

# CONSERVATION

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## Perspectives in Conservation

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### Having dedicated over 20 years to working on amphibian research and conservation programs, you have made quite an impact. When did you first realize that this is what you wanted to do with your life?

A lot later than you would expect. Everyone of course cares about conservation, and I did too, but even when reports of the amphibian crisis were first brewing in the late 1980s, I remember watching and saying, “Huh, this is scary, and fascinating, and interesting” and all of the other terms you could use for it. But I remember thinking, “I’m not an ecologist,” I don’t know what I possibly have to contribute here. We didn’t even know it was a disease at that time, so certainly I’m not a disease ecologist, or a mycologist, or anything like that. I remember thinking, “Well, I’m kind of not needed here.” So, I was just watching from the sidelines back then, say around 1991 or so.

I was also becoming friends with Karen Lips at about the same time. We were at different schools, but in the same grad-student cohort. She was front and center on the unravelling amphibian decline story. She was the one who was finding the dead frogs, not just noticing the missing frogs. Karen said to me one day at a conference: “You’re going to get pulled into this Mendelson.” And I said, “I’m a taxonomist, I don’t really understand what I have to offer.” And she said, “Well, for example, what’s going on in Mexico? Is this happening in Mexico? Has it already happened in Mexico? You know Mexican frogs, and you know your way around Mexico, so let’s go!” And I remember thinking, “Oh, she’s got a point.” So she and I got a grant and went to Mexico together. And she was right. I got sucked into it for some 20 years or so now.

### So you shifted from taxonomy to conservation at the height of the amphibian decline. Did you have any mentors or guidance during this transition?

I didn’t fully shift away from taxonomy, or other topics, but certainly amphibian conservation took most of my energy. As for mentor, not initially other than Karen. But, I met George Rabb in 2004, coincidentally immediately after I took the position at Zoo Atlanta, and he became my mentor for conservation, and beyond, for the rest of his life.

The groundbreaking dataset that changed everything was the Lips et. al. 2006 paper documenting how this new amphibian disease was moving across Costa Rica and Panama. The story is legend at this point but, simply put, she made a bold prediction of where, and roughly when, this pathogen was going to invade a pristine site. She and her team worked there (El Copé, Panama) for years. Then, in 2004, just after I arrived at the zoo, she called me one day and said, “Joe, it has hit, the frogs are dying. It’s happening right now, aren’t zoos supposed to be set up to take care of endangered species and things like this? What about frogs?” And I thought, “Huh. I just got to a zoo, and you’re right.”

So, I got funding from Zoo Atlanta to host, essentially, an emergency stakeholder meeting. As I started putting the international team together that we were going to bring in, George Rabb’s name was at the top of the list. That’s when I actually first met him, when he joined us at that meeting.

### So that is how it began, the long-term friendship with George Rabb and your long career at Zoo Atlanta. Was it difficult for you, leaving academia as a professor at Utah State University and transitioning to Zoo Atlanta?

I get asked that question often, everybody wants to know how in the hell did that happen. The short version is I had just gotten tenure at Utah State, which of course means you’re golden, you’ve succeeded, everything’s secure moving forward. But at this time, I was getting more and more pulled into this conservation stuff. I remember looking around going, “This is not really an ideal place to manage these types of issues.” Not because it was Utah State, but because it was a typical university.

I was having these thoughts in my head, but not talking to anybody. Then, I got a call one day from Dwight Lawson. He and I had overlapped for a year in Jonathan Campbell’s lab at the University of Texas at Arlington, and had remained loose friends ever since. When he got his PhD, he came straight into the zoo world in terms of both research and conservation. Unbeknownst to me, Zoo Atlanta, although not a large zoo, was a leading example of a modern zoo that was active in both realms. So, he cold-called me one day while I was in Utah and just said,

“Joe, it’s Dwight. What would it take to get you to move to Atlanta?” And I said, “What are you talking about?” He responded: “I’m going to send you a couple of plane tickets to fly out here and I’ll show you what we’re talking about.”

The back-story is that Zoo Atlanta has a long and prestigious history of research on great apes and, by this time (early 2000s), it was heavily invested in giant panda research. The zoo made the decision they wanted to bring herpetology up to that level as well. So, they hired our colleague, Gordon Schuett, who came out and built the essential base of the new program. Modelled after the great ape program, it was essentially an academic herpetology program inside the zoo. After Gordon left Zoo Atlanta, on very good graces, Dwight called me and asked me to pick up where Gordon left off. I reminded him that my background was in museums, not zoos. He said my job was to put Zoo Atlanta on the map as a top-level academic institution in herpetological conservation and research.

My academic mentors told me it would be academic suicide and that I was making the biggest mistake of my career. But I believed Dwight, and I believed in the program. I was excited for the opportunity to develop a novel program. It was a really hard decision, but ultimately I went to my Department Head (Edmund D. Brodie, Jr., no slouch himself!) and my Dean at Utah State, and quit. I took the job at Zoo Atlanta.

### Was this ultimately a good decision?

I’m extremely happy, and very enriched, and never bored. Oh, yeah. It was the best decision I ever made.

### What are a few of the conservation programs you have been involved with that you are proudest of?

I would say getting the Amphibian Ark up and running. That concept came out of that original 2004 meeting. It took a couple of years, but we did get it formalized as a branch of IUCN and launched it here at Zoo Atlanta, and I’ve been associated with it ever since. The ark concept was never intended to be the “grand fix” of the amphibian crisis, but Amphibian Ark certainly has worked hard to bring the quality and quantity of necessary captive husbandry programs up to speed.

Also, the role that I’ve played in different high-level decisions and policies, entirely following the lead from Karen Lips, George Rabb, and others. Among the roles I’ve played is taking my experience of seeing how bad it really can get out there, and lobbying incessantly, doing dozens of lectures and seminars every year, to do everything I can to make sure this doesn’t happen again. I emerged, professionally, as the consummate gonzo field herpetologist. I never realized I could have so much influence by putting on a suit and tie and simply talking. Over the past 6 years this is probably where I’ve put most of my conservation energy. I no longer see the amphibian crisis, especially the amphibian chytrid fungus, as a veterinary or even a biological problem. It is a policy problem. Policies won’t help much at all in retrospect, but we have to learn from our naivete in the 1980s–2000s to create policies to limit the spread of emerging infectious diseases in all taxa. No longer is this just an amphibian issue.

### Based on your experiences, if you had to create a formula for a successful conservation program, what would that be?

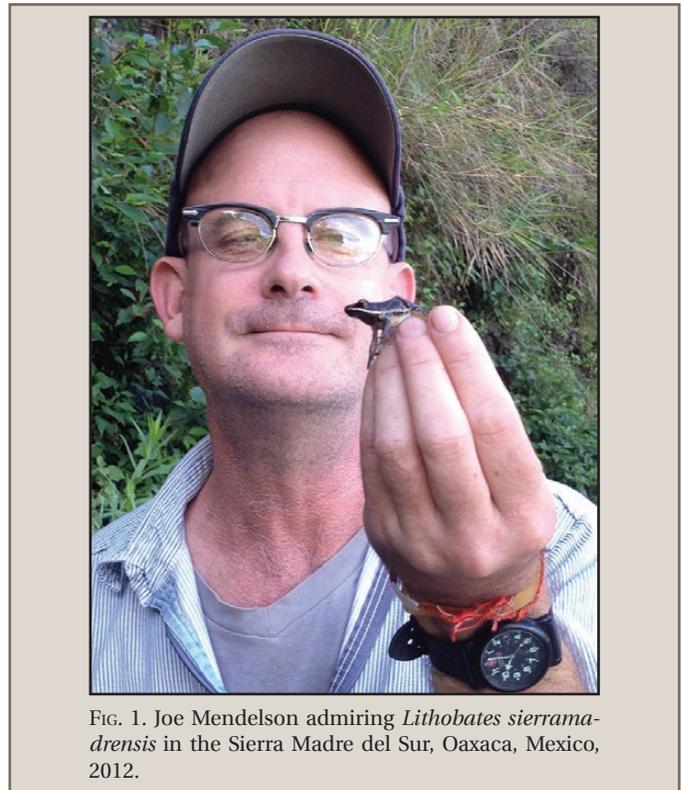


FIG. 1. Joe Mendelson admiring *Lithobates sierramadrensis* in the Sierra Madre del Sur, Oaxaca, Mexico, 2012.

You really must understand the realities of the primary threats that you’re dealing with. It was a very difficult message to sell, back ca. 2006, that traditional conservation measures of land protection and such could have no effect on emerging infectious diseases. People like Karen and me took enormous flak for our strongly entrenched logic along those lines. I became quite disappointed in the mega-NGO conservation organizations that embraced us swiftly because of the sheer scale of the amphibian issue, but quickly distanced themselves when they realized we were not going to paint a feel-good story on this—“if you just give us this much in donations, we can save XX number of amphibian species.” That was not true, and we would not say it. Very rough times. Quite unpleasant, and, as I said, I really lost faith in a lot of the motives and messaging of many conservation organizations. But, we always had George Rabb at our back! He never, ever let us down and supported us through the worst of it. Conservationists simply were not prepared to hear a tale in which money could not mitigate the problem. My snarky quote, to sum up that era of experience, is in response to real-world conversations where NGOs would say “But we can’t raise funds for lab research on microscopic fungi, we have to have a success story.” My response: “This fundraising goal, then, isn’t about the frogs, is it? It’s about simply raising funds.”

So, I guess the take-home here is to be very careful diving into something that you don’t know you can fix. It’s one thing to start a conservation program and then put all your efforts into restoring the habitat, but this idea of putting frogs in captive care and having no idea how to stop chytrid fungus... we still don’t, we’ve made no substantial progress on that front at all, from my perspective. In fact, the quote that I use all the time in my talks is, “With all due respect to every chytrid-based conservation program out there, more frogs have saved themselves from chytrid fungus than have any of our conservation programs across the world.”

Some of these populations are coming back and we didn't help them. The ones we've tried to help, we haven't really helped. That's nobody's fault. That's just the nature of the beast.

### Why do you think that is?

Fungi are unbeatable. There are no vaccines. The only thing you can do with fungal infection is treat the individual. That's, logistically, just impossible, especially because it confers no resistance. So, this fungal problem is just going to get bigger, whether it's snake fungus disease, bats, the newly discovered *Batrachochytrium salamandrivorans* (*Bsal*), or what have you, it's going to get bigger. Without getting too doomsday about it all, a core of us still-engaged stakeholders are pushing the agenda that proactive programs and policies to control movement of animals around the globe is the best answer. This stance has not made me very popular in some arenas.

### What is on your desk today and what programs do you see yourself working on over the next decade or so?

Honestly, the nasty politics and the lack of major successes in amphibian conservation wears on me, personally. So, I've found myself over the last 8 years or so taking "conservation sabbaticals" to focus on teaching and unrelated research. So, on my desk today are manuscripts naming a couple of new frogs, wrapping up a fun study with my students on lizard learning cognitive trials, a boa nutrition study with Robert Hill, and wrapping up a book chapter about zoo research, specifically academic research at zoos.

The advantage of this job is that it is so flexible. I'm sandwiched between a very progressive zoo, and a mega research university. There's really nothing I can't do with the opportunities and resources around. A few years ago I was even making robots based on sidewinders.

### You have described around 40 species of reptiles and amphibians; do you still find that rewarding... or tedious?

Discovering a new species, or solving a century-old taxonomic problem is fun. Like working on nature's puzzle. Selecting the final name is fun. The work only gets tedious when a project starts to snowball on you. The one I'm working on right now is exactly that. This was going to be pretty simple and it got way more complicated than I could have expected. I don't really enjoy when projects explode beyond the scope I had envisioned.

### Having done so much throughout your career, what keeps you motivated?

Learning new stuff. Figuring out things that either were brought to my attention or I just noticed for the first time, and realizing, "That's interesting!" My head never stops racing with questions to follow. I've been obsessed the last couple of days trying to figure out why roadrunners have zygodactyl feet. I don't know where I'm going to go with it, but that's the kind of thing that keeps me motivated. It's just constantly challenging myself to figure out new stuff and new perspectives on things. The best way to do that is to talk to really smart people, because then things just pop up.

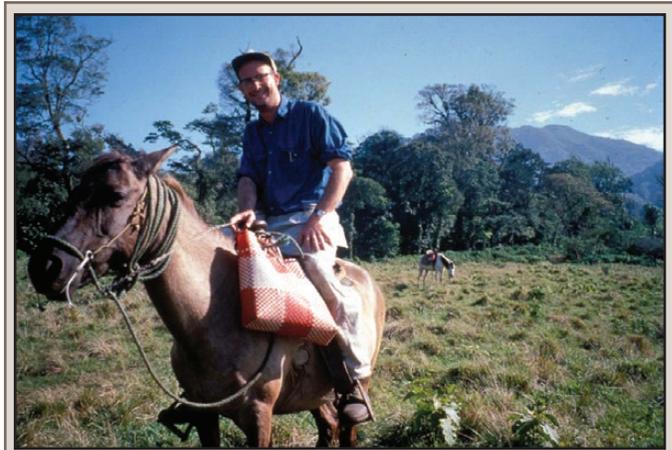


PHOTO BY P. USTACH

FIG. 2. Joe on horseback, in the Sierra de los Tuxtlas, Veracruz, Mexico, looking for *Incilius cavifrons* (1998)

### On top of being an esteemed researcher and conservation biologist, you are also a musician. Your band has played at multiple science festivals, you have bridged a gap between music and science. Tell us more about that.

The connection for me is based on the ethos of punk rock. I am not a particularly good musician or singer, but I have things to say and contribute. So, there you have it—harder, faster, and louder than you can imagine. I just have to express myself, and I won't let lack of virtuosity stand in my way. Same goes for science. I am not the smartest person in our field, but I work hard, and am insistent upon contributing and expressing everything I have to offer. Nevertheless, there had not been any real connection between music and science for me over the years. But, one day in 2005 I was exhausted from the political trenches of amphibian conservation, and laid low to play guitar. Unexpectedly, the song that came out that day ("I Want My NGO") was a really bitter take on conservation. I guess the two halves of my brain fused? On a less serious path, after I settled at Georgia Tech, a faculty member in Biology, who also had played in bands back in the day, cornered me in the hall one day and explained that I was the missing guitar-vocal link in her imagined band "Leucine Zipper & The Zinc Fingers" and that I had to join and rehearse in time for the upcoming inaugural Atlanta Science Festival. The premise is that all of the band members are academic scientists, now transmogrified as genetically engineered rock organisms. So, we hunkered down and wrote a dozen punk-rock songs about science. So much fun! Exactly what I needed to balance out the reality of watching Rabbs' Fringed-limbed Tree Frog go extinct in my hands. Our band is loud, fast, sincere, scientifically accurate, and silly. I really needed that in my life. Five years in now, we play 4 or 5 shows a year. We have more songs, a few videos, and new grant from a Georgia Tech Science-Arts council to record a full album in a real studio, and more videos. We played to 12,000 people at the Atlanta March for Science 2017. I'm pretty sure that beats any audience I'll ever reach again. How does one calculate that for their impact factor?

Thinking back to your previous question about what keeps me going, I'm going to say everything I said before is true, but I forgot one, and that is the opportunity to be creative. That's why I like writing. That's my favorite part of the whole scientific process is the writing part. I get to use words to best explain what I'm



FIG. 3. The reason Joe can no longer hear hylid frogs or small rattle-snakes! Gringo Perdido (his alter ego), performing live with Heedless Youth, San Francisco, California, 2010.

talking about, whether I'm writing a popular piece, or a lecture, or a manuscript, a song, or anything. Words are fun creative tools. The band's songs are the same thing. I have no interest anymore in bashing angry teenage punk songs, but I like the challenge of writing those songs about entropy or the scientific method! I just cannot be serious all the time. Basic research is one thing, but conservation in this era of disasters will eat you alive. You must have other things in your mind.

### Let us know when your first album is out! In the meantime, do you have any advice for the next generation of herpetologists?

Go read every important paper you can find on the concept of shifted baselines. Perhaps the best way to do this is to dive deep and read every historical paper, and I mean every one of them, on any aspect of the zoology or botany near your field site. You must realize that we are all working in completely shifted, and shifting, baselines with respect to that older literature you will find. You must connect the dots, as neither the old literature nor the new literature is going to do that for you. So much has changed that you can be lulled into thinking that what you're looking at is normal. You may make mistakes, like, "Well, I'm going to study the community ecology of these frogs," without even realizing that this is a highly-modified ecosystem, and X number of species in this community went extinct in the 1990s. You have to acknowledge that. It doesn't make your science useless. It doesn't mean you can't do your study. But if you don't acknowledge that then you're artificially studying something that's not what you think it is.

I got completely tripped-up by this whole mess myself, because I didn't see it coming. During my first trip to the Neotropics, in Guatemala, and then soon thereafter my first trips to Mexico, I couldn't find any frogs. I went through every reason I could possibly think of, including, "I suck." And it never occurred to me that they were simply gone and nobody knew it. A couple of years later, this was exactly the point that Karen Lips was making. What caught me off guard was that, after so many decades of field work in these areas by the most famous of our senior colleagues, was that I was the one just figuring that they were gone.

I was bewildered. I had no concept of a shifted baseline. No one had any indication that this had happened. That they were simply gone wasn't even in my vernacular.

Also, just as important, don't put off field experience, because the opportunities to do that are going to become less and less. I wouldn't want anyone to regret what they missed. Things can happen in life. I lost my knees. I lost my ability to do field work, and that just really crushed me.

Fortunately, I have no regrets. I did years of tons of fieldwork, and I'm very happy about it, and it gives me lots to look back on. But if I had decided to not keep spending every summer in Guatemala with Jonathan Campbell, or that I needed to instead be writing more papers, I would not have gotten to see so much before it wasn't possible to do so anymore—either because of my handicap, or socio-political reasons, or lack of habitat, or restrictive laws. Do as much fieldwork as possible. I am testament to the fact that you can write it up, on crutches, for the remainder of your career.

Also important, try to look at the big picture. Focusing on places, sites, valleys, species that are going away at just appalling rates, there are going to be some that you just can't mitigate. You can wave signs, and sign petitions, and pull things into captivity, and do all of this stuff as best you can think of, but ultimately, you're going to lose some of those battles. So my advice, as a bitter pill to swallow, is to pick your battles where you think you have a chance of success. Look forward 50 years and imagine what might be saved and what likely cannot. Hence, I am a strong proponent of the value and goal to keep the common species common.