A passion for wildlife genetics

FROM FROGS TO DOGS, JJ APODACA PUTS DNA TO USE

By Dana Kobilinsky

JJ Apodaca had a feeling the first time he saw the soon-to-be-named Hickory Nut Gorge green salamander. It was flatter, darker and had longer legs than others he had seen in western North Carolina's Blue Ridge Mountains.

Courtesy JJ Apodaca

▲ **JJ Apodaca holds an eastern hellbender (*Cryptobranchus alleganiensis*). From discovering new species, to helping those on the brink of extinction, Apodaca puts DNA to use.**

Using a stick, he lured it out of its crevice so he could examine it more closely and study its DNA later. At his lab, he and his colleagues confirmed his suspicions. It was a newly discovered species — *Aneidas caryaensis* — a species that raised concerns about rapid population declines before it even had a name.

Studying amphibian and reptile DNA has become a focus for Apodaca — and herps seem to have always been in *his* DNA. Growing up in New Mexico and Central Florida, he sought solace in the outdoors, and he loved turning over rocks to discover the slimy critters wriggling beneath.

Apodaca founded Tangled Bank Conservation for the recovery of endangered and imperiled species. In addition to his own consulting firm work, he also serves as the director of conservation and science for the nonprofit Amphibian and Reptile Conservancy. Through both of these roles, Apodaca has dedicated his career to protecting the unglamorous wildlife many people overlook. "In the herp world, we are very bird-envious," he said.

Endangered and in trouble

As an undergraduate at the University of South Florida, Apodaca wasn't sure what he wanted to study. Then he came across a book, *Appointments at the Ends of the World: Memoirs of a Wildlife Veterinarian*. "It had a huge impact on my life," Apodaca said. Enamored with traveling around the world studying wildlife, Apodaca started down a pre-vet path, but he decided he was more attracted to a career in wildlife biology. He went on to earn his PhD in evolutionary biology at the University of Alabama, set to study amphibians.

The more he studied them, the more he saw how many amphibian species were at risk. "I realized that holy cow, these things are really endangered and in trouble," Apodaca said. "It kind of felt weird doing pure research on just one species while the whole group was declining."

While working on his PhD, Apodaca attended a regional meeting of the amphibian and reptile conservation group Partners in Amphibian and Reptile Conservation, or PARC. On a field trip to see the Red Hills salamander (*Phaeognathus hubrichti*), Apodaca became inspired. He and a group of colleagues put together a state wildlife grant to fund a study that included genetics, species distribution modeling and field surveys that would ultimately help identify priority conservation areas for the Red Hills salamander, and eventually for all amphibians in the Southeast.

"With that grant, I went from not knowing what my dissertation was going to be to being fully funded with a project," he said.

After postdoctoral work at Florida State University concentrating on evolutionary ecology and salamander conservation, Apodaca took a job as a professor at Warren Wilson College in North Carolina, but he found he didn't enjoy academia as much as his volunteer work with PARC.

"I wanted to be working with partners and doing conservation on the ground," he said.

Making changes

Apodaca soon began taking on leadership roles within PARC.

"Every time I met him, I became more and more impressed," said Jeff Holmes, the executive director of the Amphibian and Reptile Conservancy,

who was the national chair of PARC at the time Apodaca began getting involved. Lots of young biologists have potential, Holmes said. "This guy also had leadership."

After serving as the Southeast PARC co-chair, Apodaca became PARC's national co-chair. "I saw and learned how conservation works across different states and different agencies and NGOs," he said.

Apodaca helped restart PARC's efforts to develop its first strategic plan. "When we started to realize the 20th anniversary [of PARC] was approaching, we decided it was a good time to look at it again," said Priya Nanjappa, a former state agency coordinator for PARC who now serves on the Colorado Oil and Gas Conservation Commission. She and Apodaca led strategic visioning meetings around the country and came up with a few main points to work on, including establishing conservation areas for amphibians and reptiles.

"He is just a real strategic thinker in general," Nanjappa said. "He looks at the forest and doesn't get lost in the trees. And he is good at thinking through the various collaborations and partnerships that might be useful in putting it all together."

Seeing results

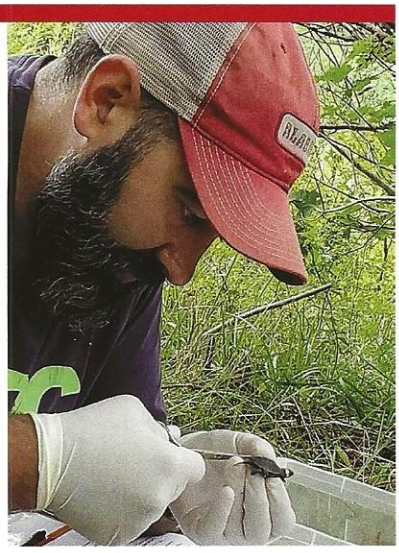
Apodaca moved on to work as the director of conservation and science at the Amphibian and Reptile Conservancy, a nonprofit that helps fund PARC, where he continues to work on Priority Amphibian and Reptile Conservation Areas (PARCAs), a task he took on during his time as national co-chair. "We're a little over halfway done," he said. "To me, that's really the future of amphibian and reptile conservation."

Part of his job includes working with private landowners, sometimes utilizing Farm Bill funding. His work with bog turtles (*Glyptemys muhlenbergii*), which have lost much of their bog habitat, is a prime example. Apodaca is working with academics and private donors to help bring the southern population of bog turtles back from the brink of extinction.

Because so many bog turtles live on private lands, Apodaca has to do outreach and forge partnerships to create turtle passages under roads, protect the landscapes they occupy and study their genetic diversity. He has turned to using environmental DNA to find the secretive reptiles in the Southern Appalachians.

The work is paying off, Apodaca said. Yearling survival is rising. After "being full of old individuals," he said, the population is seeing its median age get younger.

Apodaca founded Tangled Bank Conservation to focus on imperiled species, particularly reptiles and amphibians. (He has also used his genetics expertise to launch What's Your Mutt, a business that tests dog DNA for pet owners.) "I've always been a believer in the power of genetics to solve our problems," he said. "Once I started learning about genetics, I was blown away by how useful to society it can be."



Courtesy JJ Apodaca

▲ **JJ Apodaca handles a bog turtle.**

Fostering diversity

Apodaca's peers say his communication skills have benefited these imperiled critters. "He has given several talks with ARC where the reviews that he got from the audience had the main word 'passion,'" Holmes said.

"He can give a technical, scientific talk and a down-to-earth talk about the same topic," Nanjappa said. "That's a real skill that not everybody has."

Apodaca's fight for diversity extends beyond wildlife. Being part Mexican and part Native American, he found it hard to fit in with others in the field. Early on, he said, he'd find himself joking with Nanjappa at professional gatherings that they were "the only brown people there."

"Seeing a lack of diversity around you early on is not a good thing," Apodaca said.

With Nanjappa and other colleagues, he helped launch a diversity, equity and inclusion task team in PARC. "We were both noticing people were looking to us as people in leadership positions that provided representation that some other folks didn't have," Nanjappa said.

Apodaca is excited about diversity changing in the field. "I'm really ecstatic about that awareness shifting," he said. "It's shifted so much in the last few years. That's great, but we still have a long way to go." ■

Dana Kobilinsky is associate editor for The Wildlife Society.

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