourth year, replant again. During that two years afterward, the water was taken off, you had all kinds of weeds come in. Prairie chickens used it. And I saw that a lot when I first started working on the Attwater Prairie Chicken refuge. There were a lot of birds that go off the refuge and go to those fallowed rice fields during the summertime and even nest in some of those areas and take their brood there because of all the weeds coming up.

Nova Silvy [00:29:19] But what happened? They went to a three-year rotation. So you only had one year after the flooding. And, and really the forbs never got up, the cover never got up. And that really hurt the prairie chicken. And so they were trying to get people to use those fallowed rice fields. They were trying to get people also to better manage their acreages for, for prairie chickens. But again, even on those areas, like Aransas National Wildlife Refuge, had prairie chickens, had about 60, 70 on that area I remember when I first came to Texas birds on the area. And then they lost them over time, as did Attwater Prairie Chicken Refuge. Even where people managed strictly for prairie chickens, they were, they were lost. And that was true because normally in the wild, large, vast areas of prairie you may have a hailstorm, you may have heavier rains like Hurricane Harvey, but then the birds will come in from other areas and repopulate the area. But once you get down to a single population, like on the Attwater Prairie Chicken, you get Hurricane Harvey coming in. It just decimates birds, and there's none outside to come in to replace, except captive breeding program that goes on today.

David Todd [00:30:39] So there's a problem of recruitment after the storm.

Nova Silvy [00:30:43] Yes.

David Todd [00:30:43] Might come through. I see.

Nova Silvy [00:30:45] Yes, or hail storm or, you know, anything like that. But, you know, these birds require large acreages and, you know, you need hundreds of thousands of acres basically if you're going to save the population of prairie chickens. I think that many a biologist would tell you that, that's made for prairie chickens.

David Todd [00:31:06] I see, so it's the sort of birds that needs a large coastal prairie, little bluestem, big bluestem, lots of forbs, so they can, I guess, restore itself from, from recruiting from other places. Is that the idea?

Nova Silvy [00:31:26] That's the idea. That's the idea. And so basically, you know, if you've got separate populations right now they've got a population, they're putting captive birds out in Goliad county and then also they're at the Attwater refuge, where they're so far apart that if if they didn't have captive breeding to replace lost birds, there'd be no way for those birds from one area, if one of them got hit hard by a hurricane or something, that they could find their, you know, repopulate the other area. They're just too far separate. So that's the major problem. They need large areas. The foothills of Kansas, where the greater prairie chickens are, you've got about 3600 square miles or something - it's a big area. The point is they can so, you know, you got a lot of area for a prairie chickens, if they get hit hard by a hailstorm in one area, they come in from adjoining areas very quickly.

David Todd [00:32:28] So that's one of the main strategies then you think is is having enough land protected and managed correctly to give habitat for these birds?

Nova Silvy [00:32:37] Yes, yes. And that takes a large area.

David Todd [00:32:41] I see.

Nova Silvy [00:32:41] And I, I do not believe we have enough habitat right now. Without supplementing, every year, with captive replacements.

David Todd [00:32:54] Well, and could you tell us a little bit about some of the measures that need to be taken to to manage some of this land, given that there's enough acreage? I think you mentioned earlier that there were efforts to to manage with fire, to keep the vegetation controlled. Can you talk about some of the predator control strategies that have been used?

Nova Silvy [00:33:20] Well, yeah, I'll get to that. But let me just say this with those large areas. If you go back probably to the 1800s, 1700s, on those coastal prairies, there were bison. Even when I first came to Texas, there was still a population of antelope down in south Texas. In other words, all those are gone and they used to, when a buffalo herd would migrate through, in the wintertime, depending how cold it was up north, how far they went south, they would come through. You know, they eat and clean up areas, but then it would come back and, you know, it was, it was a natural, and then they would leave so the stuff would recover, etc.

Nova Silvy [00:34:01] Well now, with these small ranches, getting smaller all the time, a guy's got to make a living, so he's just trying to eat down as much as he can to feed as many cows as he can. So it's not conducive now to, except on the refuge where they can control the amount of cattle on there, because it's not making money off those cattle. They usually lease it out to someone. And when it gets too low or droughtier, they have to take them off. Well you can't do that if you're a rancher. So you know, that's, that's the problem.

Nova Silvy [00:34:31] So far as predator control goes, if you got enough habitat, and it's good habitat, you shouldn't have to worry about predators, because they evolved with predators. But when you, when you put them down into a small area, can you imagine right now you've got ten thousand acres at Attwater Prairie Chicken, and you have a lot of, a lot of rice farming around, here come all the migrating raptors, hawks, down to overwinter. Where are they going to end up? They're not going to end up in the rice fields with all the water looking for prey. They're going to look at the refuge and the trees around them and, and prey on the prairie chicken or quail that are there also.

Nova Silvy [00:35:13] So without good managed habitat, predators can be a real problem. And so far, you know, skunks and things will eat the eggs. There's no question about that. And and and coyotes etc. And so they also have a problem with the feral hog that have taken over and are hard to control.

David Todd [00:35:40] So it's feral hogs and snakes eating the eggs and what are some of the other predators?

Nova Silvy [00:35:48] That's another problem. If you get rid of a lot of the coyotes and other things that may eat snakes, especially baby snakes, then you're going to have snake problems. And then they're into, especially the Texas rat snake. You know, I've done some work on quail on the Attwater Prairie refuge and had rat snakes eat my radioed quail. You find a rat snake with a big lump in, along his body and he's got my radioed quail inside. So yeah. Yeah. So the same thing with young prairie chickens. So, yeah, it's, it's a problem when you got predators like that.

David Todd [00:36:29] I see. And I guess this is both a predator, and a sort of a food competitor, but I've understood that fire ants can be a pretty serious impact on the Attwater prairie chicken. Can you tell me much about fire ants?

Nova Silvy [00:36:47] I've did about four years work on fire ants on the refuge, in fact not so much, on quail, mainly. Because of the way the refuge are set up, the northern half they treat with, with, for fire ants, and on the southern half they do not. And so basically we studied quail on both areas. And basically they really controlled the fire ants with their pesticides that they put down. And so it really worked. But then you, you get flood coming in. It washes fire ants in from neighbors' areas because they got a creek that runs right through the middle of the refuge. They got a river on the east side.

Nova Silvy [00:37:33] And there was one year, I think, right after when, one of the big storms, not Harvey, but I think we went up, had more fire ants on areas that had been treated after the floods, than we did on the southern part of the city, because down there was a lower elevation and all the fire ants got washed away. So, again, there's, I've never found a fire ant that was in a quail nest, eating a quail nest, etc. And we had as good a production of quail on the areas that had fire ant treatment as we did on the areas that didn't.

Nova Silvy [00:38:10] So I know that Mike Morrow - he's a former student of mine - has a, believes that fire ants are a major problem. To me, if they're major problem, it's more eating the insects from the, from the, that compete with the baby prairie chicken and baby quail. And that would be my effect on them, not so much on them eating the baby chicks and things like that. We never saw that with our quail.

David Todd [00:38:37] I see.

Nova Silvy [00:38:38] We used quail as a substitute for prairie chicken on both areas.

David Todd [00:38:44] Yeah, I imagine it's difficult to study prairie chickens since there are so few of them in the field. You have to use these analogs, is that right?

Nova Silvy [00:38:55] Yes, yes. We did the same thing with, Attwater prairie chicken too, when I first started, they had a lot of reservoirs where they attracted a lot of geese. And then they found out geese were carrying cholera. And so basically we did a study looking at quail, Northern bobwhite, to see if they had cholera, etc, etc. and so anyway, we did not find that much cholera, but we did find some parasites for that could affect prairie chicken.

Nova Silvy [00:39:26] But again, they got rid of all that so they wouldn't have those geese defecating all over their display grounds passing on parasites and things that might affect the prairie chicken. So we got rid of all the areas where the geese come in now, not that some don't still come into some of them. If you get heavy rains, they may come in there. But again, a lot of times you use a surrogate species to understand an endangered one, because you're not allowed to go kill for a prairie chicken to look for internal parasites, which you can do for Northern bobwhite. So, yeah, we use quail a lot of times as a substitute to learn more about the prairie chicken.

David Todd [00:40:09] Well, you mentioned parasites. I think that you had studied antibodies and parasites in prairie chickens, and I was curious if there were any major diseases that you found affected the birds and their efforts to recover?

Nova Silvy [00:40:24] Well, in our efforts to develop ways to raise Attwater prairie chickens, we first had to develop methods with the greater prairie chickens because, you know, it's better to use a species with a lot of them around to develop methodologies, in case you end up killing a bunch of them. So we worked on, developed methods to raise greater prairie chickens in captivity. And once we were able to do that, we were able to start working with the Attwater, raising them in captivity. But one of the things that we found at my facility at A&M, an outbreak of reticuloendotheliosis, the virus "REV". And it produced lesions in that and killed these greater prairie chickens. And so right now, all the captive breeding facilities check all their birds every year to make sure they don't have that disease and because it can kill the birds.

David Todd [00:41:20] I see.

Nova Silvy [00:41:24] It produces lesions and things and causes real problems. So all the captive birds are checked at the breeding facilities. If they got them, they separate them. Now sometimes you can actually get the eggs from those infected birds and, and check them afterwards, and may or may not be passed through the egg. And so you can still find save of that. But it's a, it's a real problem. And, you know, we found it in the wild, in wild turkeys in the Hill Country, the same thing. So anyway, we know it's there.

David Todd [00:42:00] Well, you mentioned captive rearing, I was wondering if you could talk about any other issues that you found and helped resolve for captive breeding Attwater's prairie chickens?

Nova Silvy [00:42:14] Well, one of the things when they first, once we developed some techniques, we turned it over to a lot of the zoos and Fossil Rim Wildlife Center, Houston Zoo -

two main breeders now, because we just can't keep breeding 'em, because at A&M we do research. And once we've done and learned something, we just can't keep doing the same thing. We know we can't get funds for it. So once we develop some techniques, then they will pass on to the zoos or Fossil Rim Wildlife Center who raise these birds.

Nova Silvy [00:42:45] But one of the problems you have with raising birds in captivity, initially, you know, they were raising them on wire, feeding them different feeds, pellet feed and stuff like that. Well, when they get out into the wild, they're not going to find pellet food. So it was a problem getting these birds to find in the wild, but one of the things that Mike Morrow and the people at the refuge developed was a holding pen. There were some studies originally how long to hold them in those pens before you turned them loose. And they did seven days or 14 days. They found that if they held them in there for 14 days. These were larger pens over the grasslands where they could get some insects and eat some vegetation. And they also had the pellet food in there, but they gradually weaned them off of that. We found they survived better if they kept it in there for 14 days rather than seven days. But then that means we've got a birds counting on you. You got to have a lot of those pens and then you got to move around again. You can't have defecation in there year after year and build up parasites.

Nova Silvy [00:43:48] So it's a monumental process that the refuge goes through so that, to adapt these birds to the wild. Now, one other thing they do at the refuge, that doesn't happen in the wild, they put radios on the females, they follow them to the nest, and then they put wire fences around the nest, check the wire fences, keep predators out. And so there's all the artificial stuff going on to try to get those pen-reared birds to survive.

David Todd [00:44:20] I see. Well, here's a question about the captive breeding maybe you can help with. I understand that the population of these birds, at least in the wild, got down almost below, I think below 50 at one point. Did you find that there were any inbreeding issues with a bottleneck like that?

Nova Silvy [00:44:40] Well, what they did, we had projections on what was going on and we projected in 1998 the birds would go extinct in the wild. Which they did at the refuge. There were no birds. They last went through there in 1998. And so basically we're already in a captive breeding and bringing birds in and supplement that. But you know, the problem with a lot of that captive breeding is trying to get them to adapt, trying to get them to, to learn where the good habitat is, etc. So there's a lot of problems that go along with that captive breeding program. But they have done a great job of raising them in captivity. It was my impression that they started out with about 10 different birds genetically. But they've been very good in how they mate birds. They've got a stud book, who mates with whom. So they probably kept 96%, I think the last I heard, of the genetic material from those original birds that they brought into captivity. Against the stud books and at times doing some genetic testing to make sure because every now and then, a bird gets into, a male get in with some females and they weren't sure if they mated or not. But, so they do some testing. But they've done a great job of not allowing any more inbreeding. But remember, they started out with few birds. They may have already been partially inbred when the population got down to 50 birds or so. But do you see what I'm saying.

Nova Silvy [00:46:22] And there have been proposals because they (remember they're just a subspecies). Actually, the nominant is the heath hen that went extinct on the coastal areas of the Northeast. Martha's Vineyard was where the last one survived. But anyway, so they're closely related. The greater prairie chicken and there have been times that bring in and cross

them with, and actually, I did some of that experiment - they do breed and they do produce and all that, but, but the Fish and Wildlife Service never wanted to go that route. They wanted to keep it kind of a genetically pure population. So.

David Todd [00:47:02] Yes. What was the idea between developing these hybrids, I guess, crossing the greater prairie chicken and the Attwater?

Nova Silvy [00:47:10] Well, they would produce and we were able to raise those in captivity. But again, they want to keep the Attwater "Attwater". And so they've never gone to that deal of producing, you know, adding more genetic material to the Attwater population.

David Todd [00:47:29] That's interesting because it seems, and I'm no expert on this, but it seems like a lot of the endangered species protections that I'm aware of focus on species and not these sort of regional variations between, say, you know, heath hen and greater prairie chicken and Attwater prairie chicken.

Nova Silvy [00:47:48] Yeah, we've done some genetic work on, had a student, Ph.D. student, that worked on many grouse species. From just recently we had a publication on rough grouse. We did some work on lessers, greaters, sharp-tailed and all of them, and there's a lot in common in those prairie grouse, genetically, you know, between those. I'm sure during Ice Ages, they got separated and turned into separate species. But again, you know, and/or subspecies. And basically with the heath hen, and a lot of people don't know this, but they brought in greater prairie chickens, and brought them in with the heath hen, to supplement those populations. So it was done earlier with those birds.

David Todd [00:48:39] I see - back in the '20s or before they went extinct in the '30s?

Nova Silvy [00:48:44] Yeah. Yes.

David Todd [00:48:45] I see. Well, you know, this brings of question in my mind, and maybe you can tell us more about it. It seems like a lot of these grouse species have problems, whether it's the greater prairie chicken, or the heath hen of course, and the Attwater's prairie chicken. What do you think it is that's challenging that whole suite of, of, of birds?

Nova Silvy [00:49:15] Lack of habitat. You go out there... I worked on the lesser prairie chicken for several, several years out there in the Panhandle of Texas. And, you know, if you go into some of those areas, those center pivot irrigations, it's just circle after circle. Or brush invasion has overtaken. When I first started working on them, there were, they were in two areas. One was more tall, I mean midgrass prairie and the other was shinnery oak area. And up in that sand-sage grass area that had the biggest population up in the very northeast part of the Panhandle. And as the years went on, oil development come in and they pretty well almost lost them all up there. That used to be the largest population.

Nova Silvy [00:50:05] So what's happened, like to have happened, even with the greater prairie chicken, which is the stronghold, when I was a student there, they would kill 70,000 a year, during the hunting season, because of all the prairie they have. What's happening through the years, the brush is coming up the draws up into the prairie and they are losing habitat and have been. Now they probably kill maybe 30,000 a year, almost, not quite, less than half what they used to. It's the, it's lack of habitat and that's what happened out there in in the northeast of the country with the last available habitat was on Martha's Vineyard. They did some great control with fire, etc. But finally, they just lost.

Nova Silvy [00:50:50] So lack of habitat is it. And we've predicted also, actually the lesser prairie chicken in Texas, we did some regression on the, students and myself and Dr. Lopez, that shows that those birds are decreasing over time faster than the Attwater's are. Now, they've spent, bought some land out there, had some land given to them, some leks for the prairie chicken. But in 2011, the population almost, you know. They were at about 3000. They were down probably less than 1500 after that one drought year. So it doesn't take much if you don't have good habitat, you're going to lose the birds.

David Todd [00:51:35] Yes.

Nova Silvy [00:51:39] It's habitat.

David Todd [00:51:39] Well, and so you've watch these birds for a long time. I think you wrote the first Attwater prairie chicken recovery plan that was published under the U.S. Fish and Wildlife Service. And I'm wondering, if, you know, your perspective and understanding of the bird then has, has changed much or if those early perspectives you had are valid now?

Nova Silvy [00:52:03] Well, I probably realized that we needed larger pieces of property than I thought at that time. I thought maybe we'd get away but, stair-step property, 10,000 acres here, separated by another ten thousand, maybe five miles away, another 10,000, or something like that. But I'm not, I don't think that would even do it. It might but we had an opportunity at one time to buy a big piece of prairie down in Victoria County. Still had prairie chickens. Never got the money for Fish and Wildlife Service to buy it. There's just not the money to buy big chunks of land that these birds need. And so, yeah, I probably would. You know, I wrote that with the help of a recovery team, well, I guess it wasn't, it was the recovery team at that time, I was recovery team leader. And basically it was, that was the best information we had at that time. And through the years, you know, you gain more and more information, a better perspective on what's really going wrong. And it all boils down to lack of good habitat.

David Todd [00:53:18] I see. You know, it's interesting to me that in a way the prairie chicken is kind of a signal species of the Texas coastal prairie. But, but it's, you know, a little brown bird that hides in the grass and isn't a real charismatic species. I guess it's not a, you know, a buffalo or something that's, you know, large and dramatic. Has that been a challenge for the bird's conservation, that it's just hard to get people to recognize its importance? Or what do you think, when that Victoria County land became available, why wasn't it possible to buy it?

Nova Silvy [00:53:59] Well, there's so many other endangered species that are in need. And so you already had one refuge. You know, it feels like that's enough. They now, they have added land to that refuge, thinking that we need more land. And even that's not enough. You know, as urbanization comes around it more and more, as rice went from four-year rotations to a three-year rotation and etc., and then we kind of lost the rice for a while, but and other crops went in.

Nova Silvy [00:54:32] But, you know, and then you get brush invasion. As you know, a lot of the area around the Houston area, that Chinese tallow come in, took over all kinds of area down around, you know, south Houston and near Galveston area in between where you used to have prairie chickens. And then on the refuge, you have McCartney rose, originally planted as a protection for quail, but then it kind of took over and it allowed birds like, to nest in there, like some of the hawks, predators to burrow in under the rose, etc., etc. So some of the earlier

management was for quail on that property, before the refuge bought it. And again, these invasive exotic plants have caused a lot of problems.

David Todd [00:55:25] I see. Well, maybe this is another thing to think about. I've heard some folks look at the Attwater prairie chicken and like you were saying, there's competition among all these dangerous species for attention or resources, time, money and so on. Do you think that, you know, there's any validity to saying that the Attwater prairie chicken is too conservation-reliant, you know, that if you didn't keep doing this captive rearing, it would wink out, and that the money would be better spent on other species, sort of like a triage approach, or, well, what is your thought about that?

Nova Silvy [00:56:03] I've heard this and sometimes I support it and maybe that that, well, let me just put it this way. And I've said this to Mike Morrow, a good friend of mine, my former student. He did a Master's on mourning doves with me, and he did a Ph.D. the Attwater, and I've told him this that, you know, those, the wild Attwaters couldn't make it on the refuge you have now. How do you expect pen-raised birds to make it?

Nova Silvy [00:56:31] Pen-reared quail do not make it in the wild. Other pen-reared critters usually do not make it in the wild. So I thought about maybe we'd would be better off and put more money into the lesser prairie chicken where at the time they had about 3500 birds. And again, you know, but I love the Attwater. Don't get me wrong, and I know Mike, spent his whole career working on the Attwater's. And, you know, you give your life working on a species and you hate to see it go extinct.

David Todd [00:57:07] Yeah, sure, and beyond people's lives and careers, its finality for, you know, all of the animal kingdom. I can see how people get attached, but it's just such a, some tough, tough, tough choices there. And I was curious how somebody like you who's really been in the thick of work with endangered species would you view.

Nova Silvy [00:57:30] Yeah. Know, at times I go back and forth. I love those that Attwaters. But then again, you think about, well, if the, if the wild ones couldn't make it on the property you have there, why do you expect the tamer ones to make it, unless you just keep all this artificial: pen-reared birds brought in every year, up to three, four, five, six hundred and you're back to forty five again every spring.

Nova Silvy [00:58:00] And you know, and all of the money that goes into that captive-breeding program by the various zoos, and by the manning of that refuge, you know, then you begin to think pragmatically should that, could that money be better spent on some other species, that you still have a lot of habitat that maybe just needs to be cleaned up and made more viable for the critter you're working with. So, again, you know, you're torn between these things - your love for a bird that you've worked with and the practicality of it.

David Todd [00:58:36] Well, maybe we can sort of pull back a little bit and talk about endangered species and threatened species, for that matter, in general. I mean, you've worked with the key deer, which I understand is very rare. How do you, how do you explain to people that aren't biologists like yourself, you know, why these species are important to study and protect and restore if possible?

Nova Silvy [00:59:06] Well, I think because they're unique, as a matter of fact, last night, I couldn't tune in because I had another call coming in. But Dr. Lopez, who worked on the key deer about 26 years after I did my Ph.D. on it, he did his Ph.D. Mine was in his '68, his was in

'98. Anyway, he gave a talk to the Key Deer Professional Alliance. And this is a group of people that really support the key deer. When I worked on the Key deer, I estimate maybe 200 Key deer on all the islands in the Florida Keys. When Dr. Lopez did his research, they were probably up to six to seven hundred deer. On Big Pine Key, the largest island, where I live now, it's 6000 acres. And now that's where probably, I'd say, 70 percent of the population is. Adjoining island, No Name Key, a thousand acres probably, has another hundred or so critters. And then the rest are scattered on some other smaller islands.

Nova Silvy [01:00:09] But you've got groups of people that, when I did my research there were 500 people on Big Pine. Now there are five thousand, even though the refuge has considerable land and the county has considerable land, so, but they were really wild when I worked on it. If you saw a deer, it was running. Now, when the last study we did a marsh re-capture back last March, to determine the effects of Hurricane Irma on the population, we come out with (you're not allowed, it's illegal to feed the deer. We call it baiting, with some dough balls made out of bread and then we spray them with a dye) and then we do a marsh re-capture. That was last March.

Nova Silvy [01:00:53] And, you know, you could, we sprayed in a week's time 360 deer. So we had a, we probably had about half the population marked. With the more you get marked, the better you are for getting a good estimate. So we probably got a pretty good estimate of what's out there right now.

Nova Silvy [01:01:12] So, again, but you have people that really love the deer. You've got people that are not supposed to feed them, but they're feeding them. But you've got, in most coastal areas, I've got a, I don't know, you probably wouldn't recognize them. But I've got an orchid tree. It produces a flower about five inches in diameter and it drops its petals. And under that tree, it dropped, especially after you have a rain, a heavy, came down, there were so many petals, the six or seven deer that come in there every morning to eat the petals that drop over night, they couldn't eat them all yesterday. So they were back again this morning.

Nova Silvy [01:01:49] But, you know, they eat a lot of the vegetation, like if you plant hibiscus, you plant avocados or mangos. You got to fence the area or they're going to eat. So a lot of the deer now, which they weren't back in the day when I worked on it, 1968 through '71, there were not the, they were not the tame deer like they are now. These tame deer - visitors down here, you've got to be careful, going down a road following a car, and all of sudden they slam on the brakes because they see a deer. They get out, they block traffic, and they get out and start taking pictures. So, you know, they know about the endangered deer. They love little critters. They're fuzzy. They like them.

Nova Silvy [01:02:32] So, and people that go to the display grounds to look for prairie chickens, and the refuge does a good job. They have, in April, they have a prairie chicken day that brings people in, let people not get too close, but from a distance, binocularing, watch the males displaying and all that. People really enjoy that stuff. So people, people love wildlife. Don't get me wrong, I don't know of anyone who really doesn't love wildlife for one reason or another. My mother loved hummingbirds. I loved her. My mother loved cardinals. She loved dragonflies. So, again, you know, it's people just had, have something that's alive and they see, they, they love those critters. And so they want them protected and safe.

David Todd [01:03:25] So it's just kind of an instinctive human thing to, to love so fellow living beings. Is that it or is it just the rarity of them, kind of exotic?

Nova Silvy [01:03:39] Well well, in some cases it may have value that they just like to see them, you know. But a majority of people I think just like to the critters around. At least, my family. But we grew up around wildlife. So I know a lot of my brothers and sisters, they have bird feeders, same as I do, and I don't care what comes in. It can be a domestic pigeon. It could be anything. I just like to have critters around and a lot of my family's the same way. I think a lot of people are that way. It's just, you know, I spend money I probably don't have to fill those feeders every day. But again, this is where you grew up around critters and, you know.

Nova Silvy [01:04:22] Even when my parents had a dairy and I had to milk cows. I had to get up at four in the morning, etc., well to this day, I love cows. It's not that it was not a chore for me or anything like that before I went to school (and that was 365 days a year, twice a day, milking).

Nova Silvy [01:04:39] So, you know, it's just, I think people just like to see something that they are not used to seeing. One thing down here, we got some box turtles. They're more rare because of the flooding from hurricanes. They're around, but every time I see one on the road, there's somebody stopping to move them across the road. And they could be tourists. They could be from anywhere. Most people I know are, they like to see critters they have seen before, or to help.

David Todd [01:05:11] Well, maybe we can cycle back to, to what you did at Texas A&M for so many years teaching students, and I was curious if there's anything that you noticed or learned from your students about wildlife and endangered species such as the Attwater's prairie chicken, in particular.

Nova Silvy [01:05:36] Before I left Texas, I think in July, I had to give a, every six years to keep your tenured position, you have to give a presentation. And they told me I didn't have to because I was leaving the first of August and retiring, but I wanted to, because I wanted, there are a lot of young faculty, etc. that I knew, and I liked to give them some background on what I've done. And what, one of the things I left them with, and this principle to this day because of how my mentors treated me, is that first place, you get great students. You recruit great students. You teach them what they need to be taught, and get out of their way, and when they produce, you take all the credit. That's what I told them. I make a joke about it.

Nova Silvy [01:06:24] But no, no, any time we were trapping, I don't care whether it was prairie chicken, quail, lesser prairie chicken, etc., I was there with the students. Now I always worked with them in the field. They didn't call me Dr. Silvy. They called me Nova. We worked together, etc. And, you know, I respected my mentors. I would have done the same thing for them and I would say ninety nine point nine percent of my students, the same way. You know, if you get out and work with them and you learn together, it's not what they taught me or I taught to them, it's what we learned together, that was important.

Nova Silvy [01:07:04] And, I, I chaired or co-chaired 123 graduate students. I had one down here yesterday, one of my final my final Ph.D. students. She's from South Korea. She's doing a LIDAR study of No Name Key and how the vegetation has changed, how it may affect Key deer after Hurricane Irma. And a lot of the pines were destroyed and a lot of it the vegetation was killed. And so she's down here yesterday, etc. So again, I met with her. She wore a mask. I wore a mask. She's a big GIS person, more mathematically inclined - she can help me in a lot of stuff. But then you know, I go around and identify all the plants and the different vegetation-type flora I saw. So, again, just I think it's not what they taught me or I taught them, it's what we learned together, I think what's important.

Nova Silvy [01:08:03] And that was that was the same way with Dr. Robel. When I worked on those greater prairie chickens, studying their movements and ranges, and behavior, etc. he was on the display ground every morning in a blind doing behavioral studies on them, on the greater prairie chicken. So again, and Dr. Klimstra, when I first come down to work on Key deer, he came down there with me. We trapped deer here together. He's come down every chance he could get. And so, again, you kind of work together, and I learned that from my mentor. And I tried the same thing that my students.

David Todd [01:08:42] Well, I can I can see that you're good at this, you've taught me a lot in just the hour we've been together. I was wondering if I could just leave you with one last sort of open-ended question...

Nova Silvy [01:08:55] OK.

David Todd [01:08:55] And is there anything you would like to add about the prairie chicken or about wildlife research in general?

Nova Silvy [01:09:05] Well, I think it's important that a lot of these species that we need to get on them before they're considered endangered or even threatened, we need to start gaining knowledge early so we don't get to the point where it may be too late, habitat-wise or whatever is causing them to go towards extinction. We need to start working more on other species. There are species... when I was still in College Station, every winter, I would feed. And I had gold finches come in by the hundreds in my bird feeders. I had about six of them long bird feeders out and they was just come in a flock. And then I also had a garden and I'd raise kale and then all of a sudden I'd see my kale leaves just being scattered. And I found out it was the gold finches eating it, eating the greens. It was a shock to me. Of course, they're seed-eaters. So year after year, I would just plant kale for those gold finches. And so learning stuff that you didn't know about a species can help save it. But through the years, the gold finches decreased. Over time, I never saw them. My sister live in Arkansas. She used to see them before they got down to Texas, but she began to see less and less of them. So there's a lot of species that are in trouble that we just don't know about because people, they haven't been put on a list yet.

Nova Silvy [01:10:32] We need to study a lot of these critters early. And there are people who do that. But the problem is, nobody wants to give you money for a species that's not threatened or endangered. And that's, that's the big problem.

Nova Silvy [01:10:48] So, you know, my, my deal is that we need to start work on a lot of these species that, that are maybe decreasing and spend more time on learning the reasons why. And some of them, before it's too late, before all the land's been gone under buildings or under cultivation.

David Todd [01:11:10] I hear you. So the idea is that you study them, you understand them, you try to intervene before it is too difficult to restore them, to get them back on a robust level.

Nova Silvy [01:11:21] Yeah, yeah. Start early. And now there are a lot of people that love a certain species and do study them. But they're doing it on their own without a lot of funding. And usually the funding goes with those species that are already in deep trouble. And then basically, it's my opinion maybe too late.

Nova Silvy [01:11:42] So, you know, you go over to Hawaii and I've been there several times, the Big Island. And they've lost a lot of birds and, you know, they have one or two in captivity, trying to breed them back. Well you know that's basically too late. They should have thought about that mongoose causing all those problems before they brought them in there.

Nova Silvy [01:12:03] Anyway, there's just certain things that come in and cause problems that we ought to be aware of - early - not wait until you get funding, and until they're endangered species or something like that. But there wasn't the funding. That's another problem.

David Todd [01:12:24] Sure. Well, this has been really helpful. I appreciate all you've told me today, and I applaud all your research over the years and the many good seeds you've put out there with these, you know, undergraduate and graduate students that are continuing your good work. So thanks for all that. And I hope our paths cross. In the meantime, enjoy your life in Florida. It sounds lovely out there.

Nova Silvy [01:12:50] OK, listen, if there's any other questions you might have, just e-mail me. I may answer through email, something like that. I know you want to record this stuff for the book or whatever. I could answer some questions that we didn't go over, or that you think of something? OK?

David Todd [01:13:04] That's very generous of you. I do my emails early in the morning, right? I go through everything. I also get them all on my phone so if it's an emergency I can do that too. I usually look at them, but I mean I don't answer them until the next morning.

David Todd [01:13:18] OK, well, you've been very responsive and really helpful today. Thank you so much for your time.

Nova Silvy [01:13:23] OK, well, good luck on your production and the book, OK?

David Todd [01:13:27] All right. Thank you. You have a good day. Take care.

Nova Silvy [01:13:30] You do too.

David Todd [01:13:30] Bye now.

Nova Silvy [01:13:30] Take care. All right.