

TRANSCRIPT

INTERVIEWEE: John Karges

INTERVIEWER: David Todd

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David Todd [00:00:01] Well, we are setting out on doing an interview today and with your approval, Mr. Karges, we plan on recording this interview for research and educational work on behalf of the Conservation History Association of Texas, and for a book and a website for Texas A&M University Press, and finally, for preservation and cataloging at an archive at the Briscoe Center for American History at the University of Texas at Austin. That is our plan. And of course, you would have ownership to this recording as well. And any use you'd like to make of it, feel welcome to it.

David Todd [00:00:48] I just wanted to make sure you understood that and that it was agreeable to you.

John Karges [00:00:52] Yeah, I am totally agreeable to it. And I am honored and glad to be part of it and delighted to be participating.

David Todd [00:01:00] Well, thank you.

David Todd [00:01:01] OK, well, let's, let's get started by just describing the date and time and place and so on. It is June 19th, 2021, about 2:30 in the afternoon. My name is David Todd. I am representing this nonprofit group, the Conservation History Association of Texas. I'm located in Austin and we are really fortunate to be conducting an interview with John Karges, a conservation biologist who, among other things, worked for the Nature Conservancy of Texas for 30 years with much of that time spent in West Texas. And during his career, he worked to manage the rare Leon Springs pupfish, which occurs at the Diamond Y Spring and Draw, on a Nature Conservancy sanctuary there. And I hope that will be able to talk a little bit about his life and career and, and take a close look at some of the work that he did with the pupfish and the habitat that supports that, that fish. He is currently in San Antonio and therefore this interview is being done remotely.

John Karges [00:02:23] So, John, I usually start these interviews with just a chronologically appropriate question. We start by asking you about your childhood and if there might have been any people or experiences, events that were a big influence in your interest in working with animals, and lands, and desert fish in West Texas in particular?

John Karges [00:02:47] Well, I can, I can try to streamline that and the fact that, that all of my memoried life, I have been interested in nature, and natural history, the biology and species of vertebrates primarily. But over a career in conservation, of course, I had to be a lot more holistic, a lot broader about that to look at systems and habitats and conservation and natural communities.

John Karges [00:03:14] But it started out in my youth, I think, with Walt Disney, Jacques Cousteau. I grew up in Fort Worth and there was a series: my mom was very active in the Fort Worth Audubon Society, and there was a series called the Audubon Lecture Series, where lecturers would visit town on a schedule, four or five times, different presenters each year, and they would have a video or a film that they would narrate in person. The film was virtually silent. And so the Audubon Nature Series of films was very influential. But I spent time in the Fort Worth Zoo, at the Fort Worth Museum of Science and History so long ago that it was actually the Fort Worth Children's Museum at the time. And I was involved with Museum Science Club.

John Karges [00:04:00] But probably most influential and seminal, besides the family outings and the family encouragement with participation in nature and, and fostering curiosity, was my participation in a student naturalist group in the very new Fort Worth Nature Center, back when it was called Greer Island Nature Center. Established in the mid '60s, they just had their fiftieth anniversary not too long ago, and I was in the first student naturalist group. My mom would take me out on Saturdays and we would participate with the naturalist in all kinds of learning activities, whether it was surveying for mammals on the nature center or on private ranch land with, with little live traps where we captured the mice. We would look at them, we would determine the species and maybe the, the gender of those mice. And so a lot of hands-on experience with mammals, with reptiles.

John Karges [00:04:54] And then I was also very influenced by tagging along with my mom on just Fort Worth Audubon Society birding trips up to Hagerman National Wildlife Refuge on the Red River, and Lake Texoma, or out to various members' private ranches, or just the parks in the Fort Worth area. So all of these were very influential.

John Karges [00:05:13] And then family vacations, particularly to the western United States, from Montana to Arizona - many, many experiences of that, that youth I recall with nature, like sitting on the bank of a trout stream with my granddad as he was instructing me on how to fish for trout and having a badger run across, down the stream, on the opposite bank. Didn't interfere with us. We didn't interfere with it. But just seeing this big woolly caterpillar of a badger run down the bankside, all these kind of seminal or influential memories in my youth that, that led me to pronounce, I think in third grade, that I was going to be a biologist and I've been a naturalist ever since.

David Todd [00:05:57] Wow. Lots of rich experiences there. You know, in the way you described it, it sounds like your mother was a particularly active and influential person in your life for this sort of conservation bent that you've had. Is that fair to say?

John Karges [00:06:20] Yeah, she was. She was, she is a naturalist in her own right. All self-taught. She never had sciences in college and was an English literature and library scientist by her profession and trade. But she was always interested in nature and because of her, her participation in Fort Worth Audubon Society through various officers, all the way up to being a president of it, she was very, very influential. And in her own right, has turned out to be an extraordinary amateur lepidopterist. She's written a book on Vladimir Nabokov and his butterflies that he used in his literature and has given presentations all over the Metroplex. So when people ask me what a butterfly is, I say they're asking the wrong Karges.

David Todd [00:07:08] Well, that is great. Well, it sounds like you had a powerful, if informal, education, just as a child with your mother and grandfather and others.

David Todd [00:07:21] Maybe you can talk a little bit about the more formal education you got. I understand that you, you went to Texas A&M in Kingsville and got a Bachelor of Science there, and then took your Master of Science in biology from the University of Texas at Arlington.

John Karges [00:07:39] That's correct. I did, actually, when I started college, I took my freshman year at TCU because my mom's affiliation with TCU. But I knew I wanted to go to a state school where there was lots of access to natural areas. And also because I'm a fisherman, I chose Texas A&I, which is in Kingsville, close to Baffin Bay and close to the Mexico border. So I chose the University because I could get my fishing fix there. I could go to begin to learn about birds in Mexico with trips to Mexico. And I got an education in spite of it and attended A&I and got my, my bachelor's in biology, focusing not so much on the lab sciences or the, the pre-medical arena, but truly the vertebrate and other ologies - mammalogy, herpetology, ornithology, ichthyology and entomology - you know, all the, all of the field courses I could grab onto.

John Karges [00:08:36] And I also came into it with quite a bit of background because of my youth and because I just devoured field guides and spent probably as much time memorizing scientific names or learning them, actually not just memorizing, but learning the scientific names of many of our Texas organisms and looking at field guides and saying, "I want to see that animal someday in the wild." And that's something I've actually been very fortunate to do over time, is see a lot of the critters I knew from the literature, I knew from pictures and books and getting to work with them.

John Karges [00:09:07] And then when I finished my bachelor's degree at Texas A&I, I actually I took a year off from, from the curriculum of an undergraduate to work on a project on the coast with the U.S. Army Corps of Engineers funding to study the nesting of water, colonial waterbirds on islands in the Laguna Madre - the islands that have been made by the dredging of the Laguna Madre for the Intracoastal Waterway. And so I took a year off to do this, to participate as one of the field technicians in this study of the, of the bird use of these islands, and then finished up my undergraduate the following year with my senior year.

John Karges [00:09:46] And then from there, I had have known for all along that I wanted to go on for a graduate degree. So I went to University of Texas at Arlington for my Master's.

David Todd [00:09:57] You know, one thing that, that sort of caught my attention when you were describing the appeal to going to Texas A&I, I mean, despite the fine education you got there, but it sounds like you not only have a kind of academic curiosity about wildlife, but that you also enjoy fishing and just being outdoors. Is that fair to say?

John Karges [00:10:23] Oh, absolutely. Matter of fact, they're inextricably intertwined because when I fish, I'm a predator. And I want to think like three things. I want to think like something a fish might want to catch and eat. So I throw lures. I want to think like the fish, because I want to think of what a hungry fish might chase down and eat. And then I think like a great blue heron or an osprey. What would it take to make that predatory fish susceptible? And so I fish for predatory fish with lures, which makes me a naturalist because I'm incorporating this cumulative set of experiences to be a better fisherman, even though most of the fish I catch, I try to harmlessly release and pamper while they're in my, my hands, or my care, and, and then release them. So I get to be a naturalist when I'm usually wade fishing on the Texas coast. And I have seen some extraordinary things, like watching various porpoise

behaviors and, and stingrays and cownose rays that I encounter when I'm wading. And so it's, it's just all the kind of cumulative me as a naturalist and angler.

David Todd [00:11:30] That's that's great. Gosh, it's fun when, when your idea of fun and your career intersect.

David Todd [00:11:41] You know, I think that, in reading a little bit about you, before we managed to do this interview, you mentioned that you, while you're at UT-Arlington, you studied with a famous herpetologist, William Pyburn. And I was hoping that you could talk about how your intersection with him, as well as any other, you know, fellow students or professors while you were in your formal training.

John Karges [00:12:12] Well, there's two people I would like to mention. One, even though it was prior to Dr. Pyburn at UT-A, and that was Dr. Allan Chaney, who was my vertebrate biology mentor as an undergraduate. And as an undergraduate, you don't have a major professor. But I befriended Dr. Chaney, who was, was an extraordinary teacher, a moderately good researcher (he didn't publish a lot because he was at a small university where he was teaching heavy class loads). But he put together a number of Master's students over the years. And so he did sponsor a lot of research. He had quite a few publications. But A&I at that time was, was very much a teaching-heavy institution and certainly encouraging faculty research. So as he would do his research, he actually would have a lot of students working on it. And when I was looking at my Master's program, he said, I would love you to stay at A&I. We were very, very close. I mean, I just, just cherished my time with this man as a as a mentor and instructor and just an influential figure in my life. But he said, I'd love you to stay at A&I for your Master's, but you've taken just about everything this university has to offer. And you need to go to a bigger place, broaden your horizons, get another perspective from a major supervisor.

John Karges [00:13:29] And at the time, I knew that the University of Texas at Arlington was, was burgeoning as a herpetological center. I'd known of Dr. William Pyburn, who was at UT-A. He was actually a student of Frank Blair, who needs to be mentioned often in Texas natural history and conservation. But Frank Blair was at the University of Texas and he produced a wide variety, a huge cadre, of graduate students who got their dissertations and went on as Ph.D. Faculty at many state universities, famous all across Texas for his reach and influence.

John Karges [00:14:04] But Dr. Pyburn was one of those students and he ended up at the University of Texas at Arlington and his specialty was neotropical tree frogs. And that's what he actually worked on the most. But because UT-A was developing as a herpetological center with a fairly large collection at the time and rapidly growing, I decided to go there rather than one of the other big institutions that was an option, like the University of Texas or Texas A&M or, or even Texas Tech. And because I was somewhat focused on herpetology, it would have been either A&M, UT or UT-A. And so I chose UT-A because it was back in my home in Fort Worth and, and was, you know, a good and burgeoning program in field biology, especially herpetology, and especially with a focus on the neotropics, so that would be Mexico and southward through Central America and northern South America. And that had all the allure of the diversity of that, that reptile and amphibian fauna, what we call, "herpetifauna", based from the word herpeto or herpes, the reptiles' and amphibians' world.

John Karges [00:15:16] And so that's what made me select that. When I got there. Dr. Pyburn was actually very close to the end of his career. And I think I was one of his last graduate students. But I ended up working on a project with the checkered garter snake, which occurs

from southwestern Kansas, through much of western two-thirds of Texas, as far west as the Colorado River Valley of California and western Arizona, and then southward well into Mexico, including species distribution all the way down to British Belize and the Yucatan Peninsula. But I worked on the checkered garter snake across kind of its broad range using museum specimens for my Master's thesis under Dr. Pyburn. And, and it was very influential. I never got enough time with Dr. Pyburn. We never got enough field time.

John Karges [00:16:09] But we did have a, a tremendous field trip to West Texas, which I actually got to be kind of the coordinator because I knew West Texas from a lot of travels out there. And so I coordinated a whole class field trip to the Big Bend and the Davis Mountains for probably the entire week of spring break one year. And, and it was not my desert introduction, because I'd been out there quite a few number of times on family trips or from even from Texas A&I in Kingsville. I would actually go looking for snakes out in West Texas. So that was that was another influential aspect of connecting me to West Texas.

John Karges [00:16:53] And matter of fact, when I was looking at colleges first and one of the decision points between Texas A&I on the coast, or in Kingsville, and the other institution was Sul Ross State University at Alpine, which also had a good field biology. It was right in the middle of all this public land in the Trans-Pecos. But I opted not to go there. And I'm kind of glad I did because I ended up spending another 20 years of my career residing in Alpine around Sul Ross. And so I could, I could come back to that, that West Texas experience and actually spend much of my professional career there.

David Todd [00:17:28] It's nice to have a little variety, especially given your future work in Texas and how diverse the state is.

David Todd [00:17:38] Well, you mentioned a couple of the people that have been influential, you know, from your mother, to Dr. Chaney, to, to Dr. Pyburn. A lot of people we talk to are also big readers. And I was curious if there are any books that you found useful and inspiring through your life?

John Karges [00:17:59] Oh, I've thought about that quite a bit. And the interesting thing about books on this subject, at least for me, is I can't read enough and I can't get them all read. But the most important ones are certainly Fred Gehlbach, who was a professor at Baylor who just passed a couple, last year or so, but he'd written a book called, "Mountain Islands and Desert Seas", about the natural history of the U.S. Borderlands. And it was, I think it's also an A&M Press book. It's had a couple of editions, but it was incredibly influential and I still refer to it to these days. To this day, I'll go back to passages or want to reread a chapter or a section on a geography that that has piqued my interest. And so "Desert Islands and Mountain Seas" by Fred Gehlbach is one of them.

John Karges [00:18:50] David Schmidly has written a couple of very influential books. One, his more recent big book is "Texas Natural History: One Hundred Years of Change", in which he took Vernon Baily's 1905 biological investigation of Texas, and reprinted that book in its entirety in his book, but then he augmented it with changes that have been measured and perceived over the last century. The book came out in the early 2000s, but it's "Texas Natural History: A Hundred Years of Change".

John Karges [00:19:21] There's a couple of newer books. Brian Chapman and Eric Bolen put together a book on the natural history of Texas, which is hugely important. And actually something that a lot of folks might not appreciate, but the newest book, the newest manual,

for Texas Master Naturalists, is one of the singular best compendiums of the natural history, from geology, soils, and climate, up to the biota of Texas. So those are all very influential.

John Karges [00:19:52] I could think of dozens of others. The former chief justice of the Supreme Court, William Douglas, wrote a book called, "Farewell to Texas", which was hugely influential. The writings of Roy Bedichek, and to some degree, Frank Dobie, as the iconic early Texas writers of the landscape and also some of the stories of the landscape. But those were important too.

David Todd [00:20:21] Great, great titles and really evocative to think about all the, the lives that are represented and the landscapes in those books. Well, thank you.

David Todd [00:20:33] Well, I think the next act in this play is to talk a little bit about your, your career, early career. I understood that you started at the Fort Worth Nature Center and Refuge, at least for, you know, one stint as a naturalist there. I am always curious about how people first have responsibility and get paid to do something. What was that like?

John Karges [00:21:00] Well, the Nature Center has actually three episodes of, of participation or involvement. And one was as a student naturalist, but from student naturalist, I actually was hired as kind of the weekend warrior. I guess, I guess you would call it the intern position, but I was the weekend naturalist staff with, with one of the professional staff naturalists for four years throughout high school, and my freshman year in college, as an employee of the City of Fort Worth at the Nature Center. And so from rolling from student naturalist programs to the weekend warrior and full summertime employment for three summers of the Nature Center, that was my first stint there.

John Karges [00:21:42] But then I went off to college and off to graduate school. And my actually, my first job in the, in the career or business was, as I was finishing my Master's degree at UT-A, I actually landed a position as a curatorial collection manager at the Natural History Museum of Los Angeles County, in the division of reptiles and amphibians. And I did that for three years from 1983 to 1985, through the Summer Olympics in Los Angeles. But that was a phenomenal experience because I was like a kid in a candy shop. I was in one of the world's premier reptile and amphibian collections, one of the largest ones on the West Coast in a public museum. But it's a research collection. It's a, it's an archive of biological specimens from around the world. So I got to see and handle animals in, again they're preserved, they're not, not live like in a zoo, or in the wild, but they're preserved animals from Komodo dragons and sea turtles and anacondas down to tiny little geckos from Madagascar and Western Africa - a global distribution of these reptiles. Many of them were from Australia and a lot of them were names I recognized from the herpetological literature, but never really knew what the animal looked like until I could actually hold the jar that had several of them.

John Karges [00:23:01] Some people think yes, that's, that's kind of morbid, but that's an incredibly and irreplaceable, incredibly valuable and irreplaceable archive of the biodiversity of the planet is held in our natural history museums. And, and there's a lot of concern about, you know, there have been excessive collecting? And there probably has. But more notably, there's a lot more damage and degradation to the environment, loss of species.

John Karges [00:23:25] But the archival collections of animals, whether it's a Field Museum of Chicago, or the Natural History Museum of the Smithsonian, or the American Museum, or a museum in Brussels, or Paris, or London, or Moscow, or Sao Paulo, Brazil. These are archives and warehouses of the biota of, of the world. And we still find new species, but we also lose

new species. And I always talk about the, the, the wonderful announcement of the discovery of a new species and virtually the obituary announcing the extinction of an animal.

John Karges [00:24:01] And so that was at the Natural History Museum. That was for three years. And then my, my very best friend was the director of the Nature Center. And in 1985, he hired me back to the Nature Center as a full-time professional staff naturalist.

David Todd [00:24:17] Well, you know, I'm glad you mentioned your time in, in Los Angeles, and I gather it echoed some of your work at Welder Wildlife, where I understand you worked on the vertebrate collections there as well. You know, this, this whole idea of being able to see and handle something up close: it must be really evocative, beyond watching something fly by or swim by, or see something in a book on a color plate. It's hard to replace.

David Todd [00:24:55] Well, so, so see if we're in the same place. You're talking about the Fort Worth Nature Center on your return there as a full-time employee in 1985. Did you work with the public a lot, I guess, while you were there?

John Karges [00:25:09] Well, I did. And that's, that's what a major center, a naturalist at a publicly funded and publicly owned nature center spends a great deal of time outbound. While we certainly do habitat management, habitat restoration, but a lot of public interpretation and appreciation for nature. And the Nature Center in Fort Worth focused on its biogeography of being at the edge of the Western Cross Timbers and the Grand Prairie. So we had prairie. We had Cross Timbers forest with post oaks and blackjack oaks. We had the Trinity River flowing through the nature center. So we had lowland wetland bottom. We had swamps and marshes, flowing river.

John Karges [00:25:49] And so it had this amalgam of kind of the biota of the Metroplex, which was a wonderful introduction for many people to know about, where do you live? You know, you can live in a city, but formerly that city was sitting on a prairie. I've seen pictures of TCU campus when it was one building on a prairie outside of, outside of town. And the TCU campus I grew up on was an urban metropolitan campus surrounded by housing and expanding housing divisions out west into former ranchlands of western Tarrant County and Fort Worth.

John Karges [00:26:27] So we had that that representation of prairie with bison and prairie dogs at the nature center. We had the post oak woodlands with trails through them. We had the boardwalk out onto the lotus marsh as the outflow of Eagle Mountain Dam on the Trinity River. So we had just this, this wealth of exposure and opportunity to the citizens of Fort Worth, whom the Nature Center serves because it's a Fort Worth City Park, but it also served the entire metroplex.

John Karges [00:26:55] And I did many public outreach programs from everything from the Tarrant County Detention Center, where I would take a un-releasable red-tailed hawk and a captive tractable possum and a bull snake and other natural history items to things like senior citizens' facilities, to school classes, to the Tarrant County youth detention center, which was really an interesting thing because those kids are incarcerated for accusations of crimes. And one of the most interesting ones was I actually gave a program to the golfers' kids for the Colonial Invitational, and many of the golfers would travel with their families. If they had kids, they would have to find something for the kids and spouses to be able to do.

John Karges [00:27:40] So I went into a classroom in Alice B. Carlson Elementary School in Fort Worth to give this program to the golfers' kids, my naturalist program. And it was the third grade classroom I was sitting in Fort Worth when we got the announcement that President Kennedy had been assassinated.

David Todd [00:28:01] Oh boy.

John Karges [00:28:01] And that was really poignant. But it was an exposure to the kids for the, the traveling golfer families. And I think I used to count it up that I would actually speak to probably five thousand people a year in public programs of interpretation. And that was either trail hikes, we, we would do things off-hours, like lead nighttime hikes down to the marsh and the boardwalk for folks. And, and then many, many public programs, including forming the Snakes of Tarrant County program that introduced people to snakes. We actually did that. We set that up to counter the information being distributed at rattlesnake roundups.

David Todd [00:28:49] Right, where I guess they're, they're barbecuing these snakes.

David Todd [00:28:55] Barbecuing, slaughtering, and this kind of thing. The Snakes of Tarrant County Workshop was live snakes with good interpretation, professional quality herpetological interpretation for the public to introduce them to snakes, let kids handle a snake. And absolutely diametrically different from a rattlesnake roundup.

David Todd [00:29:16] Oh boy.

David Todd [00:29:18] Well, speaking of the species that you might have handled and interpreted, was, was part of your effort also to sort of explain the role of urban and suburban animals, whether they were, I don't know, skunks, or 'possums, or raccoons, you know, the grackles and starlings? Was that also part of it, where's it's not maybe some of your pure wild creatures that are native, but, but some of the creatures that, that seem to co-exist well with people?

John Karges [00:29:54] Well, then actually it's probably been more of a burgeoning thing in the last 30 years, is the interaction between people in the urban environment and wild animals in the urban environment. It was not talked about so much 30 to 40 years ago, other than the animals that were brought to the Nature Center that were found as either orphans or injured and needed to go to rehabilitators to be properly taken care of. The, the whole interaction now between people and urban wildlife, with the deer on the lawns, of the skunk in the backyard, or the, the grackles at the mall grove of trees over cars, that, that actually has become a lot more prevalent in the last few years.

John Karges [00:30:39] And I think that Fort Worth Nature Center today would probably have to say they do deal with that a lot more. I mean, there are feral hogs in the environment, both at the Nature Center and in people's yards. There are coyotes and bobcats in the Dallas / Fort Worth area. There's almost been like an urban repatriation of some of these, these animals - the occurrence of otters on the Trinity River back in the Metroplex.

John Karges [00:31:04] So I think that's actually a lot more prominent these days than it had been perceived in in the past. And, you know, it's a double-edged razor. We're moving from the urban environment into the rural environment as the cities expand. And so there's a lot more interaction with animals. And sometimes they're fairly adaptable, like raccoons and

coyotes, of living compatibly, at least in their mind, with people, and then incrementally in people's minds.

David Todd [00:31:36] It's interesting. I guess the animals are changing and people's attitudes are changing as well.

David Todd [00:31:44] Well, let's, let's jump ahead a little bit and talk about the Nature Conservancy, where you spent a generation, I mean, a full 30 years, a huge chunk of time. And I think that's so related to the, your work with Diamond Y and with the Leon Springs pupfish, which I really want to hear about.

John Karges [00:32:08] Yeah.

David Todd [00:32:09] I was hoping that you could talk about how you first came to work at the Nature Conservancy.

John Karges [00:32:15] Well, in 1990, I left the Nature Conservancy, the Nature Center in Fort Worth and joined the Nature Conservancy out in California for just a year stint on a place called the Carrizo Plain Natural Area. And I was there for a year. I had a fantastic time, I worked with, with all kinds of interesting biota and researchers on the Carrizo Plains Natural area. It's now a national monument. But in 1991, I was in the Conservancy, so I knew about job listings, and the Nature Conservancy in Texas, our Texas chapter, had just opened a brand new position, first time, for this position called the West Texas Land Steward.

John Karges [00:32:58] And so I think it was in September of '91 that I moved to Fort Stockton and took the role of the West Texas Land Steward. So I was in charge of everything the Nature Conservancy did in West Texas. Now, we already had several preserves and those were acquired by our land protection staff that would either secure easements or, or transfers of land to government entities, or would buy the reserves. And so we had several preserves and several commitments. But we had no staff out there. This was all done remotely from the state office in San Antonio at the time.

John Karges [00:33:36] And so by filling that position as a West Texas land steward, I actually resided in the area and as a steward, land steward, I was over the properties that we either owned or managed as conservation easements.

John Karges [00:33:49] Now, the Conservancy had done some land transactions where we had purchased the Harte Ranch in Big Bend National Park area, and it later became part of the National Park. But we also at that time had Brushy Canyon, which was a 9800-acre preserve in Brewster County. We had just acquired the conservation easement with the Chandler family in Terrell County on the Pecos River, where Independence Creek confluences with the Pecos. We had a tiny little preserve out west of the Guadalupe Mountains called Gypsum Dunes Preserve. And then in 1990, we also had just purchased Diamond Y. And that's where we'll focus a lot of our conversation for the rest of the interview.

John Karges [00:34:33] But we had multiple properties in West Texas that I was responsible for and also in some of the community relations, because it's got a longer history than we have time for for our interview. But there's been a lot of controversy about the acquisition of conservation lands in West Texas, beginning with Big Bend National Park in the '40s. And so the Nature Conservancy actually was in the middle of some of that controversy. When we would acquire properties, or easements, or do transfers, we were under the scrutiny of a fairly

suspicious public that it's not not completely done with nowadays. But we were building some conservation trust and we were certainly acquiring crucial lands.

John Karges [00:35:15] And so in 1990, actually, even before I got there, the Nature Conservancy had purchased Diamond Y Spring Preserve, which at the time was a 1500-acre tract of land in Pecos County, just north of Fort Stockton.

David Todd [00:35:29] Well, while we were on Diamond Y, why don't you tell us the, the background to how that, that piece of land was identified and how, if you know, the negotiations with the, the landowner eventually ended up with a sanctuary in the Nature Conservancy's hands?

John Karges [00:35:47] Well, the land was, was targeted for the Conservancy's attention. Well, it actually is, it goes a little bit before even the Conservancy's involvement. The Diamond Y Spring is a rare kind of salty spring and associated marshland (which we call a "cienega" in Spanish) in Pecos County, and it had been known since about the '60s to harbor a rare fish, an ultra-rare fish called the Leon Springs pupfish.

John Karges [00:36:18] And in the late '80s and early '90s, one of our Nature Conservancy board members was Dr. Clark Hubbs. And he was the preeminent fish biologist and conservationist in Texas, as a professor at University of Texas. He was on the board of the Nature Conservancy and he was the primary impetus for a lot of the aquatic conservation focus for the Nature Conservancy in West Texas, including Diamond Y Spring. So our protection and protection staff determined that Diamond Y Spring might be available, and it was owned by a person that we can identify. And we approached that person about the possibility of purchasing that 1500 acres of his ranch and the Nature Conservancy did.

John Karges [00:37:04] Now, to take a little bit further back from that, there is an information system called the, now, it's now called the Texas Natural Diversity Database, but it harbors the records of what we know about the rarest organisms, plants and animals and natural communities, across Texas with a mapping program. And we may get to a little more detail about that. But we also, at that time, knew that not only was the Leon Springs pupfish at Diamond Y Spring, but also was the Pecos gambusia. And both of these animals were federally endangered species of fish. But the Leon Springs pupfish, it occurred at Diamond Y Spring and as the only known wild population on the planet. It was named Leon Springs pupfish because it was originally occurred at Leon Springs, which has long since dried up. It's about eight miles west of Fort Stockton.

John Karges [00:37:56] And when the, the springs dried up, the fish was presumed (it was known to science - it had been described in the 1850s in a biological expedition), but it was presumed extinct. And it was not until 1965 that the fish was rediscovered. And when it was rediscovered, announced to the scientific community that this, the fish still existed, then it was identified as being at Diamond Y Spring. And so that's what really fostered the Nature Conservancy's interest in conserving Diamond Y Spring. So in 1990, every state chapter of the Nature Conservancy tried to, to seal a deal or complete a conservation acquisition project on Earth Day of 1990, and the Texas one was Diamond Y Spring Preserve acquisition.

David Todd [00:38:51] Do you know much about the, the original owner of the Diamond Y, and why this spring might have persisted since so many springs had dried up or been degraded in some way?

David Todd [00:39:04] Well, the owner is Mr. M.R. Gonzalez. He still lives in Fort Stockton. He was a county commissioner and his family was a multi-generation ranch family in Fort Stockton, Pecos County ranches, elsewhere as well. But he, he had worked with the fish biologist years before the Conservancy's involvement to build a protective collar around the spring. Now the spring is sitting in the middle of a Gomez oil and gas field. And there was a natural gas plant not too terribly far, less than half a mile, from the spring. And so in in the '70s, I believe it was, Mr. Gonzalez, at the encouragement and impetus of a fish biologist, worked with the Natural Resource Conservation Service or at that time, the Soil Conservation Service, to build a protective levee around the springs so that should there be a surface spill at that gas plant, that the spring would be collared by this protective berm that would prevent leakage into the springs because we knew that's where the Leon Springs pupfish was, also the Pecos gambusia and now actually several other rare species as well.

John Karges [00:40:15] So in 1990, we consummated the deal with Mr. Gonzalez. He was a willing seller. He was still a livestock man. He grazed the preserve. We actually had a lease that extended into a few years of the Conservancy's ownership with Mr. Gonzalez. And we worked with him on pasture management and fence rotation, fence, fence building and pasture management rotation so that the springs would be pretty well protected from either overgrazing or the mechanical damage of cattle.

John Karges [00:40:46] And there's a very plant up there called the Pecos or puzzle sunflower. And we knew that the cattle like to eat those sunflowers when they were just sending up their flowering heads. Because that's an annual plant, those seed heads, if they're in a cow's belly, never turn into sunflowers. So we actually worked with him to take the cattle off of the pasture with the sunflowers while they're bolting up and making their beautiful yellow sunflower heads. And then after the seeds set at the end of that growing season, then the cattle come back onto the ground and onto that pasture and eat the grass around the spring, but they would not impact the rare plant.

John Karges [00:41:22] So it was all real compatible collaboration with the former ranch owner, very agreeable to him. He still got to graze his cattle on his heritage ranch land. But we also managed it for conservation purposes. And because it's in the middle of the oil and gas field, we also worked with energy companies to prevent any kind of degradation or threat to the springs or the watercourse from an oil spill or a pipeline accident or something like that.

David Todd [00:41:51] Well, this is really interesting because I think, as you said when you went out there, I guess there was a real burgeoning controversy with Take Back Texas and a lot of property rights advocates who were none too pleased, I guess, about acquisition of lands out there. And it sounds like you, you managed to thread this needle with Mr. Gonzalez. And I like your, if you would, something about your collaboration and the Nature Conservancy's cooperation with these local oil companies that I guess were operating. I think there're pumpjacks and pipelines and refineries out there very close to the spring.

John Karges [00:42:33] There are there are pipelines and pumpjacks. There's both oil and gas. This is the Gomez gas field. And it's a very shallow oil field that's kind of playing out. It's not as highly productive as it used to be. It's all in the middle of the Permian Basin. So a lot of energy production. And there's also some very deep gas wells. But there were majors, major companies that were working out there, and when it came to light that the Nature Conservancy would acquire a Diamond Y Springs, they were, the oil companies were very willing to work with us to protect, first of all, their assets, but also against environmental degradation.

John Karges [00:43:15] And so they were willing to double-wrap pipelines across aquatic areas where the pipelines had to be there (they had to get to remain), but they would put protective collars around them. They would elevate pipelines so that they would not corrode underground and therefore rupture and make a spill. And they would make berms around their production sites. So pumpjacks, at the pad, that would be a full containment site should a leak develop prior to detection. And they were very sentinel, responsive, about being out there every day when the pumpjack was working, or in operation and pumping.

John Karges [00:43:55] And the, actually, Exxon company worked with us. And we matched money with the National Fish and Wildlife Foundation to restore some pad sites and that, these sites had been taken out of production. They no longer had infrastructure on them and we actually restored them either to the native gradient of the terrain and/or with revegetation. And that was a very collaborative project.

John Karges [00:44:22] So and they also, the energy companies, because it's a, there were seven federally endangered or threatened listed species out there, they were fairly responsive to any kind of threat and or notification of, if there was a spill and prompt attention and remediation or abatement of, of any kind of threat.

John Karges [00:44:48] So it was a really collaborative. And it was funny because I one time ran into an oil field worker out there and he said, well y'all are part of the environmental movement that is trying to shut us down. And I took another person from a very strident environmental group out there and he said, "Oh", because we had a sign out there that talked about the partnerships, and he said, "Oh, you all are in bed or in cahoots with these energy production producers." And I said, "You know, we must be doing something right because we're right in the middle of a controversial center."

David Todd [00:45:17] Gosh. You were in cahoots and environmental radicals, at the same time. That's, that's a complicated place to be.

John Karges [00:45:26] It's what we call the radical center.

David Todd [00:45:29] That's, that's a good term for it.

David Todd [00:45:33] Well, you talked a little bit about the, the, the landowners and the oil and gas operators and the land.

John Karges [00:45:42] And I was hoping you could tell us a little bit about the environmental history of the Leon Springs pupfish itself, because it seems like it's had a really bumpy history. I mean, from its discovery back in the 1850s and, you know, at various times, inundated and disappeared and poisoned. And it amazingly hardy creature to have made it to 2021. Can you tell us much about its history?

David Todd [00:46:14] Well, I can. The pupfish, of course, was described, as we mentioned earlier, in 1850s and then it was virtually either ignored, or forgotten, or the land was inaccessible to see whether it was still at Leon Springs. We know Leon Springs dried up about the same time as the most famous spring in Texas and certainly in Pecos County. Comanche Springs dried up in the late 50s. Well, Leon Springs was much less famous in Comanche because Comanche was a huge-volume, spring-fed discharge right in the center of Fort Stockton, a very contentious legal case that recodified Texas right of capture water law. But

there was, there's a pool in Rooney Park in Comanche, around Comanche Springs, in Fort Stockton that was bigger than an Olympic-size pool. And when the springs were flowing naturally before the '50s, that pool volume would change every 15 minutes. It was such a spring discharge. Well, when that spring declined in the late '50s and the court case was settled, we also lost Leon Springs out west of Fort Stockton and the fish was presumed extinct.

John Karges [00:47:23] And then when it was rediscovered by a biologist (and kind of an interesting story) as being in the Diamond Y Draw, north of Fort Stockton, that's when the fish community, the fish conservation community and Texas endangered species biologists, first of all, announced the rediscovery of what was thought to be an extinct species, and then the listing of it as an endangered species, and the confirmation that it still occurred at Diamond Y Spring on, on this gentleman's ranch, Mr. Gonzalez's ranch, and then ultimately under the Conservancy's ownership in 1990.

John Karges [00:48:01] Well, the pupfish is an incredible animal. Matter of fact, it's very diverse. There's a huge group of pupfish out in Death Valley, and Amargosa Springs, and, and Devil's Sinkhole in California. There are pupfish in the eastern Chihuahuan Desert, including the Leon Springs pupfish, the Comanche Springs pupfish, which was extirpated from Comanche Springs when it dried up, the Pecos pupfish, which still occurs in the river in very limited numbers, and the Devil's River pupfish, a Conchos pupfish, which also occurs in the Rio Conchos in Chihuahua, Mexico. So we have this kind of epicenter of pupfish diversity in the Trans-Pecos of Texas.

John Karges [00:48:43] And Toadfish are also remarkable in the fact that they have some of the widest thermal tolerances from cold water to hot water of any vertebrate. And they can live in very salty waters. So pupfish have actually been used in biological kidney research in human kidneys on how does, how does the body manage salt. And the kidney, of course, removes salt from the blood. How does a pupfish tolerate this salty environment that can be almost hot springs like? I mean, I've seen fish thriving in water that almost is too hot to wade in and they seem to do well. So they're real survivors.

John Karges [00:49:25] But the other thing about pupfish is they are extremely geographically restricted. There's a lot of endemics, which meaning that is the only place they occur on the world - like the Leon Springs pufferfish. They have a very limited range. Their evolutionary history, how they got separated, and divided, and isolated, and then formed full species, is fascinating research endeavor that Dr. Tony Echelle from, formerly from, Oklahoma State University had worked on for years. But we do know that they're very diverse and most of the, many of the places where they occur, like there's a pupfish out in White Sands, where there's still a stream in New Mexico - a very, very arid environment and they're still pupfish. The same is true in the Nevada / California border pupfish around and north of Death Valley. So they're, first of all, when you just think about a fish in the desert. That's got to be fairly limiting because water is limited.

David Todd [00:50:29] Sounds like an oxymoron.

John Karges [00:50:31] It really does. And so, so where there are, where there are still sustainable waters - and that's one of the crucial things about Diamond Spring - as long as we can sustain that surface water availability, we hope that we can also manage the habitat and sufficient space for a viable population of pupfish.

David Todd [00:50:52] Well, could you, I know this, you're not, I guess, in your day-to-day life, a hydrologist, but you mentioned that Leon Springs is, is highly dependent on, I guess, both surface water and groundwater flows. Can you talk a little bit about the, the, the history of water policy and rights out there? And I think you mentioned in passing some of the controversies back in the '50s that were so critical for, for groundwater law across the state.

John Karges [00:51:27] Well, I'm not the expert on the current flavor and tenor of Texas groundwater policy, but of course, that's hugely controversial and, and very proprietary because of the numerous court cases, including the one in Fort Stockton with the Williams estate against the City of Fort Stockton for groundwater rights.

John Karges [00:51:51] But at Diamond Y Spring, it's exclusively ground water. And we know that there are at least three, if not four, aquifers that contribute to the upwelling of water that make the spring. But it's absolutely crucial that there be surface water availability for pupfish habitat, for rare snail habitat, for Pecos gambusia habitat, and even saturating the soils out for the adjacent marshland, for the Pecos sunflower. So water sustainability out there is very, very crucial.

John Karges [00:52:24] But it also is very, it requires a tremendous amount of research to know true cause and effect of either groundwater threat or diminishment of groundwater availability. And what is its real cause? Is it geohydrologic? Is it seismic? Is it extraction for fracking or municipal water? And it's all a very tangled web that still requires a lot of resolution throughout much of Texas, but especially in west Texas, where water is either critically important to surface conservation and or critically important to human economic endeavors and well-being of communities.

John Karges [00:53:07] So, I can't really talk about water rights of Diamond Y. You mentioned earlier about Mr. Gonzales. Mr. Gonzales was a rancher, not a farmer. So he didn't use irrigation rights. He may have had irrigation rights, but, but ground was either not suitable to be tilled for farmland because it was so salty, or his preference and his, his livelihood and, and life was being a cattle rancher, a stockman. So he, we've never really worried about water rights from Diamond Y. But we're absolutely concerned about water extraction in the area and the reduction of groundwater availability, which is expressed as surface springs.

David Todd [00:53:55] OK. Well, this is fascinating. You've got such a complex overlay of, of issues, you know, from the land to the water, to the, you know, the land ownership, to its operation for oil and gas. And, and through it all is this thread about the Leon Springs pupfish. And so, as you said it, it reappears in the mid '60s in Diamond Y. And I was hoping that you could describe a little bit about Diamond Y, and about the population of the fish in the Springs and Draw there.

John Karges [00:54:38] Right. Well, Diamond Y is really interesting, and some of our, even some of the Nature Conservancy literature said, you really expect it, but it's a hole in the ground that has water in it. And when you look at it, you're standing there with me, I'll tell a lot more details about the vitality and the crucial nature of this desert spring from this groundwater upwelling into what virtually is a hole in the desert that's full of water with some peripheral springs. And then the spring, the water that flows out of that, that pool flows downstream for a ways. And I'm talking several hundred yards. And then it goes back into the ground, soaked into the soils of that valley floor. And then about, over a mile away, the springs, or the water flow, again reappears. And there's a few handful, there's a handful few of side springs that also contribute to it.

John Karges [00:55:34] But their surface water at the northern end, or the downstream end, that also has the pupfish. So we virtually have two severed populations of the pupfish. And because some of these spring holes are fairly deep, they're very hard to count the pupfish. You can, you can do multiple person estimates around the edge of the pool, and say, "OK, I saw 47." "I saw 64." And you try to average it, and hope that that's pretty accurate. But they are really, really challenging to count that as long as we're seeing pupfish that's substantial. If we don't see pupfish, that's of concern.

John Karges [00:56:09] And one of the contingencies that the fish biologists had done in the '70s was they actually had removed some of the Leon Springs pupfish from Diamond Y Spring and taken them to the Dexter National Fish Hatchery, which is now Fish & Wildlife Service Fish Technology Center, where they have, they have reserve populations of rare, some of the rarest fishes in holding pens and tanks at that facility, which is very, very prescient. That's, that's having your eggs in a separate basket, in case there's catastrophism at the only place they're known - like an oil spill or whatever. So, we at least have a contingency of knowing that we have some of the genetic material and the populations in reserve, and that, that's true for the Leon Springs pupfish, and several other rare southwestern U.S. fishes, as well.

David Todd [00:57:04] And when you've been acting as the land steward in west Texas for the Nature Conservancy, what have been some of the challenges in managing this Diamond Y Preserve for the, the Leon Springs pupfish, as well as for some of the other endangered species that are out there?

John Karges [00:57:24] Well, there's been several different actions. A lot of it is certainly a partner-assist or partner-associated, including with the oil companies, to try to prevent any kind of a spill, or accident, or like a turned-over oilfield truck, or something like that from contaminating the water course. So we've had a good communication with them, plus the restoration of the old pad sites and then a lot of collaborative research partnerships like with Dr. Echelle in what used to be called the Rio Grande Fish's recovery team, that Dr. Hubbs, Dr. Echelle and many, many other prominent Southwestern fish conservation, either academic, biologist or agency biologists were part of. So we did a lot of collaboration and meetings and deliberations about what needed to happen out at Diamond Y.

John Karges [00:58:17] And some of the stewardship actions were we tried to, and this is a continuous battle, we tried to reduce the ever-present and expanding introduced plant, the salt cedar or tamarisk tree, because we know they're water-thirsty. And if they're drinking the water, that means there's not water for rare fishes or rare aquatic snails. And so we would do some aquatic or riparian restoration by trying to remove tamarisk or the salt cedar from encroaching upon the springs, are becoming too numerous around or too mature with its deep soda-straw tap roots. We would actually apply fire to the grasslands of the basin of the Diamond Y Spring and in the cienega grasslands, because those annual grasses would get really senescent or decadent and the fire would actually return those nutrients to the soil, and allow for resprout.

John Karges [00:59:15] But there's also mesquite on the preserve. So we would use fire to try to contain the mesquite. And the unfortunate thing is that when you burn mesquite the first few times, it actually comes back with a thank-you note for thanking you for the fire, because it's rejuvenated. But the more often you can burn it, and that's, that's kind of the obligation for the Conservancy, and a tough thing to get the resources with it for is to, is to burn with the frequency that the preserve needs it.

John Karges [00:59:43] We would also try to do some aquatic habitat management for things like the pupfish. One of the big concerns was the we, we actually know historically, since fish research has begun out there, that there's not quite as much water and not much, quite as much of an expanse of inundated land that is now pupfish habitat. Where when we lost that expanse of habitat and maybe because of water flows, we don't really have historic water measurements. But we just know that the more water is, the more aquatic habitat there is in the valley floor.

John Karges [01:00:19] Well, as this has declined, we, we actually have had some things like a scirpus reed, which is a natural, salt-tolerant reed of the marshlands, become very, very prolific. And so one of the actions of that habitat-crowding or change, which actually cut some of the scirpus out from the marsh and replaced them with concrete or cinder block tiles that would give the pupfish adequate space to have a nest, an egg deposition site. These things are called pupfish because the males are very territorial. They're pugnacious little guys who chase each other all over the place, trying to guard and protect that territory and just provide for the females that they can so the spawn will be their offspring.

John Karges [01:01:07] So a female would deposit an egg and then the male with depositors' is milk or his sperm over it. That fertilizes the egg. The egg is not free-floating out in the column. It's actually deposited on a hard substrate, like a cinderblock, or a plant stalk, or, or some kind of firm structure out there. And so we would actually augment the habitat by adding the cinder block tiles.

John Karges [01:01:31] And there's, there's prospects and proposals for actually expanding that habitat. But the huge concern is, is there enough water to sustain that? And one of the big aspects with pupfish is you know, we could put 40,000 pupfish in there, but maybe that habitat can only take 10,000. So that's another that's another consideration. But we would do aquatic habitat management, aquatic research, upland or terrestrial land management surrounding the springs. Much of the preserve, and the preserve is far larger than just the original 1500 acres. Nowadays, it's, it's 4000 acres. But a lot of that's limestone upland that we're not as concerned with because the aquatics have the Nature Conservancy's prime focus on sustainability and sustenance that spring.

David Todd [01:02:21] I see. Well, you mentioned some of the efforts to, to push back against the crowding of this scirpus reed. I understand that aside from that, there's also been an effort to try to protect the Leon Springs pupfish against hybridization. Is that something you were involved in?

John Karges [01:02:47] I was. Well, I certainly was, and that has always been a big issue to us is there is a fish from the Texas coast called the sheepshead minnow, which is in the same genus as the pupfish. It's *Cyprinodon variegatus*. And somehow, and Dr. Echelle can articulate this far more knowledgeably than I can, but somehow the, the sheepshead minnow from the Texas coast has been introduced into several spring and stream systems in West Texas, to the detriment of our native pupfish, because they either hybridize or outcompete the native fish.

John Karges [01:03:24] And that was actually part of an effort one time, I think it was actually part of the effort to get the original pupfish to Dexter National Fish Technology Center so we'd have our, our eggs in yet a different basket should there be a reason or catastrophism, as I said. Well, that was in, I think, in the '80s, or yeah, it was in the '80s and maybe late '70s, that they were working on the, the pupfish genetics and genetic purity of the Leon Springs pupfish.

And then in the early '90s, the Rio Grande Fish's Recovery Team sponsored a project out there to, to restore the, the pupfish in the Springs as the purest ones they could. So what we did was we actually managed the Springs so that we could bring back pupfish, pure pupfish from Dexter to re-populate the main headspring and the main outflow to, to conserve the pupfish.

John Karges [01:04:25] But currently right now I know the Nature Conservancy has a project to look at the genetics of the pupfish in both of the water systems at Diamond Y - the upper watercourse where the head spring is and the lower water course that I mentioned earlier - and then also compare and contrast it to the captive pupfish at Dexter, just so we have the greatest genetic variety of the genes we're supposed to have, i.e. the genes of the Leon Springs pupfish in the three populations. And that's being, that's being assessed currently.

David Todd [01:04:58] I see. Well, you know, it's interesting to hear you talk about the efforts to manage and protect and restore these Leon Springs pupfish. And I'd be curious to hear your thoughts about how the challenges and the management approaches for the Leon Springs pupfish compare with, you know, some of the other rare desert fish that you've probably run across in your many years in west Texas - the Devil's River minnow, the Comanche Spring pupfish, Pecos gambusia, et cetera.

John Karges [01:05:34] Well, let me start with the Pecos gambusia, because it co-occurs with the Leon Springs pupfish and also the Comanche Springs pupfish over in Balmorhea, in what we call the Balmorhea Springs complex, which are a number of springs at Balmorhea, not just the main spring that feeds the famous swimming pool that just reopened, but the, there are several springs over there. But the Pecos gambusia, it's a live-bearer. And Gambusia is just the genus of the mosquito fish. So it's very much like the common mosquito fish that's been introduced all over the globe for mosquito control and malaria concerns. But the Pecos gambusia is an endemic to the Pecos River basin, virtually from Roswell south to about, actually, I'm not sure how far south, but, but mostly on the Pecos plains, so north of Sheffield on I-10, but especially at Diamond Y Spring and Leon and Comanche Springs habitat, which is at Balmorhea now because Comanche Springs is dried up, or at least is no longer pupfish habitat.

John Karges [01:06:38] So the Pecos gambusia is a federally endangered species, not quite as rare as the Leon Springs pupfish, but still qualified, warranting endangered species status. And at Diamond Y Spring, it co-occurs with pupfish. Well, we did find that when a pupfish female would lay her eggs, the Pecos gambusia would actually eat the egg off of the deposition site. And what do you do when you have one endangered species eating another endangered species? Well, my feeling about that is if we have enough habitat for a number of Pecos, of Leon Springs pupfish, then we'll have enough so that some of their offspring also feed the Pecos gambusia. But we haven't really measured the Pecos gambusia. It might, definitely is known to cause the decline or local extinction or extirpation of the Leon Springs pupfish, and that's just the Pecos gambusia. So I hope there's enough habitat at Diamond Y Spring and also at the Balmorhea Springs complex over in Balmorhea, that there's, there's room for both species to flourish, even if they're still under the endangered species veil.

John Karges [01:07:51] The other fish you mentioned, like the Devil's River minnow and some of the other fishes I know and worked with in conservation in West Texas, are stream fishes, and they occur either in the Devil's River or tributary streams of the Pecos, like Independence Creek. And because the Devil's River and the Independence Creek are entirely spring-fed, they're high quality Edwards-Trinity Aquifer waters that still sustain spring-obligate species of fish like the headwaters catfish, the Rio Grande darter, the Devil's River

minnow, the Proserpine shiner. There's a whole little guild, or suite of, or subset of Rio Grande fish fauna, which includes the Pecos and the Devil's, that are these, these rarities in conservation. And I've gotten to work with them in the Devil's River and also at Independence Creek. And then the Nature Conservancy, when I was with them, we actually were involved with the Comanche Springs pupfish, but not at Balmorhea, but at Phantom Lake and Phantom Spring, which is west of Balmorhea, but in the same springs complex.

David Todd [01:08:58] So it sounds like all these fish, I guess, share similar characteristics in that they're, I guess, extremely isolated and then very dependent on the, the flow regimes in that area. Is that fair?

John Karges [01:09:17] Yeah, they're dependent on both flow regimes and water quality.

David Todd [01:09:21] OK.

John Karges [01:09:22] And because the water coming out of Independence Creek, the springs at Independence Creek, or the springs that feed the Devil's River, I've knelt down like a mountain lion and drank straight out of those springs. They are high quality, Edwards-Trinity Aquifer discharge. And the Devil's River is pretty unimpacted for its entirety. It's only 45 miles long, from its headwaters down to Lake Amistad.

John Karges [01:09:45] And the Pecos, the Pecos, is such an enigmatic river. Because on the Pecos plain, once it enters Texas at Red Bluff, south of Carlsbad, it's a, it's a salty dewatered trickle across the desert, until it gets to the canyons south of I-10 and Sheffield, the limestone canyons of its own making. And from there down to its confluence with Lake, the Rio Grande at Lake Amistad, that river, unlike most other rivers in the United States, actually gets better the farther downstream you go because of the spring augmentation and dilution.

David Todd [01:10:22] That is so interesting. That does seem flipped on its head from other streams and rivers that seem to accumulate all of ...

John Karges [01:10:32] All of our cumulative ills.

David Todd [01:10:34] Yeah, yeah,

John Karges [01:10:36] As you go downstream. And the Pecos, I actually call it, what do I call it? The same river in, three rivers in the same channel, because where the Pecos starts in the Sangre de Christos in the Pecos wilderness, it is a Rocky Mountain clear-flowing trout stream. Then it flows across New Mexico and the Pecos Plain of Texas, which a lot of people call the Permian Basin, and it is dewatered. It's high salinity. It's, it's actually what I call it, an emasculated river. But once it gets into the canyons south of I-10, it gets better and better because of all these spring discharges until it empties into Lake Amistad and then all bets are off. But it is, it's an interesting river. And those three reaches are so markedly different.

David Todd [01:11:28] You know, I'd like to, with your permission, return to just talk a little bit about pupfish. And as you've explained them, they're, they're just a fascinating, hardy, diverse, very special and interesting group of animals. But they, they are not large and famous and charismatic and, you know, great for sportfishing or for big barbecue meals.

John Karges [01:12:02] So why save them?

David Todd [01:12:03] Yeah, I think that that's, it's a, it's a question. And I'm curious how you respond to that.

David Todd [01:12:12] Well, I can take it purely from a biodiverse standpoint, more than, more than an anthropocentric standpoint. Just the fact that these are endemics in a functioning ecosystem that have a role, what the role is, we're not absolutely positive. What would happen if they were extirpated or eliminated from the system, we're not sure about the consequences. But, ethically, it seems like, for conservation, those systems should be as intact as possible, with protection of sustenance, which is the groundwater, and protection of their role in that, that natural environment.

John Karges [01:12:57] Yes, sir. Pupfish have no economic benefit.

John Karges [01:13:01] I mean, the Pecos sunflower that grows around the the wetlands of the marshes there, we've actually taken the seeds of those and we've deposited them at the National Cryogenic Seed Bank, which means that they're in genetic reserve. But there was also some experimentation with the seeds from the Pecos sunflower to hybridize them with a commercial grade of sunflower to see if you can actually grow a commercially viable crop of sunflowers on previously unarable salty land. Now, we don't want those hybrids on the preserve because that's where the pure Pecos sunflower is. But it had an anthropocentric motivation to look at that salt-tolerant plant, to see if it actually could make a commercial grade plant that you could use on lands that previously had not been commercially productive. So, you know, the Pecos sunflower might have that human reason for keeping it going.

John Karges [01:14:02] But the pupfish, again, it doesn't have to be a trophy. I mean, a big old wall-hanger boar male is only two inches long. So, the reason to preserve it to me is a responsibility to keep biological intactness and viability where we can on the planet.

David Todd [01:14:25] So I guess under the rationale that the first rule of intelligent tinkering is to keep all the pieces?

John Karges [01:14:33] Right.

David Todd [01:14:35] OK, well, I think that that part of the value of these animals is still unknown. And I think that it'd be curious to hear about your work with the Texas Natural History Survey, this database of biological information, which I think is been a really amazing, far-flung effort to understand more about places and creatures. And could you talk a little bit about the Survey and, you know, its value, particularly in a state that has so much private property where it may not be as fully explored as some other states.

John Karges [01:15:21] Well, in one of my former roles with the Conservancy was as the director of the Texas Natural History Survey. And it has a very interesting past in the fact that there is a global database called the Natural Diversity Database. It's actually run by an organization that was split off from the Nature Conservancy called NatureServe. And it's a global nonprofit organization that is a central repository, and kind of a clearinghouse, for the biological distribution records of plants and animals, especially the rarities, across the planet. And NatureServe was formed, like I said, by a, by a very forward-thinking man named Dr. Bob Jenkins from the Nature Conservancy. But as the technology developed, it actually was then split off from the Nature Conservancy. But many of the states either had their own natural

heritage program within the Nature Conservancy's purview, or their natural resource agency would pick up that database.

John Karges [01:16:28] And nowadays, the natural diversity database that the Nature Conservancy started is now solely operated by Texas Parks and Wildlife through their non-game program in the, as the Natural History, Natural Diversity Database. And that's where all the records of species of rarity and communities are kept.

John Karges [01:16:50] But in a private-lands state, there are huge issues with disclosure of who has that land, or where does that record reside? Where's that record found, on whose land? And so the Parks and Wildlife Department and the Nature Conservancy, back when we maintained the database, the Conservancy, under my tenure, actually transferred all of the records we had in the biodiversity database, that we could share, meaning that we had landowner permission and we knew it was OK to, to, to provide to a public agency, we actually transferred that information to Texas Parks and Wildlife.

John Karges [01:17:27] So Parks and Wildlife now is the central depository. And the utility of that is, is, there are many utilities. But one of the utilities is, should there be a pipeline or a transmission corridor across the landscape, Texas Parks and Wildlife, as a public agency, can provide information to those who are interested as to what are the endangered, or threatened, or species of greatest concern species in the swath of that pipeline, or in the swath of a new development. Should there be an endangered species, there would have to be some regulatory oversight or constraints, too. So that's what the Natural Diversity Database does, is it provides, as publicly accessible, an information archive of where organisms occur on the, in the state that is public information.

John Karges [01:18:23] Now, some landowners say, "I don't want anyone knowing what's on my land." And so they may not even allow Parks and Wildlife, or formerly the Nature Conservancy, to collect, to even get on the land to collect records. Or they may sign a very clear legal form that says you can come on the land, but you will not share this information with anybody. So there's a disclosure form that Parks and Wildlife has had to do in a private-lands state about whether or not they were at liberty to distribute records from someone's land.

John Karges [01:18:58] Some people, and what's really an anomaly about that is people were so afraid that a record would be collected on their land and all of a sudden federal Endangered Species Act biologists and / or regulations would shut somebody down. And, and some of the same people would then say, "Well, wait a minute, this pipeline is going to cross my land. I want you to come out and find an endangered species..."

David Todd [01:19:18] [Laughter]

John Karges [01:19:22] "So shut that down or make it go on the neighbors or whatever." And that really is, it's been an interesting conundrum to watch in Texas.

David Todd [01:19:29] Yeah, well, I can see how this, this life and career have been really interesting and, and complex for you, you know, certainly with the Leon Springs pupfish and all the aspects of it, but just wildlife and land issues in the state. And so I'm so glad you've managed to tell us about it.

David Todd [01:19:55] And as we sort of wrap this up, I was hoping that you might tell me if there's anything you'd like to add about, you know, your work at the Nature Conservancy or in natural resources conservation in general, or maybe more particularly about Diamond Y and the Leon Springs pupfish.

John Karges [01:20:17] Well, gosh,

David Todd [01:20:19] So much to cover.

John Karges [01:20:20] Yeah, the interview the interview is far too short to talk about everything I'd love to cover and many things I can't even remember right now. But you know what was probably most special to me was getting to spend 30 years hoping to make a difference, and thinking I was successful at it, in collaborations, and partnerships, and conservation successes.

John Karges [01:20:45] Part of my tenure with the Conservancy out in west Texas was a regional conservation biologist. So when a land protection opportunity arose and someone might approach the Conservancy about, you know, what's, what's the validity of my land, and what's the likelihood that I could do something to protect it forever, like with a conservation easement, then I got to do biological assessments of the land, the ecological assessments, the context, maybe species surveys on there, to inform the landowner and the Conservancy about the validity of an easement.

John Karges [01:21:19] And in some cases, the easement might not be exactly aligned to being the Nature Conservancy's, but still somebody else. So is there a even better or more appropriate partner for a conservation easement? Or is it for the Nature Conservancy? And, and then working with public lands transfers: like we, the Conservancy, transferred gypsum dunes to the Guadalupe Mountains National Park after the National Park Service had acquired all the surrounding lands, kind of ensuring the permanent protection with a boundary within a national park of gypsum dunes. And one of the neatest canyons I got to work with was the addition of the Fresno Canyon Ranch for Texas Parks and Wildlife to add to Big Bend Ranch State Natural Area.

David Todd [01:22:12] Well, these are treasures and they're just going to get more and more valuable as time goes by, and so I'm so glad that you and all your partners were active to try to secure them for the future.

John Karges [01:22:26] Well, one of the dilemmas, and I'm sure you've addressed this in other arenas and are so aware of it, but the fact that every bit of conservation land that's at least designated as conservation land in Texas has been a re-acquisition. Meaning that the state, or the feds, or the Nature Conservancy, or some other nonprofit have had to go back and, and acquire those lands or protect them somehow with an easement, because of our private lands situation in Texas and the fact that we disposed of most all of our public lands as we became a state in the Union.

David Todd [01:23:07] That's been a huge challenge to put, put the genie back in the bottle, so to speak.

John Karges [01:23:12] Absolutely, yeah.

David Todd [01:23:14] Yeah. Well, again, I just wanted to emphasize how much I appreciate not only your visiting with us today, but all you've done over a generation. And I wish you well for continued good stuff, Good Trouble. And if, if possible, I hope our paths will cross in the future.

John Karges [01:23:37] Well, I look forward to it. I will always be interested in the biodiversity of Texas till my last cogent thought.

David Todd [01:23:44] Well, well, good. Well, I know you'll have many cogent thoughts to come. You've been very clear and helpful today, and I wanted to thank you.

John Karges [01:23:53] Well, it's been my pleasure. Thank you for inviting me to participate.

David Todd [01:23:57] You bet. All right. Well, you have a good day. And again, thanks for your time.

John Karges [01:24:01] My pleasure.

David Todd [01:24:03] All right.

John Karges [01:24:03] Thank you.