TRANSCRIPT
INTERVIEWEE: Dan Saenz
INTERVIEWER: David Todd
DATE: August 24, 2021
LOCATION: Nacogdoches, Texas, remotely recorded
TRANSCRIBER: Trint, David Todd
SOURCE MEDIA: MP3 audio file
REEL: 4066
FILE:
RedCockadedWoodpecker_Saenz_Dan_NacogdochesTX_24August2021_Reel4066_NoiseReduced&VolumeDecreased.mp3

David Todd [00:00:01] Well, good morning. My name is David Todd. I'm here with Dr. Dan Saenz and with your permission, Dr. Saenz, we are planning to record this interview for research and educational work on behalf of the Conservation History Association of Texas, a nonprofit here in the state, and for a book and a website.

Dan Saenz [00:00:28] Sounds fine.

David Todd [00:00:28] Oh, good. And it's also intended to be used for a book and a website for Texas A&M University Press. And lastly, it'll be kept and accessible at an archive at the Briscoe Center for American History that's based at the University of Texas at Austin.

David Todd [00:00:52] All that being said, I want to make sure that, you know, Dr. Saenz, that you have all rights to use the recording for whatever purpose you would like, and we'll make sure to, to facilitate that in any way we can. Is that OK with you?

Dan Saenz [00:01:08] Yes, that's OK. Sounds great.

David Todd [00:01:10] All right, well, good. Well, let me, at this point, lay out when and where and why this oral history interview is being conducted.

David Todd [00:01:21] It is Tuesday, August 24th, 2021. It's about nine twenty in the morning. My name, as I said, is David Todd. I am representing the Conservation History Association of Texas and I'm in Austin. We are really fortunate to be conducting a remote interview with Dr. Dan Saenz. He is a research wildlife biologist at the Southern Research Station in the Wildlife Habitat and Silviculture Laboratory in Nacogdoches, Texas. That is a unit of the U.S. Forest Service, which in turn is an arm of the U.S. Department of Agriculture. He has spent 30 years and change studying issues regarding timber and wildlife and upland and riparian forests. In particular, he is an expert on the red-cockaded woodpecker, which, of course, overlaps with, with this oral history project. And so today we'll talk about his life and career and especially focus on his work studying the natural history and the restoration of this rare bird, the red-cockaded woodpecker.

David Todd [00:02:40] So with that introduction, I thought we might just jump into some questions. And I was wondering, Dr. Saenz, if there might have been any early events or influences in your childhood that might have introduced you or encouraged you to take up an interest in nature?

Dan Saenz [00:03:02] I think as a child, that's, that's just who I was. I was the kind of kid that was always catching every grasshopper, every lizard, anything I could get my hands on. I just

was really, really interested in the little things that everybody else was just overlooking as far as, like bugs and anything in nature. And I know I remember, you know, this was back in the '70s when I was growing up, my dad and I used to watch Mutual of Omaha's Natural Kingdom every Sunday afternoon. We would not miss it. And I don't know what it was. There wasn't anything that really influenced me. It's just that I was really, really drawn to, to nature and to wildlife. I don't know why. I can't really explain it.

Dan Saenz [00:03:48] I do have a memory from one of my best friends, as a second or third grader, we made a pact that we would grow up and we'd be like Charles Darwin and we would travel to the Galapagos. I don't I don't know what happened to that kid, but I kind of stayed pretty much on that path. And, and that's the kind of stuff I like to do even in my spare time. I like to do nature travel even when I'm not on the clock. So I don't know. I just I've always liked it. That's what I've always wanted to do.

David Todd [00:04:22] And it sounds like a lot of this was really self-generated, that maybe it was the way you're hard-wired. But do you think that there were some people - it sounds like your dad at least accompanied you when you watch Wild Kingdom - were there people like him or others who might have been companions or mentors when you were young?

Dan Saenz [00:04:47] When I was really young - I'm talking about my childhood - I think it was just I found the other few kids in my school that wanted to go catch toads instead of, well in addition to doing the other stuff, I was really into sports, too, but I would also hang out with a nerdy kids that were playing in the ditches, catching tadpoles and water snakes. And I was, definitely I would I, I sought my peers out that had like interests and we would spend time just catching whatever we could get our hands on and just observing it and enjoying it.

David Todd [00:05:28] OK. So jumping forward some years, I mean, you've told us a little bit about your childhood and I guess somewhat informal exposure to toads and water snakes and grasshoppers and lizards and so on, you, you went on to earn a B.S. and M.S. in biology from Stephen F. Austin State University, and then I have a Ph.D. in Wildlife and Fisheries Sciences from Texas A&M. And I was curious at that stage, were there classmates or teachers or experiences that you can recall that, that helped you find your way into conservation and ornithology?

Dan Saenz [00:06:17] Right, certainly, and I think my formal education started before university. It started at my high school, I went to La Porte High School, which is in Harris County near Houston. And we are fortunate enough to have a great school. And we had elective biology classes. We had marine biology. Our high school was two blocks from, from the ocean. And we had vertebrate zoology. And these are basically college-level classes being offered at high school, as far as the material that was presented. So those two - I had a teacher, Miss Terry Barry and Bob Miller - they were my teachers and they would even take, take kids on weekends to go. My, my vertebrate zoology teacher, Bob Miller (he was Coach Miller) - he, he was a real snake handler. So we'd go looking for, you know, reptiles and amphibians with him. And we even had field trips.

Dan Saenz [00:07:13] And then Terry Barry, she was a marine biologist. And, you know, these people had master's degrees. The high school, at least Terry Barry did. And she would have us do weekend excursions to Galveston to go seine up, you know, tidal pools and things like that. And I would I would take those opportunities and I would go with them. And I learned so much. And that's, they were like my major first influences on kind of science and nature.

Dan Saenz [00:07:41] And then when I moved on to, to the university, I came to Stephen F. Austin as a transfer student. And, and my first semester, I met Cliff Shackleford, who's the senior ornithologist for Texas Parks and Wildlife right now, and Rick Schaefer, who is a wildlife biologist for the Forest Service. We all had a lab table that we sat at together in comparative anatomy. We, all our last names end in "S", and it was done by medical order. And just by chance, my first my second semester there, I sat in lab with these two guys that I still work with today. And, you know, we immediately started talking and I started taking, we started taking birding trips together and, and we joined other, other contemporary students at the same time. And we would have people that were entomologists, students that were really into entomology. Other students were really into herpetology, fantastic ornithology students. And we spent a lot of time together. And those, that group of people that are that are still really successful, we really helped each other and encouraged each other. And, and that was kind of the start of me, really knowing that this is the kind of career that I'm going to have. There are other people doing this and they're serious about it and you know, they wanted to answer the science questions and use the, I guess, the class of animals or wildlife that they were really interested in. That's what they wanted to focus on and focus their careers on.

Dan Saenz [00:09:24] And it just so happens a year later, since I was a transfer student, so I wasn't, it didn't take me very long to get my bachelor's degree from Stephen F. Austin since I transferred as a junior, my comparative anatomy instructor stopped me in the hall and said, "Hey, you're about to graduate." He just happened to be my advisor. They assigned people randomly. He just happened to be my advisor for my, for undergraduate, for, for my degree plan. And he stopped me in the hall, he goes, "Hey, what do you do when you graduate?" And I go, and I probably had a blank look on my face. And he goes, "You really need to go to grad school." And I go, "Oh." It never dawned on me. And I said, "OK." And so at that point I started making preparations to get myself together so that I would be competitive for graduate school. And that's kind of how those things worked out. And some of them were kind of fortuitous. And that's what got me on the path into becoming a professional in, in wildlife. And at that time, during grad school, that's when I started working for the Forest Service as I was finishing up my master's degree.

David Todd [00:10:45] I love the, the sort of coincidence of being assigned to a lab table with other people, you know, whose last name starts with S, or you're coming down the hallway and you bump into your comparative anatomy teacher and he asks, "what are you going to do?" The hallway and the lab people seem to have played a big part in your, in your luck and good fortune in finding a path that's really rewarding. So this brings you to grad school?

Dan Saenz [00:11:24] OK, well,, well, I was, actually I started grad school with Dr. Fred Rainwater at Stephen F. Austin. And I continued at Stephen F. Austin. So I worked on a project with the invasive Mediterranean gecko. And I was learning. Basically, it was a relatively unstudied invasive species and it occurred in east Texas. And so it was a pretty easy project. It was pretty inexpensive and one that I could more or less self-fund. Funding opportunities at the time were, were probably not like they are now. And things were cheaper anyway. And we just kind of paid our own way. So I was able to to do that project.

Dan Saenz [00:12:10] And that's what led into my career with the Forest Service - more, you know, an additional series of fortuitous events. So I was the lab instructor for herpetology. As a grad student, you know, you do these upper-level classes as, as a lab instructor. And I taught herpetology lab and I had students. A lot of the students in there were basically on my level, they were grad students also, or we'd been undergrads together, because there's a lot of

overlap in those upper-level classes between, you know, juniors, seniors and people that are seniors-plus, graduate students that have overlap classes.

Dan Saenz [00:12:55] So I'm doing that. I'm working as a, as the lab instructor and one of my lab students comes up to me - more, more fortuitous stuff - it seems almost unbelievable how this happened. He came up to me and this his name is Jeff Reid. He works, he works for U.S. Fish and Wildlife Service now as endangered species biologist. He's, he's, he's a pretty critical cog in, in wildlife in East Texas, as far as endangered species go. But at the time, he was he was a beginning grad student also. And he came and he happened to taking an overlap class, and I was his instructor. And he goes, "Hey, I'm working. I have a two-week job with the US Forest Service research lab here and where I'm trapping amphibians and reptiles. And Dr. Phil, who is the project leader at the Forest Service here at the time, said, I could hire anybody I want to help me." And he says, "I need somebody that can identify these things. Can you help me? Do you want to do it?" And I said, "You. Yeah. Are you kidding? Of course I will. This sounds amazing."

Dan Saenz [00:14:03] So I spent two weeks with him trapping, you know, a couple hours a day. And we'd go check these, these funnel traps and we'd pull salamanders and frogs and snakes and lizards out of them. And I would help him ID them. Some of them were tough to ID and that's why he asked me. And then we'd come back to the lab afterwards to, to put the equipment up. We'd take a vehicle out. And in the hallway, I ran into my friend Rick Schaefer, who we were lab mates. We were in lab together and shared a lab table. And he said, "Hey, what are you doing right now?" And I said, "I'm helping Jeff with this project." He said, "Well, hey, I'm going to need help on a red-cockaded woodpecker project because the technician that worked here, she's, she's quit and she is going to move with her husband. And, and because he moved off, he got another job. So she had to leave. And I need somebody to help me." And it was a project climbing red-cockaded woodpecker cavity trees and looking for the, seeing what was occupying those cavities, in addition to red-cockaded woodpeckers. And I said, "OK, I would like to do that, as soon as this other job's over." And they didn't really mind. And he said, "Sure, we have time."

Dan Saenz [00:15:15] So when I finished the little short project with the reptiles and amphibians, I helped Rick Schaefer with this other project. And we had been doing it for about a week and climbing trees is not easy. It's hard, hard work. And it takes a person that's not afraid of heights. We were going, you know, over 60 feet up, climbing trees, you know, several times a day. And it's kind of scary. We didn't know what we're doing, which made it kind of dangerous, too. So it was a lot; it was a high adrenaline job. But, but I was pretty good at us. I was pretty agile. And Rick and I got along great. So we, we had a great time.

Dan Saenz [00:15:54] And we came back to that lab after one of our field trips going out in the field and he said, "Hey, that, Carrol's job's open." This is the person that was before me as that technician, and he said, "You should apply for that." I said, "Oh, OK. Yeah, I should." So I went and checked on it and I went to see the secretary. We had secretaries at the time and she said, "Well, yeah, the job closes tomorrow. You have to have, you know, it has to be postmarked tomorrow, the application." So she hands me this paper application that's probably 30 pages long. Really different back then. And so I went home that night and spent hours filling this thing out because it had asked how all this information that, you know, I don't just have at my fingertips, I have to pull up my Social Security car, all sorts of stuff. And I get it done, you know, in sloppy ink handwriting that (I have terrible handwriting) and I get it, I get it to the, the express postal mail. Got it, got it stamped and sent off.

Dan Saenz [00:17:01] And then, you know, a couple of weeks will go by. And I hadn't you know, I didn't think anything about it. And at, at that time, our supervisors, Dr. Richard Conner, Dick Conner and I didn't know him really at all. And he had been talking to Rick about how I was doing. And he kind of stopped me in the hall, and we were about to go out in the field again, and he goes, "Hey, are you still interested in that job?" And things worked so differently back then. And I said, "Yes, definitely." He goes, "OK, we'll start the paperwork." And then I was hired. And it was just unbelievably lucky.

Dan Saenz [00:17:47] So I started as a GS-5 technician in 1991. And it happened because I was a lab instructor in herpetology, that happened to be the lab instructor of Jeff Reid who's now Fish and Wildlife biologist who happened to run into the hall, Rick Schaefer, who is a Forest Service biologist. And you know, we knew each other, so, but it wasn't total, total luck. You know, we, you know, they knew me and they, they knew that I was a reasonable person that they could get along with and enjoyed being around and, and they knew that I knew what I was doing as far as wildlife. So all those things came together and I got my foot in the door. And that is, that's the biggest step - is getting your foot in the door in one of these federal jobs. And that's how that all happened. That's how I started with the, with the, it used to be the Southern Forest Experiment Station back in those days, and which, which merged and became the Southern Research. It merged with another station and became the Southern Research Station, later on after, and I don't remember the year - 1999 - I think. But that's how that happened.

Dan Saenz [00:19:06] That is a great story. I love the, the, there's a certain element of good fortune and fate and coincidence, but there's also I think you were maybe without knowing of being checked out and vetted by your peers. I'm sure there was some, some real attention on, you know, all your skills. So maybe it was meant to be.

Dan Saenz [00:19:34] Well, so tell me about this next stage - I guess would take us to your, your visit to Texas A&M. Is that right? And your effort to get a Ph.D. there?

Dan Saenz [00:19:50] Yeah, that, that actually came down the road. That, that came later, I went back in 1999, no, in '97. I'm sorry, I can't remember it's been so long. And it was part of a, the GETA program, which is the Government Employee Training Act. And I don't even know if that exists anymore. But what it what, what this Act was, that federal employees could go back to school to higher, for a higher education type school or trainings or whatnot, and graduate school counted. And the Forest Service actually paid for my classwork. And they allowed me the time to go back to graduate school while, and to keep my job. So, so while I was in classes at Texas A&M, (it was only three semesters because you do a one year residency plus), so during that, those semesters, they paid for my coursework, and they also paid me my salary like I was at work. But I still had to, I still came home on weekends, came back to the job and took care of what I needed to do. Nothing really fell through the cracks. I just had to work a whole lot more. But, but the Forest Service actually supported me. They didn't pay for all my research hours and those type of things. I paid, the bulk of it came out of my pocket. But they, they did allow me to go, which was unbelievable.

Dan Saenz [00:21:31] And that was really by the support of Dr. Conner, Richard Connor. And he was instrumental in, at the time, I had a master's degree and the research scientist jobs, the minimum requirements are Ph.D.s. And if I was ever going to move into that position, I needed to, to further my education and get a, get a Ph.D. And again, things lined up. And it sounds like I'm making this up. It really does. I listen to it, it's almost embarrassing, because it sounds like it's completely made up.

Dan Saenz [00:22:05] I was, I wrote I was, the good thing about working with Dick Conner is he allowed his, he treated his technicians and his support staff like colleagues from the start. The first day I started, he treated me like he wanted to know my opinion. And, and it was an incredible environment to work in. And he also encouraged that the technicians write their own research papers and be lead authors and get all the, get all this credit. I mean, I was he made me co-author on everything I worked on. And it was an amazing honor to have that. And so he was, he was very much a positive influence.

Dan Saenz [00:22:48] And so I was writing a research paper and it happened to be on, on reptiles and amphibians. I can't remember. It was on snakes. I think at the time we were doing some side projects on snakes, and I'd submitted a paper to a journal, "The Herpetological Review." And the associate editor that I worked with, his name's Lee Fitzgerald, and he emailed me back, back then. We were, I think we were emailing at the time. Yeah, we were doing email because we used to do a lot of this stuff, we would actually go to the post office and mail our, our manuscripts in, when I started. And we were doing some of this, at least the correspondence by email, and he emailed me and said, "Hey, I went to Stephen F. Austin and I just got a job at Texas A&M. I just started last fall. We should get together and do something together." And I was like, "OK, whatever."

Dan Saenz [00:23:44] And it turns out that Lee Fitzgerald was my Ph.D. Advisor. We, we, I had a project in mind, a community ecology project in mind. I had funding. So I, I contacted him again. I said, "Well, do you want, you mentioned that, are you serious? I would like to come up and interview and, you know, kind of present to you my ideas for a Ph.D. Dissertation and get your thoughts and, and see if we can work together." And I did. And things worked out again, beautifully. All the, everything, timing lined up. I had the funding lined up. An opening in his lab opened up. I was one of his, I was his first Ph.D. Student. So that's how that happened. Through a kind of a chance contact. I mean, I still may have contacted him anyway, but we had already had rapport before. I had made a decision that I needed to go back or that I was going to go back and attempt to enroll in graduate school.

Dan Saenz [00:24:50] And it turned out that Texas A&M was close enough to, to Nacogdoches, that College Station is close enough that I could still drive back and forth and get my work done. And I, I, there were times where I would come and drive to go to class and then go back the next day. And I mean that it was close enough. So all those things lined up for me again. And I don't know why I'm such a lucky person, but all those things have just seemed to happen for me.

David Todd [00:25:19] Oh, I love hearing the story of this sort of daisy chain of mentorship and encouragement and support. I mean, whether it's Dick Conner or Lee Fitzgerald, you know, that there was this respect and encouragement to, to succeed and, you know, it helped the whole research effort on. That's wonderful.

David Todd [00:25:48] Well, let's,, let's talk a little bit about, I guess one of the, the main targets of your interest and study. Would it be good to start now to talk about the red-cockaded woodpecker?

Dan Saenz [00:26:02] Sure.

David Todd [00:26:04] So, yeah.

Dan Saenz [00:26:06] Absolutely.

David Todd [00:26:06] OK, well, could you give a a sort of beginner introduction to the life history and the habitat of the red headed woodpecker?

Dan Saenz [00:26:20] Sure, that's a pretty open question. But yes, like, if I was going to talk to someone that didn't know anything about red-cockaded woodpeckers, I guess I would start out and say, the red-cockaded woodpecker evolved, and if we're going to talk about the habitat, evolved in the longleaf pine ecosystem. And this is open park-like habitat. So it's pine trees, basically a grassland with pine trees sticking out of it. And this is the habitat where the, where the red-cockaded woodpecker thrives, and where it evolved.

Dan Saenz [00:26:58] And this habitat's maintained through frequent fires. These could have been natural fires and they could have been fires encouraged by Native Americans historically. And these frequent fires, what they did is they kept the forest pretty thinned out. So the trees are pretty far spaced apart. And a lush, herbaceous understory, the ground layer, was grassy, forbs. Really a beautiful park-like, -type ecosystem.

Dan Saenz [00:27:27] And the one thing that happened in this ecosystem historically is there were so many frequent fires and these fires would typically happen at, you know August, September, hot times of the year. So those fires would get going and they would cook off pretty good. But at this point, the habitat had adjusted. So there were these fine grasses and they would burn over pretty quickly and it would happen, you know, every so often. We don't know exactly how, how, you know, how frequent, what the frequency was exactly, but I think researchers estimate every three to five years on average, could be more often, sometimes could take longer, that these forests would burn over.

Dan Saenz [00:28:16] And what that, what would happen there is all the dead trees that were standing would burn up. And all the dead woody debris on the ground would burn up. So there was no, there weren't many dead trees. There weren't many snags in this, this ecosystem. And if, why is that important? Well, most every woodpecker you know of excavates its cavity in a dead tree. So the red-cockaded is the only one, the only woodpecker species, that excavates its nest and roost cavity. They sleep in a cavity every night, so they make a cavity to sleep in and they also nest in those too. They're the only species that excavates their cavity in a living tree, exclusively. So they excavate their cavities in living pine trees.

Dan Saenz [00:29:08] And that gave them a competitive advantage over the other woodpeckers. So they were basically involved in an ecosystem that didn't have many woodpeckers because the habitat wasn't there for them. So they really thrived in this habitat. And they were basically a widespread species across the southeastern United States in these open, park-like ecosystems that were really abundant, historically. And that's the basic history. That's where they lived and that's where they evolved.

Dan Saenz [00:29:43] So where do you want me to take it from there?

Dan Saenz [00:29:47] Well, I think that's a good...

Dan Saenz [00:29:48] I kind of set up set up a scene there.

Dan Saenz [00:29:50] Yeah, no, that's, that's a great introduction. I mean, it sounds like what has become a sort of a specialist bird now, because that ecosystem is pretty rare, was at one time, I guess, really widespread because that southern pine ecosystem was so widespread. Is that fair to say?

Dan Saenz [00:30:13] That is fair to say. I, I don't know the exact figure, but it's like one or two percent of the, of the longleaf habitat's left. I could be off on that number, but most of it's gone, at least the virgin uncut stuff.

Dan Saenz [00:30:35] Well, you know, one of the things I've heard about red-cockaded woodpecker's that unique or pretty distinctive is, is their social system, which seems really complex in the sort of cooperative breeding strategy that they have that incorporates multiple generations with helpers and so on. Can you sort of walk us through that and help us understand it?

Dan Saenz [00:31:02] Yes. I mean, cooperative breeding isn't, isn't rare in birds. It's not even rare in woodpeckers. Acorn woodpeckers do it. But, but red-cockaded do, it's probably the actual mechanisms and the social structure of the red-cockaded woodpeckers is probably unique in that they live in groups, small groups. And the group, the center of the group is the breeding pair, the male, breeding male, breeding female. Those tend to be, that tends to be the mother and the father.

Dan Saenz [00:31:38] And then they have helper birds. And those helpers tend to be their offspring from previous breeding seasons. And "helping" - what does that, what does "helper" mean? "Helper" means the helper helps feed their siblings from the next nesting season. So they stick, those birds stick around for some time and they will help feed their brothers and sisters in the nest then in following years. And they also help defend their territory.

Dan Saenz [00:32:06] So and usually a typical group consists of the breeding pair and one to three helpers. And a group of five is a pretty big group. And the helpers are generally males. The males tend to stick around and the females tend to disperse after their first year, but not always. So it tends to be a family group. But there are also situations where a, an offspring moves off and ends up with another group, and joins up with another group. So they're not always completely family groups, but they're mostly family groups. The birds can move around a little bit and switch groups.

Dan Saenz [00:32:46] And I think the, the, I guess what was thought to be going on here is that when you have a cooperative breeding system that evolves in a bird, there tends to be, and like I said, it's pretty common in birds. There tends to be a limiting resource. So there's something about the resources that are limited that cause these birds to take on this social structure. So for red-cockaded woodpeckers, it's obviously, it's the cavity trees.

Dan Saenz [00:33:25] So cavities are, that can be used, are in short, are in high demand, short supply. So if you're a new offspring, if the birds produce a new crop of offspring, they really have nowhere to go, because the cavities are so important and they take so long to excavate. It takes a group of woodpeckers on average, 1.8 years to excavate a cavity from the time they start it to the time they finish it in a loblolly pine, I mean, in a shortleaf pine. And 2.1 years in a loblolly pine, and over 6 years in a longleaf pine, because of the amount of resin that the tree exudes. A longleaf pine exudes a lot of resin. It takes a long time to, to build that cavity. So, it's a limiting resource. And this is research from Texas that that we did here. And we figured out how long it took a group of birds.

Dan Saenz [00:34:24] So a single bird cannot just fly off to a new part of the forest and make a cavity. It doesn't happen. It takes, it almost takes generations to build these cavities. So, so the bird has to stick around. The males have to stick around because they can't fly off and make their own cavity. And what happens is eventually the breeding male dies, and one of his sons takes over the territory. And usually when of the breeding male dies first, the female will disperse because there's that, I think they're actually quite good at avoiding inbreeding. So the mom will leave and she'll try to find a new group. But if the mom dies, the breeding male sticks around and waits for, hopefully, for another female from another dispersing group to come over and join them. It's actually fascinating the way they operate.

Dan Saenz [00:35:26] It sounds like, like renters in a busy city where there just aren't enough apartments and you get these kind of strange sets of bedfellows and roommates and housemates and they all help each other, kind of out of necessity.

Dan Saenz [00:35:44] I think that's it. Yes, they're roommates out of, out of necessity. That's right. And the only way, the most, the primary method for a male becoming the breeding male in a territory is to inherit it from his father. Or from whatever breeding male, because they can disperse to another group and sometimes join up and then become, become the leader there, but, but generally they stick around. And it's, our research has shown that it, and not just ours, other research as well, that the more helpers you have, the greater nest success you have, the more offspring successfully fledge from the nest. Because the red-cockaded woodpeckers typically produce, almost always, produce four eggs. And, and typically, at the max, and there's always brood reduction, I mean, the four will hatch, but almost never do four nestlings leave the nest. I've never heard of it. Three is a really good nesting, a good nesting success - if you have three, three birds hatch, that make it all the way to fledging and fly out of the cavity, and it's typically around two, when you start with four. So, but the research has shown the larger your group size, the, the higher on average number of nestlings that that group can, can produce. And successfully get to fledge.

Dan Saenz [00:37:23] Very cooperative.

Dan Saenz [00:37:26] Yes.

Dan Saenz [00:37:26] Well, I could see how this is a very delicate dance and, and that it requires maybe a pretty sophisticated social structure to make this work and that it can easily break down if you don't have enough helpers and upcoming generations. Is this one of the clues to why the bird declined? Maybe you can talk about, you know, the, the pretty dramatic decline that was seen, and what some of the factors might have been.

Dan Saenz [00:38:07] Right, right, right, I mean, initially, the initial decline of the red-cockaded woodpecker took place at the, the end of the 1800s, late 1800s, early 1900s. The South was logged pretty much from, from Texas to the Carolinas. And the longleaf pine was actually really easy to log because it was on upland sandy soils. So it was never too, really rarely too wet to go in and cut these trees. So these trees were easy, easy to cut. And basically it was called the Bonanza Era in forestry, where they just basically liquidated the forests and basically just cut down all the red, all the red-cockaded woodpecker cavity trees and cut down their, their foraging trees.

Dan Saenz [00:39:00] And really, I think, fortuitously, the red-cockaded, you can pick a red-cockaded woodpecker cavity tree out of a forest pretty easily. They're generally covered in

resin, pine resin. They look like a white candlestick. And what people quickly realized is that the red-cockaded were selecting pine trees that had heart rot fungus. And this fungus doesn't harm the living tree itself, but it rots out the center of the tree, the, the heartwood, the part that's now no longer living tissue. The way a tree grows, it goes from, it grows outward from the center. And as the tree gets bigger, the center part of the tree dies. And then you basically get a center part of the tree that's heartwood, that's no longer living tissue, but it's still good structural tissue that holds the tree up. It's still good wood.

Dan Saenz [00:39:57] But in a lot of cases, Phellinus pini, which is a heart rot fungus, enters the tree through a branch stub and enters the hardwood. And it only it only decays the hardwood. It doesn't decay the living sapwood tissue - the other wood that's living. And what it does, it softens that wood up and it makes it easier to excavate a cavity for red-cockaded woodpeckers. So they can excavate cavities in those trees much, much faster than they can in trees that don't have rot.

Dan Saenz [00:40:28] So and what this fungus does as well, it, it sends out a fruiting body like a conk. It's called a "conk". It's like a, you've seen them on dead wood, these little shelf-like, bracket-like structures that are the fungus fruiting body. And those are pretty obvious to people. And I'm sure loggers at the time were using crosscut saws, and they were not going to spend, waste their time and effort cutting down a tree that had a fungal conk on it because that wood wouldn't be merchantable. It wouldn't be any good. So they passed those trees up. So they were passing up the red-cockaded woodpecker cavity trees because they knew they were rotten and hollow.

Dan Saenz [00:41:13] So that's probably the only thing that saved them at the time. Had, had they had modern equipment like chainsaws, they'd probably have just mowed them all down, and we wouldn't be talking about red-cockaded woodpeckers right now, unless we we're going to, you know, put them in the same group as the ivory-billed. And, and it just so happened that they didn't have the resources, or they didn't want to spend the time wasting their time on these gnarly little trees that had fungus on them. And they passed those up. And that's probably the only thing that saved the red-cockaded woodpecker during that big Bonanza Era, you know, deforestation period that we went through from, from the late 1800s to the early 1900s. So that...

Dan Saenz [00:41:58] That is fascinating.

Dan Saenz [00:41:58] That was the cause of the big decline. Yeah. That's the cause of the big initial decline of red-cockaded woodpeckers. And their populations dropped dramatically. And no one really knows what it was, though there are some estimates and I can't even come up with a number right now, what, what they dropped to during that period. And it was significant.

Dan Saenz [00:42:21] So if I'm following you, the, this, this, I guess the laziness of people with crosscut saws or maybe the prudence that they didn't want to cut a tree that wasn't merchantable left us some remnant, some small portion of these longleaf pines that were heavily and obviously infected with red heart. But it, they probably took out a lot of the trees, too, that the next generation of birds might have occupied when red heart hit those? Is that, is that maybe the way it went, or what do you think?

Dan Saenz [00:43:03] What do you mean what they...I'm sorry. Can you repeat that?

Dan Saenz [00:43:06] Well, I was just curious.

Dan Saenz [00:43:07] I didn't quite follow.

Dan Saenz [00:43:08] Yeah, well, I've probably garbling this, but I'm just curious if, if the,, the loggers avoided the trees there were obviously, you know, infected with this red heart fungus and that incidentally were being used as roosts and nesting sites for the red-cockaded woodpeckers, that I'm curious why the decline would have happened. And the only thing I can speculate as a, as a total layperson is that they cut down a lot of the younger, or non-infected trees so that, you know, 20 years later, there weren't new candidates for red heart fungus and for the next generations of red-cockaded woodpeckers to excavate. Is that, what do you, is that..

Dan Saenz [00:44:02] Right.

Dan Saenz [00:44:02] Fair to say?

Dan Saenz [00:44:03] I don't think I don't think there were any trees. Yeah, I think that played a part. I don't think there were many trees left, period. And during that time, reforestation wasn't, wasn't a thing. The lands were just clear cut and left. And left to either re-seed or decades later replanted. The Forest Service bought up a lot of these lands and that's a lot of the national forests today are these lands that were just cut over and left and then weren't worth anything. And these were the lands that no one wanted, and the Forest Service bought those and you know reforested them because they weren't worth a whole lot of money. And they were able to get these huge chunks of land for not much.

Dan Saenz [00:44:49] And there weren't many trees to begin with. And it takes roughly 60 years for a tree to be large enough and to have large enough heartwood in the center to, to hold a red-cockaded woodpecker cavity. So you can't really have really young trees. Right. And then there was this big gap where there weren't new trees for cavities for a long time and there weren't. And the red-cockadeds forage on pine trees. So they need trees to to get their food and they also need trees to excavate their cavities. So all of those things were gone, for a long period of time, and they hung on in a lot of places, you know, somehow. And but you're right, there's a big gap there. But a lot of these forests naturally regenerated, and over time, the, the, the longleaf pine came back in a lot of places.

Dan Saenz [00:45:49] And in some places later an off-site species, loblolly pine, was placed, was, was planted in place of longleaf pine because it grows faster. So it replaced it replaced longleaf pine in a lot of situations. And a lot of it was on purpose - it was planted. And a lot of it was it's a very invasive pine species and it grows and out-competes longleaf. So if you were in areas where there was some loblolly pine, it would be the tree that would come back predominantly in those stands. And you see that today. You go out and you see these 100-year old trees, 100-year old pine stands and that are mostly loblolly, but they'll be a few old longleaf pines still mixed in them. And those are the remnants that, that we're able to to re-seed and make it and where it was predominantly loblolly that, that took over in a lot of those situations. And most of the time, it was intentionally planted, because for, for timber production.

Dan Saenz [00:46:58] When you were first explaining the, the evolution of the red-cockaded woodpecker, you, you noted that it nests in these, these living trees, and that part of their evolutionary edge, I guess, was that they were adapted to an ecosystem that burned really

frequently. And I've, I've heard that one of the reasons that the red-cockaded woodpecker decline was that, you know, after this first big cut, that a lot of these fires that would have usually gone through the forest were suppressed. Is that correct?

Dan Saenz [00:47:45] Oh, right. That, that is that is correct. So fire suppression was the next challenge. I mean, once the trees were gone, the next thing that happened was, like you said, all these roads, firebreaks, all these things that would stop these big widespread fires. Historically, once a fire started, it could burn, you know, hundreds of thousands of acres. You see that out West. But in the South, that would do the same thing. But now everything was so chopped up, it was really difficult to get large swaths of land burned. And a lot of people had moved into these, had made ranchettes. All sorts, all sorts of land ownership was, was changed. It wasn't a big contiguous block anymore, like it was historically. Everything was chopped up. So fire did not flow across the system, across the entire South like it used to do. So fire suppression, what that basically caused was an increase of ... the forest vegetation changed. So, so, if, what you need to know about pine forests, is a pine forest, is a fire-maintained sub-climax community. What that means is that, to have a pine forest, you have to have repeated disturbance, but through fire.

Dan Saenz [00:49:19] [And sorry, I got distracted here, my dog came in. So, so, these... Sorry, but let me. Sorry about that, David. I had to get that thing straightened out.]

David Todd [00:49:41] [That's OK.]

Dan Saenz [00:49:42] [That's the, you know, one of the issues from working from home.]

David Todd [00:49:46] [Yeah. Not a problem - totally a part of the, the pandemic life.].

David Todd [00:49:52] Can you maybe start at the top? So you were saying that pine forests are a, something that requires continued disturbance and fire, I guess, is that.

Dan Saenz [00:50:05] Right, so, so, so pine forests, to have a pine forest, repeated disturbances have to occur because it's a sub-climax community: meaning that if you just let it go, it's going to change into something else and something else will be the climax. So in our part of the world, in the Southeast, these forests would, if left without fire, would eventually become hardwood forests because the pines need, need the fire to regenerate themselves.

Dan Saenz [00:50:38] So what happens is a lot of the forests basically went from being pine savannahs to being mixed hardwood / pine thickets. And the red-cockaded woodpeckers just avoid those areas. And we, we have a lot, there's a lot of current research showing that they avoid areas with hardwood trees. So they just won't go into those areas and they won't excavate their cavities in these stands. Even if the pine vegetation structure becomes too dense, the birds will tend to abandon their, their, their cavity trees. They like an open area to to live in or else they'll actually abandon those sites. And the hardwoods are especially bad and cause cavity tree abandonment. So if you exclude the fire, you basically reduce the habitat that the red-cockaded woodpecker wants to be in and they'll move out.

Dan Saenz [00:51:40] And we have some research showing that with the exclusion of fire, you have less arthropods in the system. So what happens is the canopy becomes closed if you exclude fire. You get a brush, a mid-layer story of, a mid-story layer, I'm sorry, of vegetation and it shades out the ground. So the ground basically, instead of being grassy, is basically leaf litter. And that doesn't produce the number of arthropods, the food for woodpeckers that the

sites that are burned. And we did lots of lots of study on the arthropods on these, these burn and unburned ecosystems. So there's less food and the birds just don't want to be there, once the vegetation structure changes to something more dense. And there's a lot of evidence that they, they abandoned those sites.

David Todd [00:52:37] That's, that's really striking, that this sort of invisible, I mean to most mortals and laypeople, effects of fire or no fire and things that take, I guess, years to accumulate, whether it's the, the leaf litter and pine straw or the yaupons that grow up. It's so subtle and so gradual, I guess you probably don't see it coming.

Dan Saenz [00:53:06] Exactly.

David Todd [00:53:06] Thing I've, I've heard about, and I always like to hear the straight story from somebody who really knows about this, is that, you know, as these forests became more like woodlots for producing paper and pulp and structural lumber, the rotations on cutting and the kinds of, the patterns of cutting changed, and that really wasn't good for the red-cockaded woodpecker either. Is that a good thing to say, or would you differ?

Dan Saenz [00:53:42] No, that, that, that's, that's absolutely true. Since the red-cockaded woodpecker requires cavity trees that are at least 60 years old and foraging habitat, they won't even go into pine plantations until they're at least 30 years old to actually go in and forage. So if you have short rotation, you know, pine management, you basically, you're excluding nesting habitat for sure from red-cockaded, and you're limiting their foraging habitat. So those, those things aren't very conducive for red-cockaded. Short-rotation forestry isn't very conducive for red-cockaded woodpecker. That being said, you know, you know, the forests still need to be thinned. They still need to be managed. So you can still get a lot of timber out. You just have to change the approach.

David Todd [00:54:40] And so can you help us understand - there are different ways of logging a forest. I've heard of clearcutting, and shelter tree, and seed tree, and selective management. Can you help us understand you know, the, the basic differences in how those might have affected the woodpecker?

Dan Saenz [00:55:02] Right. I mean, there's, there's, you're right, there's a few different basic types. There's shelterwood, seed tree and there's clearcut. Clearcut's pretty clear, pretty self-explanatory. You cut all the trees down. That's a clearcut.

Dan Saenz [00:55:18] A shelterwood cut, or a seed tree cut, is what you do is you go in and you cut all the trees, you cut down, you leave a lot of trees, you go in and you reduce the amount of trees that are in the stand. And those trees that were left are the trees that are producing seed for the next generation. So you let the, the site, the stand, regenerate itself with those seed trees. So and so then, at some point, those trees, once you get some regeneration, those, those seed trees are cut out. So that's still kind of single-age, I mean, one generation-type management.

Dan Saenz [00:56:02] The shelterwood's a little bit different. You leave those over story trees, you leave the seed trees.

Dan Saenz [00:56:07] And those work, seem to work really well, initially, because the red-cockaded woodpeckers like seed trees and shelterwood sites because they're real open. So

when, when the forests, the national forests here in Texas went to some of that approach, those sites did, the woodpeckers did really well in those sites, with that type of management.

Dan Saenz [00:56:32] And then the selective harvesting doesn't happen a whole lot, where you go, because it requires so many repeated visits to the stands, but what happens is a lot of sites become really dense and then a certain proportion of the trees are removed and that's done periodically. And that works really well because you, you reduce the density of trees, which the woodpeckers like, and you can get a lot of volume out.

Dan Saenz [00:57:02] And actually the national forests in Texas are having trouble logging, you know, the sites where the woodpeckers are. They're so dense. That's one of the challenges. I'm not saying they can't do it, but I'm just saying one of the, their challenges is is cutting enough. They can't cut enough trees, really, to keep up with the demand for open sites for woodpeckers. So what, it seems kind of counterintuitive, but, but that's truly the way it is on these sites, is we need more cutting in a lot of places to actually help the woodpeckers.

David Todd [00:57:39] Do you think there's some, some easy, rough numbers you can give us, I mean, like the number of stems per acre in an old longleaf pine forest and then the number of stems in a modern-day forest that that the red-cockaded woodpeckers really can't utilize?

Dan Saenz [00:58:02] Well, we use basal area ...

David Todd [00:58:06] OK.

Dan Saenz [00:58:06] And I don't know what that, and that can, that can mean a lot of different, that doesn't translate directly to the number of stems because it's the size of the stem also. So the base, the, it's 60 feet per, per acre, per square acre, is the, is the basal area that's kind of the, the baseline for red-cockaded woodpeckers. And when you get above 90 and 100 is when you start to see declines in the woodpecker in the basal area.

David Todd [00:58:41] OK, and what's, what is sort of the, the highest you might see in some of the lands that you've studied?

Dan Saenz [00:58:49] Where woodpeckers remain?

David Todd [00:58:51] No, we're just, you know, some that you've experienced or seen in the National Forests.

Dan Saenz [00:58:57] Well, I'm the scientist in charge of the Stephen F. Austin Experimental Forest, and we have stands there that are 210 is the basal area, where, it's so, so we're in the process of thinning those right now, of getting, getting the, the, the contracts worked up to, to thin these sites. So it can become incredibly thick. So there is so much wood that needs to come out of there and then we're still not even down at the levels that it's good red-cockaded woodpecker habitat yet, but we're just on the margins. So there's a lot of wood out there that can be taken out, that, that needs to be taken out, so that would red-cockaded woodpeckers can have adequate, suitable vegetation structure for their habitat.

David Todd [00:59:49] This is so interesting, I mean, that the red-cockaded woodpecker's in this sort of sweet spot between having too few trees and too many, and which kind, and what age, and it seems immensely complicated.

Dan Saenz [01:00:09] Right.

David Todd [01:00:09] So let's talk a little bit about the recovery of the bird and some of the tactics that have been used to start bringing them back. And can you talk a little bit about their restoration?

Dan Saenz [01:00:27] Sure. I started in 1991 and at the time when my, my supervisor, Dick Conner, had a dataset going back to 1982 where he had all the red-cockaded woodpeckers in Texas. He knew every, he counted, we had all the woodpeckers counted, all the groups counted. It's pretty easy to do because they don't move around. Right? They have cavities that they passed down from generation to generation in these cavity trees. So you know where they are, you know where to look for them. Had them all mapped out. And he had data going back to '82. I started in '91 and started working with him, doing the inventories. At that time, you know, we graphed the trends and you'd look at them and it was on a steep decline. It didn't look like we were going to get out of the 20th century with, you know, without them being extirpated from all the national forests except maybe the Sam Houston National Forest, which has the largest population in Texas. They were on a collision course with extinction, rapidly approaching.

Dan Saenz [01:01:35] And right about that time is where artificial cavities were, that's, that's when they were developed. And they were really put to the test in 1989 when, when Hurricane Hugo hit South Carolina and hit the Francis Marion National Forest. And the Francis Marion National Forest had one of the largest populations in existence, at the time. And the hurricane, Hurricane Hugo, that hit it, it was a Cat 4 when it hit, when it hit the forest. And they're right on the coast. And it wiped out, and I don't have, there's a lot of papers on this, and these aren't the exact numbers, but it wiped out more than half of the population, overnight. And something like 80 or 90 percent of the trees were snapped off that were cavity trees. And cavity trees tend to be weaker because they tend to have heart rot, and then they have holes in them, right, from, from the cavities. So they tend to snap off at the cavity. So, so they're a little more vulnerable to these high winds than just a normal, regular tree in the stand.

Dan Saenz [01:02:40] So they lost most they lost half their birds and lost most of their cavity trees overnight. And it just, fortuitously, at that time, then there was new technology for drilling a cavity into a tree, artificially, to help the woodpeckers out. And nest boxes, which, which are in, what we call "inserts", which are nest boxes that you, you cut a rectangle out of the tree of the, of a living pine tree and you slap this box in it. It has a cavity ready-made. And the bird can move into it that day, and they generally do move into them the same day you put them in.

Dan Saenz [01:03:18] So that technology had just been developed. And they, they hit it really hard, the Francis Marion really hard. And they, that's where they implemented it. And it, it was like, it was the savior of the red-cockaded woodpecker. And right at that time, they started, we started getting these, this technology in Texas right about the time I started. And that's when inserts became a thing in our populations.

Dan Saenz [01:03:47] And if you look at a graph, and we have some publications on the population trends, you see that there's like a 45-degree decline on, if you look on the timeline, of the red-cockaded populations. In about 1991, it, it takes a 45-degree turn upwards. So we go from a steep decline to a pretty steep increase. And it was primarily due to the artificial

cavities. Basically the birds were running out of places to, to, to have cavities, and they were dispersing, they were abandoning their sites.

Dan Saenz [01:04:27] And that all came at the same time that just general overall forest health, forest management came into play as well. So things started to shift on that front, at the same time that the cavities came to play.

Dan Saenz [01:04:42] But the cavities were the immediate, proximate cause of the decline in Texas, at that time. There weren't enough cavities, and enough cavity trees, to hold the birds. And they weren't excavating them fast enough. They weren't keeping up with the rate of loss, because we had losses to southern pine beetles that tend to seek out red-cockaded woodpecker trees. And the pileated woodpecker is a notorious destroyer of red-cockaded woodpecker cavities. So those two main factors were the main factors of cavity loss in the red-cockadeds could not excavate cavities fast enough to keep up. So they weren't going to make it very long. They were going to completely run out of cavities if something didn't happen.

Dan Saenz [01:05:31] And so that was the primary, that, when whenever I give a talk, asked to give a talk about red-cockaded woodpeckers, I have a picture of an insert, and say this is, this is what saved the red-cockaded woodpeckers. And it completely changed the landscape on, it, it allowed us to put cavities in trees that were too young for a bird to excavate in. We could put, they could be put in in 30 minutes. And I've seen it over and over again - when you put an insert in a cavity tree, the birds move into a immediately - like that evening! They get taken over by a woodpecker. They, woodpeckers, like, red-cockaded woodpeckers like brand new cavities.

Dan Saenz [01:06:16] That's one thing we've learned in our research. Also, the newest cavity goes to the breeding male, because he's, he's the boss. And he would generally move into one of those new cavities on that day.

Dan Saenz [01:06:27] And that's where everything started to turn around. And that was in the early '90s and, and that got better. And there were periods of time where not many artificial cavities were being used. There was kind of a little bit of a lull. And then we, we started getting, we noticed when we had Hurricane Rita and Ike that hit Texas, they hit the national forest pretty hard. And there was a lot of emergency money for red-cockaded woodpeckers. And a lot of that money went for artificial cavities. So every group of woodpeckers got three or four new, every group got three or four new cavities installed by the biologists across all the forests. And the population spiked. It was incredible how that little bit of money, with inserts put into these artificial cavities, caused a big jump in, in the, in the populations in Texas. And I think from that point on, I think it was pretty clear to everybody, that's what we've got to focus on, primarily, because that's the single most important proximate, short-term thing that we can do to, to try, to, to try to help these birds.

David Todd [01:07:46] You know, while we're talking about these, these nest boxes, the artificial cavities that y'all were installing, I understood that you often would try to also have cavity restrictors and, and that you did some research on how to keep snakes out. Can you talk about how you sort of beefed up this whole strategy to make sure that it was successful for the birds?

Dan Saenz [01:08:12] Right, the, the, the thing with the, with the restrictor plates, and a researcher plate is a piece of metal, a square piece of sheet metal, that's probably six by six, six

by six inches. And a little horseshoe track is cut out of the bottom, to slide right over the cavity to still allow entrance in the cavity, but protect the top part of the tree over that.

Dan Saenz [01:08:39] So what was going on was that pileated woodpeckers, the big, large crow-sized woodpecker that we have here in East Texas, was going in and destroying the artificial cavities and they were also destroying natural cavities at an incredible rate. I think that, when I did, when I was doing some surveys, that over half of the cavities had been damaged by a pileated woodpecker within six months. It was something like that. When I was doing these repeated surveys, I could go and survey, and the pileated has a real distinctive excavation marks they make. They make rectangular excavations in the pine tree. So it's real obvious which species was doing the damage. So what they were, they could go in and in 30 minutes destroy a brand new insert that a biologist had just put in.

Dan Saenz [01:09:35] So these restrictor plates just cover the top half of the cavity and the part of the tree that is immediately above the cavity entrance and it's just a piece of metal that's nailed into the tree with aluminum nails. And that in itself stopped 95 percent or more of the pileateds from destroying the cavities. So that really, really helped, because you couldn't, actually couldn't even keep up with the, with the, with the artificial cavities, at the rate that the pileated woodpeckers were destroying those cavities. And you could also use the restrictor plate on, over natural cavities. And that was used generally too. And then later on, restrictor plates were just built into the artificial cavities. So when they're installed, they already have the metal on the top of them. So that, so that that other woodpecker can't destroy those cavities. So that, that was, that really helped.

Dan Saenz [01:10:31] And I really focused on the pileated woodpecker for some of some of the research, because I was going out three times a year and surveying every single cavity tree on the Angelina National Forest. So I would look at each one, observe it, and I would take data and I would observe any, any damage from other woodpeckers, any use from other woodpeckers. And so we were able to, with our extensive dataset, really get a handle on what the threat was from, from that species on the red-cockaded. And it was significant. And something needed to be done, management-wise, to help slow it down. And the restrictor plate wasn't my idea. Someone else - I don't know who developed it. I can't think of who that who did that, off the top my head. But whoever did that, really, that was, that was ingenious. And it works.

David Todd [01:11:22] I guess the pileated woodpecker coveted these, these nesting sites. But were Southern flying squirrels a problem as well?

Dan Saenz [01:11:32] Well, yeah. It's a different thing. They were more, they weren't like a cavity, they didn't destroy cavities. There are more of a cavity competitor. So my very first job where I climbed trees, when I first started out with the Forest Service, as a contract worker, as a student, was determining what species used, in addition to red-cockaded woodpeckers, what are the species used red-cockaded woodpecker cavities. And flying squirrels was the number-one species other than red-cockaded woodpecker that used the cavities.

Dan Saenz [01:12:13] They tended to use cavities that weren't being used by red-cockaded woodpeckers. There's generally, it, you know, you'd have the breeding pair, and, you know, usually one to three offsprings that are helping in the bird group. But these clusters of trees that these birds basically were in charge of, their home range, they were usually many other cavities that they had built and then had abandoned. And the squirrels tended to use those more often. And, in some cases, it seemed like they were, they would compete for cavities on

occasion, but in a large, healthy population, you know, there's debate on how much of a problem, red-cockaded, I mean, flying squirrels were to red-cockaded woodpeckers. But we feel that, here in Texas, it wasn't as serious a problem as the pileated woodpecker. In most cases, the red-cockaded could defend its cavity and keep its cavity from, from the flying squirrels.

Dan Saenz [01:13:22] And one of the observations that, that, that I made when I first started working, I started working on, when I first started permanently, we were doing a project where we were watching the entire group feed the nestlings. And we were trying to look at provisioning rates: like how much food was coming to these nestlings. And we were looking at group size and that sort of thing. So I would have to travel out to the sites before sunrise. So I would be there when the birds came from their cavities and I would set up in a lawn chair and I had a spotting scope and I'd watch the nest. But I realized that the red-cockaded woodpecker was about the last bird in all the whole morning chorus that was up and singing, and that got up and got out. So it it wouldn't leave the cavity for another 30 minutes after sunrise, or more. They stayed in their cavity really, really late. And so that was interesting. All the other birds were up and singing for like an hour before the red-cockaded, actually. So man, this bird's lazy! That, you know, that was our, that was our take on that.

Dan Saenz [01:14:29] In addition, we would do roost checks at night. So we would go to the cluster sites and that's how we would count the number of birds in a lot of cases. We would see when the birds would come in to go to bed, we'd count them. And we did that quite often. And I noticed, man, these birds, it's still daylight when they're going to bed. These birds really are lazy! So, and the more I gave this thought, I go, well, if they're in their cavity, when, if they go into their, if they leave their cavity after it's daylight and go back into the cavity when it's still daylight, they don't overlap with flying squirrels. Flying squirrels are nocturnal. So if those, if occupancy is 99 percent of the game, if there's a red-cockaded woodpecker in the cavity, a squirrel can't get in there. So they don't overlap in their diurnal activity, when they're active during a day. So if the woodpecker's in the cavity when the flying squirrels are active, they, they can defend their cavity. And they do that by, by leaving the cavity really late in the morning, and going to bed really early. And they have no problem holding the cavity because the flying squirrel won't come out, because they're strictly nocturnal.

David Todd [01:15:48] That's interesting. I love it.

Dan Saenz [01:15:51] That's all our, those are all observations. And that's somewhat speculative, but it seems to make sense.

David Todd [01:16:02] Well, so, in some cases, "early to bed, late to rise" is a good thing?

Dan Saenz [01:16:11] Right.

David Todd [01:16:11] Well, so let me ask you again about ways that you try to promote the ability of these birds to, to find a nesting and roosting cavity. I think that you had done some research on keeping Texas ratsnakes from climbing these, these cavity trees. Is that right?

Dan Saenz [01:16:33] Right. Right. And my colleague, Craig Rudolph, was the lead on a lot of the early rat snake work here in Texas. And what, what, what we found really on this, is an active cavity that's been used by red-cockaded woodpecker for a while, typically, then especially the nest tree, there's a lot of resin. What the birds do is they pick the tree all over around the cavity. And they basically wound the cavity tree and the cavity tree resin runs

down the tree, like pine tar. And it is super, super, super sticky. And they also, they also go up and down the tree and scale off all the loose bark on these pine trees. So it's a real smooth, slick, sticky tree, for a cavity tree - the one that's being currently used by the red-cockadeds.

Dan Saenz [01:17:33] And, and if there are other cavity trees in the cluster that aren't being used, those are really obvious because they don't have any of this scaling. They tend to be rougher. They haven't been wounded, so they're not oozing resin. So they look really different. It's real obvious to someone that's spent any time with red-cockadeds, which cavity trees are the ones that the birds, birds are currently using, by the condition they're in, because the birds maintain them.

Dan Saenz [01:18:02] And what Craig Rudolph started doing is he's, he wanted to, and what I noticed doing some of these early morning bird research with provisioning rates, is I saw several rat snakes trying to climb up and get to the nest, nest while I was sitting there watching. And they never were able to access the nest.

Dan Saenz [01:18:24] And what Craig Rudolph showed was, the bird, on these active trees that the birds had been pecking on, that the resin that's being exuded by the tree after being wounded by the bird is sticky. And once the snake touches that, they freak out, and they don't like it. I guess it's like putting tape on a cat's paw. They just go, "Ah, I don't like this and I want this off of me." And then they just flail and flop off the tree. Generally, they don't like it.

Dan Saenz [01:18:51] So when we did, we did experiments where we'd run the rat snakes up inactive trees, trees where the, the bird, the birds weren't using and weren't pecking on and the snakes climbed right up and went into the cavity and often grabbed the, the flying squirrel that was in there.

Dan Saenz [01:19:12] So, so the red-cockaded has a pretty good defense against rat snakes. It's probably generally not that big of a problem.

Dan Saenz [01:19:19] However, when artificial cavities are produced, they're slapped into a tree. Cockaded is making a new cavity tree. By about the time that cavity is being finished, they start wounding the tree, do that it starts running resin starts running down it. So by the time they use it, it has an established resin barrier. When an artificial cavity is placed in a tree, there is no resin barrier. The tree is really scaly, a rat snake can climb it. They can climb a vertical tree, like if, like if it was laying flat on the ground. They are amazing climbers.

Dan Saenz [01:20:03] When, when I did a lot of experiments with, with climbing snakes up trees, and when it gets high enough, I want to retrieve my snake. I pull it off and it sounds like you're pulling Velcro, ripping Velcro open. It makes that crackle sound because it's so wedged into the little spaces in the bark and you peel it off the tree. It's incredible.

[01:20:27] So what some researchers developed in Arkansas is they had aluminum sheeting, like hard, not hardware cloth, it's like hard cloth, but just aluminum flashing. That's what it is: like the kind you put around your house if you don't want things to get under it. And they wrapped it around the trees and stapled it. And they tested that, and it seemed to work pretty well. The snakes sometimes accessed the tree by using the staples that they wedge their body and use that as a little purchase points so that they could climb the tree.

Dan Saenz [01:21:04] So what I developed, I developed a technique, by I scraped the tree with a drawknife and I just smoothed out the bark in a wide swath and tested the efficacy of

that on, against rat snake climbing. And it worked really well. I could smooth the bark out, but not cut into the tree. And it was effective enough that the snake couldn't climb the tree past that barrier. So, so that's really my, my experience in the research I did with preventing the rat snakes from climbing the tree.

Dan Saenz [01:21:36] Generally, there's not much of a concern in a natural population, but when you're providing artificial cavities that don't have protection from rat snakes, you could be putting those birds at risk in the short term, until they can become established in the tree. And given that the male, breeding male is the one that's going to be using the newest tree, in the way their, their system, the way their breeding strategy works, or their behavior, is the female will lay the eggs in the male's roost cavity. So the breeding male, he's the one that sits on the eggs at night. So his tree is the epicenter of the group and, and he likes the newest tree almost always. And he, he seems to get, and early, after doing this for so long, and knowing when a new cavity came online, in a, in one of these woodpecker territories, you know, I would, I figured it - out, "Hey, that's going to be our nest tree this year. It's the newest cavity." And, and sure enough, the breeding male would move into the new cavity. And we figured all that out as well.

David Todd [01:22:53] Boy, it is fascinating how you've figured out these patterns just through lots of, you know, months and years of just being such careful witnesses.

Dan Saenz [01:23:03] Yes.

David Todd [01:23:05] You know, something else I understand you've spent a lot of time thinking and working on is, is the efforts to translocate red-cockaded woodpeckers to new areas. And, can you talk about how you've gone about that?

Dan Saenz [01:23:25] Right. When I, when I, when I started in '91, that's about the time Dick Conner and Craig Rudolph had kind of come up with this idea. Or they may not have come up with the idea, but they were kind of pushing, implementing, pushing some of this on the national forests. So the Sabine National Forest, at the time, had 11 individuals. That's not groups, that's just individuals - birds. And it might, they might have been spread across six or seven groups. So there were a lot of singles, a lot of single males. So the idea was to bring in birds from another population, a bigger population.

Dan Saenz [01:24:02] And that, and since the red-cockaded woodpecker has this strategy where you have the group, the breeding pair and the helpers, when they produce three more birds, those birds tend to disperse somewhere. So we figured that's an expendable pool to draw from because most of those birds aren't going to make it anyway. So if we can direct that dispersal that, that year's, you know, fledglings, if we can direct them to new territories, that would go a long way, increase the efficacy or the efficiency of population growth, to help them out that way.

Dan Saenz [01:24:45] So the kind of the starter way to do it was we got some Florida, some birds from the panhandle of Florida. And the biologist at the time, he drove four or five birds over, drove all day and all night, got over to Texas. We met him in the Sabine National Forest. And we just crammed these birds in these old, abandoned woodpecker cavities that were just old and degraded, but we didn't have artificial, really have artificial cavities at the time. And it kind of worked. A few of the birds stuck around and became part of the population. And that was kind of the beginning, the first real, real stab at it. And there was some success

immediately. And if you just get one or two to work out of five, that's pretty good. We were pretty excited.

Dan Saenz [01:25:38] And then as soon as the artificial cavities became a thing, that's when we noticed that if you put brand new cavities in, this translocation success goes way, way up. I did a paper on that. So that, so instead of putting them in just old, dirty, nasty cavities that were, you know, 20 years old and they're abandoned for a reason, we gave them brand new artificial cavities. And that really, really seemed to help the success.

Dan Saenz [01:26:09] And, you know, a lot of this, this has been going on for a while and a lot of, everybody has caught on, has their own little techniques that have gone beyond what, you know, our first observations and what we suggested. But kind of the general idea is to move several groups to a forest at a time, in close proximity to each other. So we're moving pairs. So you might move four pairs to one national forest, but you keep them in a close proximity like adjacent territories so that the birds can kind of figure out among themselves who they want to - they may not like their partner - so, so we let them kind of sort it out a little bit. So that works really well.

Dan Saenz [01:26:58] And it's actually, at a population from zero and raise it up to whatever we have the land base to hold, really. I mean, the technology is there. It's just, basically, the limitation's the land base, and the will to do it. And since we're somewhat limited to national forests and public land, you know, it won't be long before, in Texas, we reach our saturation because I think the biology's been figured out enough. The, the translocation has been figured out. The cavity augmentation, the forest management - it's, it's not a secret anymore. Everybody knows what to do. And the attitudes have become different from the early days. And it's, we understand that timber management is compatible with red-cockaded woodpecker management and it actually helps red-cockaded woodpecker management to take timber off the national forest. I, I think that we're on a good trajectory, at least on the public lands. And, and, you know, just eventually we're going to run out of space for, for the woodpeckers, because we just run out of land base.

David Todd [01:28:18] I see. Well, you know, you have done a wonderful job of explaining some of these interventions for the, the birds themselves - you know, the, the, the artificial cavities and the nest restrictors and translocating and, you know, the metal flashing, and all these wonderful tools.

David Todd [01:28:42] I wonder if you could talk a little bit about some of the forest management methods that were sort of on a wholesale basis, changes in the use of fire, or the amount of timber that was cut, and the kind of timber that was cut - those things that were done on behalf of the woodpecker.

Dan Saenz [01:29:06] Right. In the early days, clearcutting, when I first started, clearcutting was still an allowable practice on national forests. And it has since become a practice that's no longer implemented, except for on special occasions. So clearcutting can be used if you're trying to do forest conversion. Let's say, you had loblolly pine forest where it used to be longleaf. And you want to, you want to convert it back to longleaf. Then you can get, you can get an exclusion so that you can actually cut that, clearcut that.

Dan Saenz [01:29:45] But in general, now the forests are just thinned. So a prescribed amount of volume, trees, are taken out of the forest to keep it within the zone that is desirable for forest health, which is also goes into, you know, basic ecosystem health and which is all

good for red-cockaded woodpeckers. So that's kind of, that's just changed. And that, a lot of that's just hard policy, that, that, is just really is just set. It's just a change in the way things are done, as far as the timber management goes.

David Todd [01:30:22] Gotcha.

Dan Saenz [01:30:22] And as far as fire goes, the national forests are doing everything they can to to get these forests back into a rotation that manages the forest structure. So they're looking for this open, park-like type structure, and each site's unique. So the amount of fire, you can put the same amount of fire across the landscape and you still get a mosaic of forest structure, because not, it doesn't all burn the same, and some sites are more productive than others. So you're never going to have it all perfect, looking the same.

Dan Saenz [01:31:02] But the national forests, they actually don't have enough burn days to get it done because, you know, it's either too wet, it's too dry, too hot. You have to be within a particular prescription, need the, humidity needs to be within a window. The temperature needs to be within a window, and the wind needs to be within the window, for you to safely burn, or effectively burn. It's too wet, the burn doesn't do any good. If it's too dry, it's too dangerous. It's too windy, it's too dangerous. So the windows when the Forest Service can actually do burning, those are, you know, limited and they're variable from year to year. So I know they, they struggle getting that in. And it's, it's really due to just the, the natural conditions that they have to deal with, and the prescriptions that they have to stay within, for safety and for effectiveness. But, but I don't think there's an issue as far as desire to get it done. I think it's, it's more just the inherent challenges in managing, you know, a forest of that size.

David Todd [01:32:16] OK. I'm trying to think of, of what the best thing to ask you. I know this is, we're, we're using up a lot of your day and I want to be respectful of that.

David Todd [01:32:34] Well, here's one question. So you've told us a little bit about, you know, the mechanical and fire management of the forest and then the interventions for the bird itself. I've heard some people question whether managing for the red-cockaded woodpecker is, is the best way to manage these Southern forests. You know, that there are many species there that may require different sort of management regimes. And then other people say, "No, you know, this is a keystone species and it's really a good benchmark to, to manage the forest, you know, according to the benefits for the woodpecker." Where do you fall down?

Dan Saenz [01:33:23] Well, there's a, there's a couple of things. I mean, I think the red-cockaded is more of a flagship species for, for the, for the longleaf pine ecosystem, and the open park-like pine forest, I think. And we're doing additional research that's not associated with red-cockaded woodpecker showing that this ecosystem management is actually greater for just biodiversity. So this open, park-like, fire-maintained ecosystems that are, that are, you know, thinned, that there's actually more, there's more biodiversity in the plants and in the wildlife, not just the red-cockaded woodpecker. So it's really ecosystem management actually works for red-cockaded woodpecker. So it's more of a flagship species because it's the endangered species that, you know, a lot of the national forests were kind of forced to do this type of management to manage the forest in a way that produced that, that vegetation structure that was good for red-cockaded woodpeckers. But it was also good for all these other species that evolved in that ecosystem.

Dan Saenz [01:34:41] So I think that was, I heard that a lot when, when I first started my career, "This is single-species management." A lot of hands pounding on the table in meetings. And nothing could be further from the truth. But I don't think anybody really thinks that anymore. And if they do, they're pretty out of the loop. I think every, all the meetings I attend from private landowners, to, to, you know, to Forest Service personnel, they all kind of see it, they understand it's ecosystem management. It's not single-species management anymore. And I think that's an old way of thinking about it. And I don't, I don't, I don't see it very much anymore.

David Todd [01:35:26] I see.

Dan Saenz [01:35:26] As far as, as far as the keystone species, that's a little bit different. That, that, that's implying that there's something about the red-cockaded woodpecker that opens up opportunities for other species. And this was, this was some Dick Conner's early, you know, his, his words was the "keystone species". And his, his thinking was that all the cavities produced in, historically, in the longleaf pine ecosystem, they were predominantly produced by red-cockaded woodpeckers, because there weren't other, many other woodpeckers that occurred in that habitat. So, the red-cockaded woodpecker was a keystone species for several other secondary cavity-nesters - keystone species for flying squirrels, titmice, even screech owls. Actually, when, when the pileateds enlarge their cavities, the screech owls like to use them. So other bird species, other wildlife species, tended to use red-cockaded woodpecker, tend to use the red-cockaded woodpecker cavities. And that's more where the keystone species comes in. So it's actually, it's, it's basically unlocking the door for other species to, to, to occupy that habitat. So, yes, yeah.

Dan Saenz [01:36:54] Well, maybe we should return to this, this view of the red-cockaded woodpecker as a flagship species. And, and I'm wondering if its, its status as an endangered species gave leverage in order to change really ingrained ways of managing the forest, you know, change the way the forests were cut, or the frequency of burns. And that without the Endangered Species Act, and the litigation from outside parties, you know, just with inertia, the management of the forest may not have changed.

Dan Saenz [01:37:40] That's, that's true. I mean, you can't, you know. I think you're right. There's no way to, to really demonstrate that. But, but there were pressures at the time in the '90s, and there was litigation and the Forest Service had to manage for red-cockaded woodpeckers. And there was, it was court-ordered, that national forests in Texas were, in the court's eyes and the litigants' eyes, mismanaging the forest and it was harming the red-cockaded woodpecker. That's what the lawsuit was about in the late '80s. And the federal court sided with the, the litigants and found the Forest Service in violation and ordered them to do management that promoted red-cockaded woodpecker.

Dan Saenz [01:38:38] And that's where a lot of the heat was, too. There was a lot of animosity at the time from some of the folks in different places. They weren't happy with scientists, in that they were providing the data to litigants really.

Dan Saenz [01:38:55] But, but that started the Forest Service down the road of managing the forest in a way that helped the red-cockaded woodpecker. And you're probably right. If they hadn't, we'd probably be way behind the eight ball right now, had that not happened, and had we not started when we started. But that seems like a lifetime ago, that, that we were thinking that way. Now it seems like everybody's on the same page, and everybody realizes that timber management and red-cockaded are very compatible. So, and I think now that the new

generation just coming into it, understanding that. It's a different world, as far as, you know, the land management, as compared to what it was in the late '90s. I don't know if that answered your question or not?

David Todd [01:40:00] Yeah, it does, it does.

David Todd [01:40:03] So I think you said earlier that y'all were getting close to saturation on public lands in these national forests for red-cockaded woodpeckers. And of course, the litigation really had to do with how the national forests are being managed, these federal lands. What do you think the opportunities are on private lands for red-cockaded woodpeckers?

Dan Saenz [01:40:29] I, I, you know, I don't want to be negative towards private lands, at all. I think they're really important. But I think they, they have many more challenges, in that it takes a lot of area to have, you know, a large woodpecker, red-cockaded woodpecker population, and most of the land base, private land base, is pretty limited. So these private landowners, timber companies, what have you, can only hold so many groups. And there have been lots of population models that show that you need at least 30, 30 groups. And that's a lot, and that's a lot of area, to have a sustainable population where you're not having to augment birds. And that seemed to hold pretty true.

Dan Saenz [01:41:22] So I just don't think there are any, the opportunities are pretty limited in how the private lands can contribute very much. Not saying they don't, but contribute, but they're just so limited in how many birds they can actually, you know, hold. So in Texas, at least, we don't have many, enough, many situations where the red-cockaded can be on a property that's going to be able to support enough groups to be a sustainable population.

Dan Saenz [01:42:03] However, there are a lot of inholdings or neighbors to the national forests. There are a lot of property within, within national forest purchase boundaries that are, sit right up against national forests. In those situations, those partners can be really helpful by providing foraging habitat for the red-cockaded woodpeckers and nesting habitat. But as standalone islands, those are, don't, those are pretty limited, in, in Texas at least.

David Todd [01:42:36] I see. So if I'm following you, it's, it's not that forest management on private lands isn't compatible with red-cockaded woodpeckers, but it's just the parcel sizes aren't big enough, that they're, there's too much fragmentation?

Dan Saenz [01:42:54] That, that's true, but in what you just mentioned, I think in general, short-rotation management is predominant on private lands. But what I was saying, of the private landowners that want to have red-cockaded woodpeckers, they're, they're limited. I think most people don't want to have them. But, but the ones that do want them and are trying to manage for them, their challenge is they don't have, they don't have the land base for it.

David Todd [01:43:26] I see. OK. All right. Thanks for clarifying that.

Dan Saenz [01:43:28] Sure.

David Todd [01:43:30] So, you know, it's, it's so interesting to talk to you because you have this, this unique niche of being a, a sort of a long-term witness to what's been going on, on public land and as a scientist for a government agency. And I was curious if you could just talk

about this role that you've had for a generation now of, you know, both having a wonderful sort of topic and area to, to do your work, but also, you know, being subject to political pressures, as you were talking about, you know, during the litigation, you probably got whipsawed a fair amount by the different, you know, plaintiffs and defendants. Can you tell me what it's like to have been a government scientist?

Dan Saenz [01:44:30] It, it's a dream job, really, I mean, in a lot of ways, I mean. But, you know, with it comes some scrutiny and this is so minor, it doesn't you know, it doesn't take away from the experience I've had much. There is scrutiny as far, if you work with endangered species, there sometimes that want to try to discredit science. And, you know, there's, there're anti-science people out there. And they, I don't know what anyone's agenda is necessarily, but you're under, you're under the microscope at times when you're working with, with threatened and endangered species. And there's, there have been incidences over the years, and I guess I shouldn't get into specifics, that, that have been disheartening.

Dan Saenz [01:45:24] But, but overall, we've had a lot of support and we have great relationships with our partners on the national forests and grasslands of Texas. And we seem to be kind of on the same team. And I have been called as a witness for them, but I was never called on the stand. I, we never got to that point in the litigation that we were going through at the time. But it's an honor to, to be thought of in that way, to be asked to be an expert witness for the, for the, for the Forest Service. I guess I don't.

Dan Saenz [01:46:07] Times have changed. The generations have changed. You know, the attitudes have changed. And it's a much better time as far as the attitudes go, than when I started in the early days in the '90s. It was almost a hostile environment. And if you, if you talk to Dick Conner, you'll, you'll get that end of it. He was at, he was, he was at the forefront of taking the heat.

Dan Saenz [01:46:40] And, you know, I think, I think it just took time, and it took it took the old generation, you know, to be replaced by the new generation, to have a little bit more forward-thinking. And I think we're in a really, really good place as far as the people, the attitudes, the, the, just, just the way that resource managers, especially in in the national ,the federal sector, have, they seem to be in favor of doing the right thing in ecosystem management. And I just think we're in a better place. It's a long way to say it without trying to say anything, to say anything about anyone or anything.

David Todd [01:47:42] Sure.

Dan Saenz [01:47:42] I think we're in a better place.

David Todd [01:47:46] Well...

Dan Saenz [01:47:46] That's a tricky one. I'm sorry I didn't want to say anything.

David Todd [01:47:50] Well, I think you're trying to be respectful.

Dan Saenz [01:47:54] Trying to.

David Todd [01:47:55] And I can understand how it's, it's important to recognize the pressures that are on all these managers from different directions and different requirements that are placed on the national forests.

David Todd [01:48:11] Well, as we start to wind this up, can you sort of take us to the 30,000-foot level and, and look in the past and try to tell us where you think things have come in the last 30 years, and then maybe also look into the future, and tell us what you anticipate for the red-cockaded woodpecker?

Dan Saenz [01:48:39] Right? Well, that's kind of, kind of like the last question kind of leads into this one. I, I think we've come a long ways from the, the early the early part of the 1900s. The, the red-cockaded woodpecker was on a crash course to extinction. And in the '90s, things turned around, and, and at that point there was still a lot of pressure from people calling this single-species management, who were really against doing anything to help the red-cockaded woodpeckers, because at the time the prevailing, I guess, attitude was that, if we have woodpeckers, we can't do our forest, we can't do our timber harvests and do our, the forest management that we want to do.

Dan Saenz [01:49:25] And some of that was true. They couldn't do the forest management exactly the way they wanted to do it. But it didn't mean they couldn't get the timber volumes out eventually like they needed to.

Dan Saenz [01:49:37] Those attitudes changed as the people, those people, just had to leave, eventually. And then we realized, we're not being held back by the woodpecker. So, at that time, everybody's on board, the populations are growing quite rapidly through a lot of work. This isn't a species you can just walk away from. It's going to require, it's going to require artificial cavities, burning, thinning. So it's going to require active management. You can't, you can't just leave them alone, and expect them to do anything.

Dan Saenz [01:50:12] But we're on the right trajectory. And what's, what's on the short-term horizon is this species will probably be down-listed to threatened. I know that it, it seems like it's on that trajectory: that some sort of down-listing, because it's doing well everywhere. Everywhere someone's managing, we've figured it out. And, really, I see a bright future for the red-cockaded, and I think we will have them in perpetuity as long as, as long as we continue to manage for them, they'll do really well. And really, what I see in the future is de-listing, and the species being really successful.

David Todd [01:51:00] That's very heartening.

Dan Saenz [01:51:03] But I guess it's one of the rare, rare, rare, rare stories...

David Todd [01:51:08] But it's interesting.

Dan Saenz [01:51:09] Where we actually have success.

David Todd [01:51:11] Yeah, I guess I come away with this sort of mixed feeling. On the one hand, you've had great success, but it's also maybe a recognition that the bird needs to be managed, that it needs intervention and you can't leave things be. You know, I think there's this sort of idea, that at least I have, that there's, there was this sort of wild state and that if you leave nature alone, that that all will be well. But it sounds like the red-cockaded woodpecker is an example where, you know, there have been just too many changes and, and a lot of biota needs, you know, human help. Is that fair to say?

Dan Saenz [01:52:05] No, that's, that's absolutely correct, because the landscape has changed. They occurred in an ecosystem that was maintained through disturbance, and now you don't have widespread disturbance because there are so many, that the land is so fragmented that this disturbance won't carry through the landscape, across the landscape, like it used to. So this is the disheartening part, is someone's always going to have to do something, for at least for a really, really long time, for this, for this species to, to continue.

Dan Saenz [01:52:51] There are areas in, in Florida, the Carolinas, where there are really, really large populations, really large land base, where let's say humans caught a virus and we all went away next year. You know, there are places where they may hang on. Most of the populations of Texas would probably cease to exist in 20 years, 30 years, if left completely untouched. But some of those other populations in longleaf pine, that is much slower to succeed in those sandy habitats that are real wide open, that burn pretty easily. It takes hardwoods a long time to, to kind of take over there. And those areas might make it.

Dan Saenz [01:53:37] Here in east Texas, we have real productive soils. Hardwoods will just jump in really quickly, as soon as you take the fire out of the system. Those won't last very long.

Dan Saenz [01:53:48] But in those longleaf pine ecosystems, I think there's a chance, if, if humans were to disappear, you know, tomorrow, there'd be a place that there'd be places where they probably could hang on and the ecosystem could maintain itself on its own, but not wide-spread across its historic range. That, that just wouldn't, isn't going to happen today.

David Todd [01:54:12] Gosh. You know, this has been a wonderful conversation because, you know, we, of course, are talking mostly about the red-cockaded woodpecker, but you've given a wonderful view of the forest as well, and, you know, everything from the, the, the rat snakes to the flying squirrels, to the pileated woodpeckers, and all the brothers and sisters that live in the forest with the woodpecker. So thank you so much.

Dan Saenz [01:54:41] Of course. A pleasure.

David Todd [01:54:41] I just have one last question, open- ended question. Oh, yeah. Our pleasure as well. Is there anything you'd like to add? Just...

Dan Saenz [01:54:52] No, I think I think your questions, you covered it. And, no, like I said before, right before we started the interview, I, you know, I think this is a good format, and I think you asked a good question to start me from the beginning to get to the end and no, I don't have anything to add. I just, I appreciate the opportunity to share some of this stuff with you.

David Todd [01:55:21] Well, thank you. You're a good teacher, and I hope that you continue to work out there in the field. Be careful when you climb those trees and ...

Dan Saenz [01:55:32] I don't climb anymore.

David Todd [01:55:36] Maybe that's smart. Well, thank you, Dan. Have a good day. And again, I hope our paths cross at some point, but I certainly hope you know that we really appreciate your participation here.

Dan Saenz [01:55:53] Thank you, David.

David Todd [01:55:55] All right, you take care.

Dan Saenz [01:55:57] You, too, bye.

David Todd [01:55:58] All right, bye now.