

CONSERVATION

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Perspectives in Conservation

Emily Taylor is Professor of Biological Sciences at California Polytechnic State University in San Luis Obispo and has been faculty there for 14 years. She was interviewed by Section Editor Jennifer Stabile in August of 2019.

What sparked your interest in reptiles and amphibians?

Actually, I was a late bloomer compared to most of my colleagues. I was originally an English major in college but always wanted to go into the sciences. Initially, I wanted to be a doctor, I didn't really know that I could have a career as a biologist. During my junior year of college at UC Berkeley I took a natural history of vertebrates course and Harry Greene was my professor. We had day-long field trips every Saturday, and during one in particular he just (nonchalantly) found a kingsnake under a rock and handed it to me like it was no big deal. I don't remember much else from that year, but I remember that moment with that snake. It was important to me. I asked Harry about research opportunities and I ended up joining his lab. I wasn't thinking much about careers, at least not until my first herpetology conference. It was the summer of 1997 in Seattle, and all of a sudden I was surrounded by a thousand people who were doing this for their career, and I realized, yes, this is what I wanted to do. So, from that moment on I just changed my course. I kept the English major because I was almost done with it and I just took whatever biology classes



FIG. 1. Emily Taylor holding a tubed Western Diamond-backed Rattlesnake in Arizona (2000).

I wanted and didn't take the ones that I didn't want to, which was pretty awesome. Following my undergraduate work at Berkeley, I started a PhD in biology at Arizona State University.

It sounds like Harry Greene was an important role model during this time of your life.

Harry was a huge mentor and still is. He has inspired so many people. I think this is because he really pays attention to you as an individual, he makes you feel like what you are saying really matters. Harry is kind and thoughtful, I think we can all aspire to be like him. He still is my friend and mentor. This past May, 22 years after I took herpetology with him, he came out and spent a week with me and my herpetology class in California and it was the best thing ever!

Sounds like things came around full circle! Was there anyone else you looked up to during or after grad school?

Certainly my grad school mentors, Gordon Schuett and Dale DeNardo were incredible. They got me into physiology and experimental biology. They're the ones who really taught me how to do science. I think Harry taught me how to do natural history, observational work, and Gordon and Dale taught me how to do experimental work. I would also like to mention my parents. It took me a long time to realize it, but my parents are 100% responsible for where I am today. They made it absolutely clear to me that I could do anything that I wanted to do. I didn't realize it at the time but now I see how incredibly rare that is. If I wanted to be a fighter pilot they would tell me "well yeah, of course you are going to be a fighter pilot." When I told them I wanted to be a scientist they were completely supportive. It was just an incredible gift to have that.

Did you go straight into teaching after grad school?

I actually had a postdoc lined up. I knew that I wanted a job at a teaching-centered university that also allowed me to do research with students, because I was obsessed with teaching. So, I was looking around for jobs and ended up getting the Cal Poly position right from grad school without a postdoc. I canceled the postdoc and I started at Cal Poly at age 28. I was lucky, I had a couple years teaching experience; during grad school I taught my own class at a community college. Cal Poly wanted someone to teach animal physiology and human anatomy & physiology, and those are the two classes I had

taught previously. Plus, they really wanted someone that could work with herps. This was in 2005, and I just landed my dream job.

I understand that you may not consider yourself a conservation biologist, however, teaching and education are important conservation strategies. Are there any projects you are working on with your students that contribute to herpetological conservation?

My students are definitely coming up with more applied conservation-based questions these days. Some of our projects focus on federally endangered species and climate change. I think the students love to be able to answer the question of why you're doing what you're doing with an applied answer. I think it's really much more satisfying to them to do that; everyone wants to have a major impact. It's my belief, in terms of the impact of conservation, that my journal articles pale in comparison to my impact as a teacher. And frankly, I think that most of our colleagues think the opposite, right? In academia we continually reward people more for their publications. I'm not trying to say that research isn't important—it's what scientific progress is based on. However, the efforts that many people in our field are putting into teaching can really make a difference. I get to teach science majors and non-majors, freshmen to graduate students, all different kinds of levels and experiences. I have 500+ students in my classes every single year. And those people are all going on to vote and to have children who they're going to help with their homework and teach to swerve when they see a snake or a turtle on the road. It can have a multi-generational impact.

You mentioned your students wanting to understand the ultimate goal of the research—why we do what we do. Has this always been the case or is it more prevalent today?

I think it is something that every advisor has to prepare their students to do, defend why your work is important. When I'm on a PhD committee I want the candidates to be able to explain their research, not just to other scientists, but to their grandmother or to the President. They need to explain the importance of what they're doing on different levels, to different types of people. I think that's something that's an important skill for scientists. I

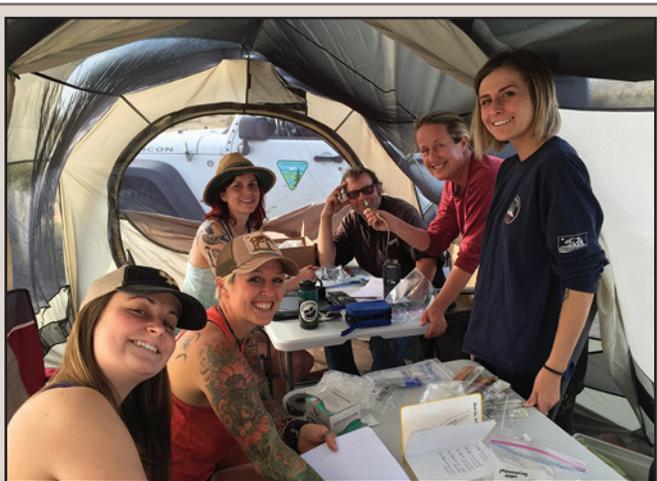


FIG. 2. Emily Taylor, collaborators, and students with Blunt-nosed Leopard Lizard, Carrizo Plain, California (2018).

think we're more passionate when explaining something that has an applied purpose, which conservation biology inherently does. If I have a student who's doing a purely theoretical physiological project, which is what I have historically done, they find it more challenging to explain why it's important. They are right to think so, it is more challenging to explain why it's important. So, I think that's why students tend to gravitate toward these conservation questions. I also think that as we dig ourselves deeper and deeper into the problems associated with climate change and abuses of the earth, each new generation of students I see are becoming more desperate for change. They're interested in doing applied research now more than ever.

What do you think makes a conservation program impactful?

In order to get the attention of a person, whether it be a student or the general public, they need to see the live animal. That is 90% of it right there. We do a ton of outreach where we'll bring rattlesnakes to events where unwilling audiences can see that these animals are just trying to defend themselves. I can tell them stories about how these individual snakes have families, and the mothers take care of the babies; it really changes perspectives. We need to create that connection. Talking to the general public about ecosystem services does not work. Most don't care about whether snakes eat rodents or that they are important members of the food web. They care that rattlesnakes are good mothers. I think that you can take that and scale it to different levels. What can we say about climate change that would get people to actually care? I don't know the answer to that because I'm not a climate change expert in that way. However, there's got to be something we can do to get people to see the issue on a personal level. That's really what has worked for me with snakes.

Do you find that students today are more or less connected to environmental issues?

It's a matter of scale. At Cal Poly I am working with 4.0 students, the cream of the crop of California public school students, who generally tend to come from good families and have educated parents. My role is to work with these already incredible students who care about the environment and turn them into amazing scientists. That's my job and I'm trying to figure out ways to go beyond that. For instance, each year I teach a class in the Chiricahua Mountains in southeastern Arizona; we just had our ninth year, and this is another way I can contribute because the people taking that class come from diverse lifestyles and educational backgrounds. Next year I'm hoping to take a high school class out there and we are working on a scholarship program for underrepresented students. I am trying to broaden my reach beyond Cal Poly.

Is there a project you are currently working on that you are particularly excited about or proud of?

With a background in the humanities and then turning into a scientist, I'm intrigued by the way that we're brought up and the way social norms and constructed gender roles impact what we do with our careers. I've qualitatively noticed that more men tend to choose herpetology than women. My team is currently quantifying the sex of authorship of every single snake paper published over the past 50 years. It's a big job. We're not sub-sampling so there



FIG. 3. Emily Taylor with John Iverson in the Bahamas with *Cyclura cychlura*.



FIG. 4. Emily Taylor taking a blood sample from a Blunt-nosed Leopard Lizard (2018).

PHOTO BY MICHAEL WESTPHAL

are roughly 50,000 papers on snakes, and we are working with computer scientists to automatically code author names. I've done some preliminary analysis which shows that authorship over the past 50 years has gone from 5–8% in the 70s and 80s and up to ~30% in recent years in terms of studies on snakes by females. It's really fascinating. We are comparing this to lizard publications because, qualitatively, my hypothesis is that research on lizards is not as male dominated. Then we're duplicating that with other types of maligned animals such as sharks and spiders to see if there actually is a disproportionate gender gap.

Do you feel the gender gap in herpetology overall is closing?

That's a really good question. I would say, qualitatively, back when I was a graduate student in the 2000s, it was probably about 50/50 (m/f) in terms of graduate students attending conferences. But in terms of faculty positions, especially at research universities, it was definitely male dominated. I would say that there's been some change, but there still aren't as many women at research universities. I think it's more balanced at teaching-intensive universities. Cal Poly, for example, has a 50/50 faculty ratio. Ultimately, I would say yes, slowly but surely there is a greater representation of women in herpetology.

One thing that may be helping is that we are making concerted efforts to recruit women into studies on reptiles and amphibians. I began my career with the attitude that whichever students expressed interest, those are who I will accept into my lab. I realized there was a limitation there, a bias based on who physically asks. So, I then tried to look for people who expressed various characteristics that I found important as students of herpetology. Then I would invite them, and not just women, other underrepresented groups as well, into my laboratory. As mentors, we really have to try to do that, help balance the opportunity.

I understand you will be on sabbatical starting this January. Any big field plans?

Yes! I will be in Guam to work with the Brown Tree Snake. After that I will be working in the Bahamas to study rock iguanas, some of the most endangered lizards in the world. I love working with my colleagues and collaborators on these projects, but one project

I am very excited about next year is continuing our work on Blunt-nosed Leopard Lizards, which are a federally endangered species here in California. They're not only fragmented down to a few remaining populations, but they are living at the edge due to a changing climate. They live in an extremely hot environment, and our research is showing that just a couple of degrees increase in climate (which is expected) will potentially extirpate their main populations. That's really scary. I'm joining forces with one of our new wildlife biologists to try to study their underground behaviors. They spend a lot of time down in the burrows of Giant Kangaroo Rats, which are also federally endangered. We hope to invest in some high-tech burrow cameras to get down there and see the subterranean interactions between kangaroo rats and leopard lizards; maybe some potential predators of each such as rattlesnakes. We plan to measure microclimates and climate change projections of the actual burrows, which are the coolest places for them to take refuge right now. It's the limiting factor for these lizards. This project reminds me of how I felt when I first learned to scuba dive. I was 30 at the time and once I was underwater, I saw a whole new world open up to me and I thought, look at what I have been missing! So now I get to do the same thing by going underground and looking at where the lizards spend half their lives, in these subterranean tunnels. I'm so excited to see the interactions that are going to be occurring in this community!

What advice can you give to the next generation of conservation biologists and herpetologists?

Speaking from my own experience, people do not want to be preached to. And I think it takes time and maturity to understand that telling a group of people what to do never works. You have to figure out how to talk to people on a level that will actually make a difference to them. And that's really difficult, particularly when it comes to the most maligned animals in North America such as snakes. My job is to convince ranchers and vineyard managers locally that they shouldn't kill snakes. Instead of telling them what not to do, I try to give them all the options and then I discuss the pros and cons of each one, then I show them a live rattlesnake. If even one of them changes the way they treat these animals, I've made a lasting difference for these snakes.