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INTERVIEWEE: David Diamond

INTERVIEWER: David Todd

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David Todd [00:00:01] All right. Well, good morning. I'm David Todd. And I have the great privilege of being here with Dr. David Diamond. And with his permission, we plan on recording this interview for research and educational work on behalf of a non-profit group called the Conservation History Association of Texas, and for a book and a website for Texas A&M University Press, and for an archive at the Briscoe Center for American History, which is at the University of Texas at Austin.

[00:00:31] And I want to stress that he would have all rights to use the recording as he sees fit as well.

David Todd [00:00:38] And that's our plan. I just wanted to make sure that that's okay with you, Dr. Diamond.

David Diamond [00:00:43] It's. It's great.

David Todd [00:00:44] Okay.

David Diamond [00:00:45] Glad to be here.

David Todd [00:00:46] Well, thank you. Thank you. I'm really delighted that you'll be with us.

David Todd [00:00:51] Well, let's get started.

David Todd [00:00:53] It is Wednesday, June 15th, 2022. It's about 1005 Central Time. Again, my name is David Todd. I am representing the Conservation Industry Association of Texas and I'm in Austin. And we are conducting a remote interview over Zoom with David Diamond, who is based in the Columbia, Missouri area.

David Todd [00:01:19] Dr. Diamond is an ecologist. From 1983 to 1995, he worked for the Natural Heritage Program at Texas Parks and Wildlife, coordinating for the last five years there. And in the years since then, he has been at the Missouri Resource Assessment Partnership, serving as an ecologist in the last nine months or so, but previously as its coordinator.

David Todd [00:01:44] And relevant for today, he has published widely about golden-cheeked warbler range and habitat, land use and cover changes over the years. So really interested in what he's done and what he can add to the perspective about the bird.

David Todd [00:02:04] So, today we will hear about his life, career and focusing on his work on behalf of the warbler as an example of the kind of impact he has had in a diverse conservation career.

David Todd [00:02:19] So, we thought we might start by just asking you if you might tell us about your childhood and early years, and if there might have been some people or events in your life that influenced your interest in animals and landscape and plants and maybe the conservation of all that.

David Diamond [00:02:37] Sure. I grew up in Montana, mostly in Billings, Montana, and my dad was a fisherman and a hunter. So, I was initially attracted to hunting and fishing. And I had a really good high school teacher who was a geologist. And so, I became interested in landforms and so on.

David Diamond [00:02:58] And so, I went to college there in Billings, and there was a really dynamic guy named Norm Schoenthal, who was my mentor there. He was an ecologist. So, he set me on the road to becoming more of a plant guy than an animal guy, because he convinced me you had to know about the plants in order to know about the animals.

David Diamond [00:03:26] So, I ended up then graduating there with biology, and then I went to Texas A&M University and ended up with Fred Smeins as my major professor. And I owe a whole lot to Fred. He was really my biggest influence. So, I got a Ph.D. there at Texas A&M.

David Todd [00:03:51] Well, and sometimes when you're a child, there are often like particular people - I think you mentioned your dad as a hunter and fishermen - who are an influence on you. Do you recall any kind of events, maybe, maybe hunting or fishing trips that you took with him?

David Diamond [00:04:16] Yeah, nothing really in specific. Nothing really specific. Sorry about this. There was something in the background. I can't really point to any specific events or things. We just were going hunting and fishing every single weekend, as I was growing up as a child.

David Diamond [00:04:37] I initially thought, "Well, I want to be a game warden", but I figured, "You know, those guys carry guns." And so then I wanted to be a wildlife biologist. And then, as I said, later on, I decided I wanted to be a plant ecologist pretty early.

David Diamond [00:04:53] I was in junior high when the first Earth Day happened. I think I might have been in seventh grade, and so that had a big influence on me, just being aware of the events that occurred around Earth Day. So, that was maybe one of the big events.

David Todd [00:05:12] And was there a group or a nonprofit or anything in your community that was interested in not that so much ecological things or botanical or biological things, but in environmental protection, sort of these Earth Day issues about, you know, protecting the planet?

David Diamond [00:05:33] Yeah, I, I definitely always wanted to protect wilderness and, but I was unaware of any particular group, you know, that was active in that. Other than, you know, just my exposure in junior high and through the media in general.

David Todd [00:05:54] I guess it was part of the times.

David Diamond [00:05:57] Yeah.

David Todd [00:05:58] And were there, I think you mentioned your dad and this high school teacher who was a geologist. Were there any kids that shared your interest in the outdoors?

David Diamond [00:06:13] You know, not really. People, I had kids in my neighborhood who also went hunting and fishing. I had friends that came with us and I with them, went with them. But really, in terms of conservation and ecology, I really was exposed to that more as I got into college. My friends just wanted to go shoot things.

David Diamond [00:06:38] It occurred to me at some point that I didn't want to shoot things anymore. And that was pretty early on, probably when I, by the time I was 20, I never went hunting again.

David Todd [00:06:50] So, why did you decide you weren't interested in hunting?

David Diamond [00:06:53] Oh, I, uh. I guess I had shot enough things, and I was more interested in knowing the ecology of the plants and animals. I just didn't want to kill anything anymore.

David Todd [00:07:06] Yeah.

David Todd [00:07:09] I'm intrigued by this fellow that was a botanist who was one of your teachers and mentors at college. Did he take you on many field trips?

David Diamond [00:07:21] I went on summer field trips with him, Norm Schoenthal. There was a Prairie Ecology two-week trip. There was an Alpine Ecology two-week trip. And then I was, after I took his ornithology course, I was a helper, you know, in his ornithology courses when I was a junior and senior. So yeah, he introduced me to a lot of stuff and he was very dynamic and energetic. So that was, he was a great guy. Big influence.

David Todd [00:08:01] And then at A&M, you were one of those lucky people to be with Fred Smeins. Can you recall anything about him that was pretty influential in your life?

David Diamond [00:08:15] Why, I just admire Fred a whole lot. Just his knowledge, number one. He's so well-read. But also just his personality. He's just open, open to thinking about things in different ways. His philosophy and so on. So, yeah, Fred was a big influence. He also helped me out a lot because when I got there, I was 21 years old and you know, I just wasn't very mature. So, I could have gotten myself into trouble, if not for Fred. Fred helped me out by keeping me level.

David Diamond [00:08:58] He did. Yeah. Yeah.

David Todd [00:09:01] Very nice. And he guided you all the way through your Ph.D.?

David Diamond [00:09:06] I came in as a botany master's student, and I got Fred on my M.S. Committee and then he was my major professor for my Ph.D. committee. So, I worked with him throughout the whole five years I was there, but he was my co-chair as a botany master's student. And then my mentor and major prof as an ecology student in the Range Science Department at A&M.

David Todd [00:09:44] You know, you have clearly had a lot of formal education from college through your master's and Ph.D. Are there any sort of pieces of the general culture out there that were important to you - books or films or TV shows?

David Diamond [00:10:04] Well, I did as an undergrad or maybe it was a grad student, I did read a Sand County Almanac by Aldo Leopold and got a lot out of that. I was very influenced by that. And the other one was Rachel Carson's Silent Spring, which was published in 1963, I believe. So, she's kind of the biggest conservation hero I have, Rachel Carson.

David Diamond [00:10:34] Because she, you know, she was a government scientist who looked at the data and came up with some conclusions and wrote a book. And she was widely vilified for publishing Silent Spring. And yet, you know, it's sort of directly and or indirectly led to all of those environmental laws that we had that were passed under Nixon - clean air, clean water, endangered species. All of those kind of traced back to one of the biggest influence was Rachel Carson and that book, Silent Spring.

David Todd [00:11:11] Well, and when you think of Rachel Carson, do you think of her as for, with respect for her scientific acumen, or is it for her courage?

David Diamond [00:11:25] Oh, just mostly for her courage, I think.

David Diamond [00:11:28] But both, you know, she carefully documented what was going on. So, she was a good scientist. But then she just had the courage to publish that book. But unlikely, it was unlikely that she knew how vilified she would be for publishing that book. But she was a courageous person and very influential.

David Todd [00:11:52] Well, so, after you got out of Texas A&M, you, it seems like, quite promptly arrived at Texas Parks and Wildlife at its Natural Heritage Program, would it be in 1983? Is that right?

David Diamond [00:12:09] Yeah. Yeah. What happened was it was my first real job, and I got it right after I got my Ph.D. at that point, the Natural Heritage Program was in the General Land Office. So, my first job was actually I worked for the Nature Conservancy, and we were housed at the Texas General Land Office, and we were there for four years until we transferred to the Texas Parks and Wildlife Department.

David Todd [00:12:40] I see. Okay. All right. Yeah.

David Diamond [00:12:42] So, this is a program that it started at TNC, was housed at GLO, and then later transferred to Texas Parks and Wildlife.

David Diamond [00:12:53] You got it. Yes.

David Todd [00:12:54] And what was the purpose of the program and how did you end up there?

David Diamond [00:13:00] Well, the Heritage Program tried to catalog, well, the locations of rare plants and animals and significant natural communities in a systematic fashion. So, they had programs in each state that they managed to establish - state-based programs that all followed national protocols. And, you know, there were regional meetings of state-based individuals to, you know, update the protocols and so on. So, it's essentially a data-gathering

effort to catalog and find the locations and figure out how to conserve the rare plants and animals and natural communities, state-by-state.

David Todd [00:13:51] You know, it, the program reminds me of a project that Don Kennard worked on called the Natural Area Survey that I think was supposed to guide public land acquisitions in Texas for, you know, sites that had special value. Do you see any connection there?

David Diamond [00:14:16] Oh, yeah. That, the stuff that was done for the Natural Areas Survey, you know, we paid close attention to when the Heritage Program was established. And you know, that that work was done, much of the Survey work was done out of UT, as I understand, biologists at UT. And one of the botanists there who worked on some of those ended up working at the Heritage Program. And, you know, it should be stated, I don't know how many of those areas that were identified by the Natural Areas Survey or whatever it was called ended up being, you know, public lands in the end. But certainly some of them. So yeah, that was a great, a great thing that was done there.

David Todd [00:15:07] Well, and what was your role there at Natural Heritage Program. You were a plant ecologist, is that right?

David Diamond [00:15:17] Yeah. Initially, I wrote the first modern plant community, ecological system classification, for the state, and ranked all of the communities in terms of their conservation need. So, that was my role.

David Diamond [00:15:37] And then I went out and looked for examples of those, you know, like especially those that lent themselves to being in a specific area like unbroken native sod in the tall grass region, for example. Those became element occurrence records or records for communities. But I think one of the biggest things that I did is write that classification, the classification of the natural communities. That was published in the Texas Journal of Science. And it also had the conservation scoring or ranking from 1 to 5 for all the communities.

David Todd [00:16:18] So, I understand, and this is a little bit of a detour, but I think it's really important: that you were the first president of the Native Prairies Association of Texas, which continues to this day. Is that right?

David Todd [00:16:33] I don't know if that is right. It does continue to this day. I don't know if I was the president. I was a founding member of the group that got together to establish the Native Prairies Association. Yeah. Yeah. So, that was fun.

David Todd [00:16:51] Well, you mentioned that this classification system that you developed and you know, one of the element occurrences that you might have marked was sites of unbroken native sod. And could you tell us just a little bit about why these prairies are rare and important?

David Diamond [00:17:13] Sure. Most of the, well darn near all of the deep-soiled, plowable tallgrass prairie areas of Texas have been plowed, or certainly those north of the coastal prairie have been. So, there is only small remnants left. And so, I helped identify where those were. And a bunch of them became TNC preserves or Parks and Wildlife areas. The Clymer Prairie is very famous. Nash Ranch, the powder powder ranch, whatever it was?

David Todd [00:17:55] Powderhorn?

David Diamond [00:17:55] Yeah. Those were all things that I identified as good examples of tall grass stuff that eventually got conserved. There are probably others. I just don't know exactly what has happened in the last 25 years. But yeah, that was a good stroke to get those identified and conserved.

David Todd [00:18:17] Well, thanks for telling us a little bit about the coastal prairie and the blackland prairie and I guess these other prairie sites in Texas.

David Todd [00:18:27] Could we sort of change route and go to the Hill Country?

David Diamond [00:18:31] Sure.

David Todd [00:18:32] I, of course, would like to hear about your work with the golden-cheeked warbler. And I thought a place to start might be in 1990. And I think you helped prepare a status review for the golden-cheeked warbler. And that was a pretty critical time. I think in May of that year the bird was given an emergency listing and then in December it got a final listing under the Endangered Species Act. And so, it'd be really interesting to know what you saw when you were working on that status report.

David Diamond [00:19:07] Yeah, yeah. Those were primitive times. I mean, back in those times, we, remote sensing was sort of, it was done, but it was not something that a lot of people knew how to do or... And there was, it was kind of primitive. And since then, I've worked on nothing but remote sensing almost. So, I look back at that stuff and I think, man, if we only knew then what we know now.

David Diamond [00:19:37] And the other thing that, big advances there have been, one is the availability of digital soils maps, which we did not have. They were paper maps only. Now they're digital. So, you can look at vast areas.

David Diamond [00:19:53] And then the other thing is the ability to do landform modeling using a slope and aspect and so on to identify the terrain. So we now, now we can map the terrain. We can map the soils, or we have soils maps available and we can do better remote sensing.

David Diamond [00:20:16] So, back in the primitive days, in 1990, what we really learned, or what I learned, basically there was a guy who did transect surveys for golden-cheeked warblers and identified how many singing males were along those transects, you know, in accessible areas.

David Diamond [00:20:39] And then we came back behind him and did random surveys of vegetation along those transects. So, it became apparent to me that they were, the golden-cheeked warblers' highest density were in areas that had both Ashe juniper and deciduous oak species, or deciduous species. So, they were the most mesic, wettest parts of the Edwards Plateau. That's, you know, that supported those woodlands. So, taller woodlands were better, higher percent cover were better, and a mix of Ashe juniper and deciduous trees were better.

David Diamond [00:21:27] So, really, the wetter, the biggest, tallest, wettest, woodlands, you know, were the best for a golden-cheeks. And, you know, I think people kind of knew that. But this was quantitative data that we had to bear. That was probably yeah, I don't think anybody had ever done that before. So, it was important to find that out.

[00:21:52] And then, we did have some notion of, through the remote sensing, about where the habitat was based on Ashe juniper, because Ashe juniper is an evergreen and it can be mapped, although it gets confused with live oak because plateau live oak is also evergreen. It's a broadleaf evergreen tree. So, we were able to identify about how much habitat there was, about how many warblers there were per unit area in that habitat.

David Diamond [00:22:33] And then we made the assumption that bigger patches were better for the bird. And, you know, that's kind of a safe assumption. You know, so you consider, you know, a patch of woodland and you have a nest and that nest is in the middle of the patch and the territory size, you know, is, is such that all of the territory has woodland within it, if it's in the center of the patch. As soon as you get to the edge of the patch and you locate a nest at the edge of a patch, then only part of a potential territory, if it was just a circular thing around the nest would have woodland.

David Diamond [00:23:18] And so, these birds need woodland. So, if you get to the edges of a patch, all wood warblers are like this, pretty much. If you get to the edge of a patch of a woodland species, there's less woodland, you know, in a circular area of a nest located on the edge of the patch. Geez, does that make any sense?

David Todd [00:23:43] Yes.

David Diamond [00:23:43] But at any rate, it's pretty simple. You know, the bigger patches, a territory located on the edge of a patch would have less woodland available for the territory. But a nest located in the center of a bigger patch would have more woodland located within a circular radius of that nest.

David Diamond [00:24:10] So, anyway, based on that logic, we said that bigger patches were better and smaller patches were bad habitat. And we did a, an estimate of the population based on patches and the estimates of the density.

David Diamond [00:24:27] And then we also sort of waved at the problem. Habitat loss for that bird is a problem. And there's urban development. But I think we later figured out and from the stuff I've done later, that the biggest problem is clearing for grazing. So, there's ongoing clearing for grazing, clearing of habitat for grazing, potential habitat for grazing. And then, you know, building very near or clearing actual habitat for housing, you know, like in the San Antonio and Austin region.

David Diamond [00:25:11] So, anyway, I could go on about the actual woodlands on the Edwards Plateau. Do you want me to do that?

David Todd [00:25:18] Yeah, I think that would be really helpful. In fact, I think that maybe some of this keys to your article from 1995: you talked about conserving Ashe juniper woodlands in the Hill Country. And maybe you could talk about why these woodlands are so valuable to golden-cheeked warblers.

David Diamond [00:25:44] Well, like I said, they're, golden-cheeked warblers are mostly restricted to the wettest areas of the plateau, because that's, those are the areas that support woodlands, you know, and forest because it's getting too dry to support woodlands as you move west across the Edwards Plateau, in general.

David Diamond [00:26:08] Except for the fact. Okay. Okay. We'll go back here.

David Diamond [00:26:15] Say you take the 26-county area that contains golden-cheeked warblers. There are macro influences on the woodlands that exist - mainly temperature, but, and precipitation. And precipitation increases to the south and west as well as to the far east. So, there is a maximum precipitation in the summer on the southern hilly part of the southwestern, hilly part of the Edwards Plateau, west of San Antonio. So, generally in North America, as you move west, it gets drier. And that's still generally too true on the Edwards plateau. But there is a maximum area in the very hilly part of the Edwards Plateau that's west of San Antonio because of increases in summer precipitation in those hilly areas in the, during the summer months.

David Diamond [00:27:22] And I think that's from orographic effects. I mean, it's almost like it's a mountain range because the south Texas plains are flat and low. And when you hit the Edwards plateau that are north of the south Texas plains, they're higher. And it causes an increase in summer rainfall in those areas.

David Diamond [00:27:42] So, anyway, there are, there are influences at the macro scale in terms of precipitation, but then there are other influences on the flats. There are deeper soils, sort of typic soils, and then there are shallower soils over massive limestone, and then there are soils over more acidic materials, either dolomite or in some cases in the Llano Uplift sort of mafic materials. I don't think it's granite. It might be rhyolite, but anyway, the forests are different on those different soil types.

David Diamond [00:28:22] So, there's the, typic, the acidic, and the massive limestone, you know, and they have different development of woodlands on those in the flats, on those different soils.

David Diamond [00:28:35] And then the woodlands on the slopes can vary too. They vary by the precipitation, as I described with the southwest and the far east being wetter. So, there are quote unquote, taller and denser woodlands in the southwest and the far east.

David Diamond [00:28:53] And then they also vary based on the way the canyonlands or the dissected topography is cut into the Plateau itself. So, in some places, the canyons are near areas where the flats have limestone or dolomite that is really porous and soaks in, the water just soaks into the limestone, just flat soaks into the limestone.

David Diamond [00:29:25] And then there are seeps on the hillsides below the lips of the canyons where that water, the groundwater, just sort of comes out. And so, on the hillsides in those seeps, it's a very wet habitat. And that's where you have deciduous species, deciduous woodlands or narrow strips of deciduous woodlands on the hillsides.

David Diamond [00:29:52] Now that situation occurs in the Balcones Canyonlands National Wildlife Refuge, and along the Colorado River and drainages north of the Colorado River, north of Austin, also up near Fort Hood in the canyons there.

David Diamond [00:30:12] But it does not occur like that in areas like west of San Antonio. So, those, those don't have those big seep zones on the edges of the, I mean, on the slopes of the canyons, because the geology is not right on the Plateau top.

David Diamond [00:30:31] So, I don't know if any of this made too much sense. But, you know, there are, the point is, there are a lot of differences in the composition of the woodlands of the Edwards Plateau. Ashe juniper grows in a variety of habitats. But the deciduous species that grow with it vary a lot across those different habitats.

David Diamond [00:30:59] So, I think the variation in the woodlands is well-recognized by ecologists like myself. And, you know, we've written about it and people know about it. But I think when the warbler biologists start to do things based on the habitat, they often fail to recognize the variation in the woodlands, both caused by the precipitation and the topography and also just the soils.

David Diamond [00:31:31] It's generally almost too dry for Ashe junipers on the central and western Edwards Plateau for woodlands to develop, other than sometimes live oak, live oak - juniper woodlands will develop.

David Diamond [00:31:50] So, the wet parts of the Plateau are the slopes and the canyons, and that's where the woodlands occur. So, in the 26-county region where golden-cheeked warblers occur, only a small fraction of the area produces woodlands where they actually, where habitat occurs for them.

David Diamond [00:32:11] And one of the things that's often done is people don't separate the live oak from the deciduous broadleaf species because live oak is a evergreen broadleaf species. And two things happen. It gets confused with Ashe juniper because it keeps its leaves in the winter time. So, if you're doing a remote sensing classification, it's green in the winter. So, it may group with Ashe juniper and then you might think it's Ashe juniper.

David Diamond [00:32:42] But the other thing is, if you if you don't separate it out from actual deciduous species, then live oak does not have the same value as a broadleaf tree for the golden-cheeked warbler as some of those other deciduous species, the oak species do, and hackberry and ash and so on.

David Todd [00:33:09] So, if I've got this somewhat right, the golden-cheeked warbler needs the Ashe juniper to make its nest, but it needs the oaks to find the little caterpillars and insects of various kinds that it feeds on. So, it needs that sort of conjunction of those two.

David Diamond [00:33:33] Yeah.

David Todd [00:33:33] Is that right?

David Diamond [00:33:35] Yeah It occurs where the junction of those two exist any way. Whether it's coincident with the deciduous species just being in more mesic habitats, and therefore it's just taller - taller junipers and taller oaks and more dense woodlands. I don't know what role the actual deciduous species play versus just it being wetter.

David Diamond [00:34:08] And cooler. I think golden-cheeked warblers also suffer from heat stress, just direct heat stress on the birds themselves. And those canyons are shadier and moister and cooler, as well.

David Diamond [00:34:23] So, yeah, what you said is right. But I don't know why the habitat is better where there are deciduous species with the Ashe juniper. I don't know if it's the deciduous species themselves, or if it's just the fact that the woodlands are taller and denser.

David Todd [00:34:42] I see. So, so the extra shade, the greater coolness, the additional water might support both the warblers and the insects that they're feeding on.

David Diamond [00:34:53] Yeah. Yeah, that's right.

David Todd [00:34:56] Okay.

David Todd [00:34:58] Well, so, well, that that just gives a lot more detail to the value of Ashe juniper woodlands. That it's not just the whole 27-county area of habitat, but it's particular parts. It sounds like these slopes and these canyons that are wetter and cooler and have the mix of of vegetation that's appropriate.

David Diamond [00:35:28] Yeah, right, right. And I have not done a calculation of what percentage of the 27-county area is actually that habitat. But it could be done. But it's a small percentage. It's like it's, I, I hate to pull a number out of my head, but it's probably like 10%. It's not much.

David Todd [00:35:57] Boy.

David Todd [00:35:58] And these birds are real specialists there. They're not generalists that can adapt to different kinds of conditions. Is that, is that fair to say?

David Diamond [00:36:06] Yeah. That they're, yep. That's right. Some species have...now, I'm kind of out of my depth when I talk about birds because I'm more of a plant guy. But some species don't disperse very far from where they were fledged. I mean, it's kind of a strategy. They kind of bud off. And wood warblers are that way and golden-cheeks are that way. Most of the, there are four species, I think, in the wood warbler group that is most closely related to the golden-cheek, and they're the black-throated green, the hermit, Townsend's, and the golden-cheek. It's those four that are real closely related.

David Diamond [00:36:56] And all of them, other than the golden-cheek, are in much cooler and wetter habitats. So, golden-cheek is like isolated in the wettest, coolest area that it can be within its range. And the sister species or the others, the species that are most closely related, are further north or higher in elevation in cooler places.

David Todd [00:37:30] That is so interesting. I never realized that. So, that these other wood warblers are further north at higher elevations. They're in cooler, wetter places. And this golden-cheek is sort of in this little island in these fingers of canyons in the Hill Country. Is that it?

David Diamond [00:37:52] Yeah, that's right. And most of the habitat for golden-cheeks are in fairly big patches and they're, it's mostly the canyonlands around San Antonio and to the west, like Lost Maples, for example, is in that area, and then in the river hills elsewhere, especially the river hills and canyons north of the Colorado River, just, you know, where the Balcones Canyonlands Refuge is, and right around Austin itself.

David Diamond [00:38:27] And then there are a set of canyons also up at Fort Hood associated with the river that cuts across the Llano Uplift there, I mean, the Lampasas cut plain there and I can't remember that river. But there, there, in that situation, there are plateau tops with porous limestone and then seeps on canyon slopes below the lips of the

canyon rims. They're at Fort Hood, just like at the Balcones Canyonlands National Wildlife Refuge and in some other areas, you know, north of Austin.

David Diamond [00:39:08] So, they're in specific habitats and they're, it's mesic, wetter parts of the landscape that support woodlands. Yep.

David Todd [00:39:20] Well, and I, I guess this is it's hugely interesting academically and just as a better way to understand the bird and its needs. But I gather that a lot of the work that you're doing for the Natural Heritage Program was also to guide conservation efforts. And I was wondering if some of this work you were doing was used to direct land purchases for the Balcones Canyonlands National Wildlife Refuge, or other preserves for the city that might have been involved in warbler protection?

David Diamond [00:39:57] Yeah, I think, I think directly, you know, kind of like the listing of the bird directly led to the Austin Preserves, because they did those preserves in order to gain a permit to do incidental take for the golden-cheeked warbler. So, that that was a direct result of the listing of the bird and the Balcones, I mean, the National Wildlife Refuge was too. So, yeah, it was a, it was a good stroke. I think that was probably one of the best outcomes of the listing of the golden-cheeked warbler was the conservation there in the Austin region, and there was some in the San Antonio region as well. But I, I'm less familiar with that. And then the, the establishment of the Refuge itself, Balcones, Canyonlands National Wildlife Refuge. So, those were good strokes for the bird and for the people and for everything.

David Todd [00:40:58] So, I guess what was driving a lot of the concern about the bird and the habitat that it relied on is due to land cover changes. And I think you mentioned that earlier, and I saw you'd done an article in 1999 about trying to track and analyze land cover changes within the Edwards recharge zone, which I think overlaps with some of the warblers.

David Diamond [00:41:32] Yeah, we did a little. Yeah, it did. And we did a little incidental stuff there, you know, and, and found reduction in the potential habitat. And then we did a study, gosh, it was recent, it was like 2014 or '16. It was just a paper that we did for Parks and Wildlife Department that we were mainly looking at updating the statewide ecological systems map for the State of Texas. But we also looked at the loss of potential golden-cheeked warbler habitat within one particular satellite image.

David Diamond [00:42:20] And, you know, every time you look and then there was another study, I think, by Duarte, and it was in the 2016. But any time you look, you'll find that there has been a reduction across time in potential golden-cheeked warbler habitat. And it's both due to direct clearing, you know, for urban, but more so, due to direct clearing for grazing. And so, you know, there's still quite a bit of clearing of potential habitat for grazing, you know, just to clear off because, you know, those woodlands are not as good for grazing as grasslands are. So, there's, you know, quote unquote, brush clearing that's going on. So, there's definitely habitat loss.

David Diamond [00:43:11] But, when you look at it from a macro scale, you know, you look at the Edwards Plateau, most of the flat areas, especially from the central to the west, have been cleared of Ashe juniper and other shrub, shrub and tree species, not just once, but multiple times. I mean, you know, there's just ongoing clearing on the flats. So, anywhere where you can clear - the flat areas aren't as mesic, the junipers don't grow as well anyway, so they don't come back as fast after you do the clearing for grazing. So, most of the flat areas are

have been cleared and are continuing to be cleared. And I, I don't know how much Ashe juniper woodlands were on those flat areas. Some and those were cleared.

David Diamond [00:44:07] But the places where the habitat is left is mainly on the slopes, which are more mesic and more difficult to clear with bulldozers and so on. So, that's why it's left, I think.

David Todd [00:44:26] Well, it seems puzzling to me. It sounds like a lot of the clearing has happened in these flat open areas rather than these sort of closed-canopy canyons and slopes, just because bulldozers really can't get access to it and maybe cattle aren't as prone to graze down there.

David Diamond [00:44:52] Yeah. Yeah.

David Todd [00:44:52] And you'd think that that latter area would be the warbler habitat. No?

David Diamond [00:44:58] Yeah. Yeah, it is mostly. Yeah. Yeah. And so, the places where warbler habitat exists have largely not been cleared because they're more difficult to clear with bulldozers.

David Diamond [00:45:13] Now, they, the junipers have been harvested massively. Like in Real County and areas there, there was a railroad that went into San Antonio and they were making cedar oil. So, they harvested cedars for the cedar oil. So, there was some clearing, but that was back in like the '20s and '30s when those cedar oil clearings happened and there were maybe massive areas were cut down, but that was sort of like by hand. So, it's nothing like bulldozers. And those areas probably just grew right back relatively fast. Now I'm just guessing. Shit, nobody knows for sure.

David Diamond [00:46:05] But, yeah, there was some cedar harvesting for cedar oil, so the big cedars were cut, but the systematic clearing by dozing and that kind of thing, you know, that's mostly on the flats, and that's also mostly, you're right, not as good for golden-cheeked warbler habitat. I mean, not now and never was. Although some of it is. Mostly on the flats, where it's good for, or would have been good, for golden-cheeked warblers are on the massive limestone that is porous that..

David Diamond [00:46:46] I mean, it's kind of like counterintuitive where you got limestone, massive limestone showing at the surface. You'd think that would be a dry habitat, but actually in the cracks and the limestone is so porous, it's kind of a semi-mesic habitat and can grow woodlands. And so, there are pretty big areas like that and they have been cleared and kept clear.

David Diamond [00:47:11] And then the other one is the soils that are on the, not on limestone but are on dolomite. And they call them red land soils and they're not so acidic that Ashe juniper won't grow there. They support woodlands more than the typical soils. And those are, those woodlands have things like post oak, more post oak and live oak in them, but also Ashe juniper. And I don't know how much of that kind of stuff was golden-cheeked warbler habitat, but those flat areas have probably mostly been cleared. And they're concentrated on the, as mapped by the NRCS soils, they're concentrated north and west of the Llano Uplift, and north of the area that is just west of San Antonio. The flat part of the plateau, that is - west of San Antonio, above the breaks.

David Diamond [00:48:24] So, some of that probably was cleared and probably was warbler habitat. You know, now I'm just sort of guessing. But, you know, it's guessing based on looking at the digital soils maps many times. We have mapped the vegetation of the Edwards Plateau based on remote sensing and soils and topography twice now. We did it with coarser resolution, 30-meter resolution, satellite data. And just recently we finished up redoing it with 10-meter resolution satellite imagery.

David Todd [00:49:02] Well, and when you use these sort of finer resolution satellite images, can you discern more about warbler habitat areas and patch sizes and...

David Diamond [00:49:16] Oh yeah, you should be able to. I mean, you know, all the stuff I've done has been using the 30-meter results. I haven't compared that to doing anything with our 10-meter results, but features such as narrow canyons, small patches of woodlands and things like that do show up more in the 10-meter resolution stuff.

David Diamond [00:49:41] Also gives you, I think, a more true estimation of where the live oaks are, because the live oaks tend to be, you know, on Plateau Flats. Well, that's probably not true. There are areas where there are live oaks and nothing else other than small junipers on flats. And I think you get a more true estimate of where those are at the 10-meter resolution. But should be better. If I were doing it again, I would use it.

David Todd [00:50:18] Well, so you've told us about the golden-cheeked warblers habitat and the some of the land use changes and the patch requirements. When you pull that together, are there some conservation responses that seem best to you?

David Diamond [00:50:43] Sure.

David Todd [00:50:43] I think you said that some of this work you did guided acquisition of some protected lands. Are there examples like that?

David Diamond [00:50:51] Sure. I think, you know, it's pretty straightforward. Try not to directly destroy the habitat of especially big patches. I mean, it's kind of simple. I mean, it's, it's obvious, you know? First off, identify the most moist woodlands that are most dense and also have deciduous trees in them and then try not to destroy the biggest patches. And, you know, don't cut fence lines. Don't clear roads through them, if you can help it, you know, things like that, it's. You know, because as soon as you clear a path or a road through the woodlands, it opens them up enough. And that things like cowbird parasitism becomes a little bit more of a problem. So, it reduces their success probably.

David Diamond [00:51:53] So, just maintain the big patches of mesic woodlands. It's, it's pretty easy. You don't really want to be building houses on the plateau tops right above the canyons with golden-cheeked warblers. It just reduces the amount of habitat available for them on the adjacent flats to the canyons. I mean, that's what's happened in Austin and San Antonio a lot. Just built out on the canyon or on the plateau flats above the canyons that support warblers. Not a great idea if you want to conserve the warblers.

David Diamond [00:52:38] Well, and I think this this effort to conserve the warblers and to do the mapping to try to understand its habitat needs ran into a lot of controversy. And I think in the maybe the mid-1990s there was pushback, shall we say against the Natural Heritage

program. And I was hoping that you could sort of explain the experience of being at the agency and seeing it happen around you.

David Diamond [00:53:06] Yeah, yeah, that was interesting. And, you know, it reminded me, in a global sense, you know, we've had this COVID pandemic and, you know, you've read about public health officials resigning, you know, and just getting the hell out of Dodge because it was such a controversy, whether, you know, you should mandate masks or, you know, try to get people to get vaccinated before they could go on airplanes - you know, just all that controversy related to COVID. And the public health officials were just trying to follow the CDC guidelines and best practices.

David Diamond [00:53:47] And a lot of them were attacked and made so uncomfortable, they just left their jobs, you know. And with endangered species stuff in Texas in the 19..., early '90s, in there. That's what happened to a lot of people in the state like at Parks and Wildlife where I worked, because we were given the responsibility for endangered species and had to do, like for example, I was co-author of the status survey. And then we were also involved in trying to identify best management practices and what is and isn't allowed and all that kind of stuff.

David Diamond [00:54:30] And there was such controversy associated with it, and we were under such pressure to, you know, sometimes say things that weren't good for the species just because they were good for ranching, or they were good for developers.

David Diamond [00:54:46] So anyway, I think over a two-year period about, you know, eight or ten or maybe more of us left because of it was just so uncomfortable to work there.

David Diamond [00:54:59] And I was one of them. And, you know, make no mistake, I think the head of the agency, and my department head did want me to leave. And, you know, they wanted several folks to leave. They thought they could get it under control, you know, and so the message coming out of the agency would be more under control if some of us left.

David Diamond [00:55:21] But ironically, after I left.

David Todd [00:55:40] [I think, I don't know if this was a gremlin, but I lost you for about 15 seconds or so.]

David Diamond [00:55:50] [Oh, yeah. My Internet connection became unstable, it said here. What was I talking about?]

David Todd [00:55:57] Well, so you said that 8 to 10 of your colleagues left the agency, and that the head of the agency and your supervisor, direct supervisor, was sort of urging you to leave as well.

David Diamond [00:56:12] Oh, right.

David Todd [00:56:12] And then I lost the trail there.

David Diamond [00:56:13] Right. Well, after I left, one of the guys who left called me up and he said when I told them I was leaving, they said, "Well, we didn't want you to leave." So, yeah, they wanted some of us to leave, and chased us off.

David Diamond [00:56:32] And it was all because of the controversy, because we had responsibility for endangered species. And we wouldn't get on board with saying things that weren't correct, you know.

David Diamond [00:56:46] So, yep, it was it was a tough time.

David Diamond [00:56:51] Afterwards, you know, years later, they said, "Oh, well, things have calmed down here at the agency. You know, all this endangered species stuff is, you know, is, is a lot calmer than it used to be."

David Diamond [00:57:06] And I thought, "Well, yeah, well, they chased about ten of us off, that's why." So, there's nobody left there to provide controversy, so.

David Todd [00:57:18] Well, you know, it seems interesting, sad, tragic maybe, that that the law stays on the books. The data is still relevant, but the people are forced to leave. And that's seen as a way to sort of diffuse things. But I don't know. It doesn't seem like the full answer.

David Diamond [00:57:47] Yeah, yeah. I don't know. You know, who knows? It's just the way these humans do things. It's like, it's like, like I say, it's similar to the running off of public health officials just because they want to follow CDC guidelines for masks. I mean, you know, it makes no sense. And you're just losing talent. But, whatever. And I guess in a global sense, you don't want that to happen to science types. You want science types to be able to say their thing. Because otherwise then you don't, you can't rely on what's coming out of the scientists and agencies. So, anyway.

David Todd [00:58:34] Well, so I think we rely on scientists to be truth-tellers and maybe you can give me examples of where you felt like the data supported one position. But you know the politicians said, "No, you can't say that. It's going to make things too hot for development or ranching or some other industry."

David Diamond [00:59:03] Yeah. Yeah. For with related to the endangered species stuff, the guidelines that came out for acceptable practices for golden sheep warblers, I think one of the things that they would never put in there, that it was a bad idea to, you know, clear, clear roads or fence lines through habitat, which it clearly is or. You know, it's not the worst thing in the world to ever happen for the birds, but it's also not the best.

David Diamond [00:59:36] So, you should tell people, "Oh, just probably don't do that if you don't have to." And they would never put that into the Parks and Wildlife guidelines.

David Diamond [00:59:46] One of the other things and it's kind of tangential, but when Parks and Wildlife got Matagorda Island, there were, you know, there's a cattle lease, you know, a grazing lease on that barrier island. And so, you know, they asked me, "Well, is this okay?" You know, and I said, "Well, it's whatever you want. You know, there's no reason to have cattle on a barrier island. They probably, there was no buffalo there. So, you know, there's no good reason biologically. If you want to have them, you can have them."

David Diamond [01:00:24] And you know, that was really controversial, just me saying that. Other people said, "Well, bison used to graze these grasslands and so now we need cattle out there to graze them," which is, it was just false, you know. So.

David Todd [01:00:43] Well, so was the response usually to just delete the advice that you felt was based in science, or to change the advice, or submerge it so far back in the appendix that nobody would see it? What was the response?

David Diamond [01:01:04] Well, I think they just controlled the message. Yeah. Yeah, they deleted it. You know, it never got out. When I when I did that paper, I did a paper on conservation of Ashe juniper woodlands on the Edwards Plateau, they tried to stop me from publishing that in the Natural Areas Journal, but I had gotten it so far along that, that, you know, they couldn't pull it. But I got in trouble for that. So, they just try to stop the message from getting out.

David Todd [01:01:42] Well, and the trouble. Would it be just a, you know, mark in your file, or would they pull you up on the carpet and harangue you or what? How did you get the message, that this is not what they wanted?

David Diamond [01:01:56] Oh, just getting talked to. I don't know that I ever got a black mark in my file officially, but they just told me not to do that ever again, kind of thing. So, yeah, I don't know what kind of actions would have been taken to actually fire people. But they just encouraged people to leave. I mean, it just became, it's just not very much, not very rewarding to work under those kinds of circumstances. And then those of us who could just left, you know, over the course of a couple of years.

David Todd [01:02:40] And so the, when they would critique what you were doing, would they say this isn't true, or this just isn't politically wise, or it's going to hurt the funding of the agency? I mean, did they give you a reason or they just said, don't do it?

David Diamond [01:02:58] Oh, I can't remember, David, you know, really. Just said, "Don't do it." I mean, there's, they might have argued that it was wrong, as well. I mean, but basically it's, "Just don't do it. We can't say this."

David Todd [01:03:18] And when you when you sort of think back about it, do you think that it was because the funding for the programs at Parks and Wildlife that were related to game were, just had more sort of buffered funding sources than those for the wildlife sections, you know, the, the non-game species, such as the golden-cheeked warbler, didn't have such secure funding?

David Diamond [01:03:48] Oh, I don't know about the funding part of it. I really don't.

David Diamond [01:03:55] I think though, you know, there is a Commission. The Commission does give the agency its marching orders and then here is a prevailing politics. And, you know, the idea is that we have to make people happy. So, I don't think it was related to funding. I think it was more related to politics. But, but it could be. I was unaware. I know, certainly, if you're favorably inclined to find things that large landowners and developers favor, then, then you'll get more funding. I mean, that's what's happened in the recent past. The funding has come through from for workers that are sort of fundamentally against endangered species, in my opinion.

David Diamond [01:04:54] But, yeah, so there's, like if there is discretionary funding, then it goes to the people whose minds are right. So.

David Todd [01:05:14] Well, so, you've talked about the impact on people's livelihoods and careers from this controversy of the golden-cheeked warbler and other endangered species. Were there other impacts from this whole controversy? Maybe, I've heard, and maybe you can confirm this, that biologists had reduced access to private lands, and it was more difficult to share data and habitat designations were aborted.

David Diamond [01:05:47] I'm sure the Endangered Species Act overall reduced the people's willingness to let biologists access their private lands, for sure, you know, overall, because they were afraid that if an endangered species would be found, they would be prohibited from doing some activity that they wanted to do. So, yeah, it did reduce access, just the Endangered Species Act overall.

David Diamond [01:06:23] I just I can't comment on the other stuff, very much, so.

David Todd [01:06:31] Okay. So, you've been gone from Texas, although I think you still do a lot of work here in the state, for almost a quarter of a century.

David Diamond [01:06:43] Yeah. Yeah.

David Todd [01:06:44] And I'd, I'd be really curious to know if that, that sort of combination of having spent a lot of time here but no longer having your, your footprints right here in the state, may give you a unique perspective, both sort of in and out of the state, to understand what makes conservation in Texas unique, or maybe similar to, how things happened in Missouri or elsewhere.

David Diamond [01:07:14] Well, you know, I guess I would start out by saying that I did nothing much in Texas for several years. But, after a number of years, I started doing a lot of work for Texas, including a lot of work for Texas Parks and Wildlife Department. I think we were funded for probably \$1,000,000 of work for Texas Parks and Wildlife Department doing the ecological systems map for the state, and doing a bunch of other stuff for them. I mean, I'm active right now on a project working with the Texas Parks and Wildlife Department, so it's not like that, you know, we had no friends in the Parks and Wildlife Department. You know, these are people that were there, who were there, you know, in the '90s with us.

David Diamond [01:08:08] So, you know, and the Parks and Wildlife Department have done fantastic work with some of the materials that we've provided them. We provided them with ecological mapping systems, sort of a map that also had descriptions of all the map types. And they've done fantastic work with that. There's an interactive map called TEAMS, "T-E-A-M-S". And so, if you Google, "TEAMS" and "ecological mapping system", you can find that interactive map and it generates reports and stuff like that.

David Diamond [01:08:52] So, ironically, in the 25 years since I've left, I went from, you know, getting run out of the state to actually doing a hell of a lot of work in the state that Parks and Wildlife Department have used very well to help the agency and people outside the agency, you know, do land management and conservation and so on. So, that that's kind of ironic.

David Diamond [01:09:20] But as to how Texas is different than other states. I had a guy who was my boss there, who was from Texas, then left and came back, and he said at one point, I remember him saying, "You know, people want to think that Texas is different from every other state, but it's not." I think, I think what I would say, is that every state is different and

Texas is no more different than every other state is from every other state. You know, I mean, it's, it's not, I don't think it's as unique as all that, insofar as every state is unique.

David Diamond [01:10:07] But, you know, you know, they say, "Well, it's a private land state. There is no public lands." Yeah. You know, all of the Great Plains states are that way, and many of the eastern states are that way. So there's, you know, there's no public lands in Kansas. There's very few public lands in Nebraska, you know. So, you know, it's not different because it's a private land state.

David Diamond [01:10:34] You know, it has its own unique history and so does every other state. And, you know, Texas tends to be very proud of its history. It's got a colorful history. It's a big state, you know, and everything. But I don't know that it's a lot different than many other states. And the extent to which it's unique, it's no more unique than any state.

David Diamond [01:11:03] So, I don't know that it's harder to do anything or different in Texas than in many other states. I mean, how would I know? I'm just guessing. But it's no different in terms of the amount of public lands than many other states. So, it does have a unique history, but so does New Mexico, so does Kansas, so does Nebraska, so does Missouri. So anyway.

David Todd [01:11:34] So, I guess Lone Star Beer is not the National Beer of Texas. It's just a state beer.

David Diamond [01:11:41] It's, it's the National Beer of Texas. I mean, you know, that's okay. But what about Shiner Bock? Are you just disrespecting Shiner Bock?

David Todd [01:11:50] Oh, heavens, no.

David Todd [01:11:53] Well, I. We're coming to the close here, so I just had a couple more questions, and maybe we could return to the golden-cheeked warbler with a question or two.

David Todd [01:12:10] You know, it's some 30 years after you did some of this early work with golden-cheeked warblers. And I'm wondering if you have a new perspective, or a similar perspective, as you did then about the progress and future of the bird?

David Diamond [01:12:29] Well, I do have a new perspective. And well, first off, I should probably note that there have been two large range-wide surveys for the, trying to estimate the population size of the bird. They, one in 2007 or '8 and, one just recently in 2022. And in my estimation, they both suffer from not recognizing the variety of woodlands on the Edwards Plateau. I think their population estimates are probably, I mean, there are wide, you know, confidence intervals on the estimates, but there probably should be wider confidence intervals. And, you know, the point counts tend to overestimate populations when you compare them to actually marked populations, where they know how many birds are there, you know, ten, ten times, 15 times. So, I think the estimates are grossly over-estimates - the new population estimates by, you know, like maybe ten times.

David Diamond [01:13:45] But anyway, the thing that worries me now, more than it did back then, is climate change. We had, we were too stupid to realize, and we should have, that climate change was coming and, you know, temperatures were increasing. And that has two effects.

David Diamond [01:14:07] One is on the birds themselves. They suffer from, it is my understanding that they suffer from heat stress even currently, and they go to water a lot while they're in, you know, on the breeding range. So, there's direct potential for direct harm to their breeding success from increased temperatures like a series of very hot years.

David Diamond [01:14:36] And then the other obvious issue is, if it does get drier, and the temperatures are, it's definitely going to get hotter, but it may also get drier. And if that happens, then the habitat, the deciduous species and the Ashe junipers may suffer mortality.

David Diamond [01:14:59] There was a big drought in 2011 and it extended in some places, people think, to the 2014. And it killed a lot of trees in Texas. The Texas A&M Forest Service estimated the amount of tree death. And then there were just, you know, I have photographs that were taken by colleagues in Texas of dead junipers, just, just covering the entire image. You know, this is mainly shrubs that had died, mainly to the north and to the west of, or the western side of the Edwards Plateau.

David Diamond [01:15:44] So, junipers will die from drought and they, ironically, may be more susceptible to dying from drought than the oaks. You know, you think of junipers as being, Ashe junipers, of being in dry habitats. And they can grow in fairly dry habitats, but they also are very shallow-rooted. So, they potentially suffer from droughts more than the oaks. And the oaks are growing in, in like, have their roots down in cracks in limestone, and, you know, they're in valley bottoms. They're in, you know, mesic areas on slopes. They may suffer less actually from droughts than Ashe junipers.

David Diamond [01:16:29] But anyway, that's ironic. That's weird. I don't think I can convince people of that, but it's nonetheless documented, Haas documented it in a, in a study, a Ph.D. study, on Sonora Research Station in 1954. And then recently, all those dead junipers were really eye-popping from the 2011 drought.

David Diamond [01:16:54] But anyway, the warblers may be in trouble, not just from clearing or from, you know, things like that. They may be in trouble from climate change and it's something we didn't even consider. And that may be the biggest threat to them right now.

David Todd [01:17:19] And aside from, or in addition to the climate change impacts, what, what sort of effect do you see from these recent legal and political efforts to down-list or de-list the bird species?

David Diamond [01:17:37] Well, that's a good question. I guess I'm going to say there wouldn't be much impact from down-listing or de-listing the bird in terms of conservation of the bird. And maybe some, but not a lot, because my feeling is that at least not for the next 50 or 100 years. My feeling is that most of the area that supports golden-cheeked warbler habitat is on steep slopes and, you know, fairly remote areas that they're not going to clear anyway. Nobody's going to clear them. So, there, they'll remain intact, more or less, I think. I don't know.

David Diamond [01:18:26] You know, it certainly won't help. You know, it's not going to necessarily help because then they'll be people will be free to clear habitat and do incidental take and free to develop. You know, more developments can go in. So, there's not going to be any restrictions on development or land clearing if the bird is down-listed.

David Diamond [01:18:51] But I'm not sure that's what is going to make it go extinct. The threats for extinction, I think, are from climate change in terms of the next, you know, 50, 30, 50, 100 years. Yeah. And if I were to guess, my guess would be that golden-cheeks... Well. Oh, it's a sure thing, they're going extinct. The question is, will they be extinct in 50 years or 30 years or a hundred years? And I think there is a reasonable chance that they will be extinct in 50 or 100 years. I mean, none of us will be around to know. But if they do go extinct, it'll be because it got too hot and dry for them.

David Todd [01:19:44] And that's what gives you the confidence that they are on their way out. It's, it's the climate change.

David Diamond [01:19:51] Yeah, well, you know, if the climate change results in increased precipitation in some parts of their range, which is possible on the southern, you know west, west of San Antonio, right in there, it could, it could actually, they may not go extinct. So I, you know, I just don't know. I say there's a reasonable probability that they will in 50 or 100 years, but there's also a reasonable probability that they won't.

David Diamond [01:20:24] And, you know, anecdotally, for example, I remember when I was at Parks and Wildlife, the Attwater's Prairie Chicken was not doing too well, you know, and one of my bosses at the time said, you know, with all this stuff that's going on, you know, those, that bird will be recovered in ten years. And I looked back at him and I said, that bird will be extinct in the wild in ten years. I'm, I was pretty confident that the Attwater's prairie chicken was going extinct.

David Diamond [01:20:56] And, you know, if it weren't for the fact that they keep releasing them, they would be extinct in the wild right now.

David Diamond [01:21:05] So, you know, I'm not confident that the golden-cheeked warbler is going extinct the way I was confident that the Attwater's prairie chicken was going extinct. So, there's that.

David Todd [01:21:19] Well, you have a unique perspective on this. I mean, you see these things at a macro landscape scale, which may just seal animals fate in ways that a lot of us don't recognize it. We see the bird floating around and think, "Well, you know, how do you protect that particular bird, when the whole sort of context for the animals is in question?"

David Diamond [01:21:45] Sure, sure. And on the Attwater's prairie chicken, you know, it was just clear, that, that is a, that is an R-selected big dumb gallinaceous bird that needs a whole big population, or it'll just wink out, you know, because it's, it's born to die. You know, there needs to be a very big population and a lot of habitat or it'll go extinct. So, that's why I was pretty sure that one was going extinct.

David Diamond [01:22:14] The golden-cheeked warbler isn't that way. So, you know, there's, there's more of a chance that it'll hold on. And if the precipitation goes up in some places in the habitat, then it'll do just fine.

David Todd [01:22:33] Okay. Well, you've been very generous talking about everything from Ashe juniper - oak woodlands to Blackland Prairies, from golden-cheeked warblers to Attwater's prairie chickens. Is there something that that you'd like to add before we wrap up?

David Diamond [01:22:55] Oh, I just think this is a cool project and I really appreciate the opportunity to get some of my thoughts on, on record.

David Diamond [01:23:07] If you ever want to talk to me about ecological mapping systems, the vegetation of, of Texas, I'd be fully willing to do that.

David Todd [01:23:19] That may be next. But this has been wonderful. And we really appreciate your time.

David Diamond [01:23:26] All right. Thank you, David.

David Todd [01:23:28] All right. Thank you. You have a good day.

David Diamond [01:23:30] You bet.

David Todd [01:23:31] All right. Bye now.