

Bret: Hi, and welcome to our second episode of the Wildlife Word. Today's topic might sound like a bad word, but it's actually a really great species found in the State of New York.

Brad: That's right. The word today is 'hellbenders.' The hellbender is also known as the mud devil, devil dog, ground puppy, snot otter, lasagna lizard, and Allegheny alligator, because it is a large, slimy salamander found in the bottom of streams in New York State and many other Eastern states down into Georgia.

Bret: The hellbender is actually the largest salamander in the United States, but its populations are not nearly as large as they once were, so here to discuss hellbender conservation with us today are four of the Service's conservation partners who are hellbent on protecting the hellbender.

Brad: We're joined today by Robin Foster, a researcher from Canisius College, Peter Petokas, a professor and researcher at Lycoming College, Michelle Herman, a researcher and PhD student at the State University of New York College of Environmental Science and Forestry, and Jeremy Waddell from the Upper Susquehanna Coalition.

Bret: Let's get into our first interview.

Brad: This first question's for Robin. Hellbenders are an interesting species that a lot of the general public might not know much about. We've given our listeners a brief introduction to the species, but could you please provide some more of your expertise on the hellbender? What makes them special, and also what makes them vulnerable to threats?

Robin: I think, for me, the thing that intrigues me most about hellbenders is their evolutionary history. There have been fossils of related species of hellbenders found that are over 150 million years old and structurally they look exactly the same as modern-day hellbenders. So these animals are really living fossils. I think, for me, when I look at an animal that's been around, virtually unchanged, at least in its appearance, for over 150 million years, and then we see it now not able to survive in this world that we've altered so much, I think that's something I really connect to and I think that's something that other people can and really should connect to. So that's something for me that makes them really unique.

But they also have a really unique, interesting lifestyle compared to most other salamanders. That lifestyle is also what makes them so vulnerable. With hellbenders, you have a salamander that grows to be about two feet long that breathes mostly through its skin. Not only is that pretty unusual, but it also leaves them very vulnerable to water quality issues. They need nice, clean, flowing water, lots of oxygen in it. They're really sensitive to pollution.

On top of that, they live a long time, more than twenty years, some people think maybe as much as forty years or more. As they're eating crayfish and taking in toxins that are in the watershed system, that builds up in their tissues throughout their lives. In the end, this makes them really a great indicator species, kind of like the canary in the coal mine. When we see

hellbenders disappearing, one of the questions that we have to ask is: what's going on with our water?

Bret: That's really interesting, and it's clear that the hellbenders are a very unique species. Is there anything unique about the ways in which each of you first got into conservation work and then became involved with the hellbender specifically?

Robin: Yeah, sure. I guess my path was kind of unique. I kind of took the long and winding road. I started off as an elementary school teacher—elementary school English. But I always loved wildlife, and it didn't take me long to know that I wanted to make a change. I taught in public schools for maybe three years and realized I really wanted to make a change.

I used the education background to start doing environmental education, volunteering at wildlife refuges and zoos. And eventually I went back to get my biology degree. So it took me a little bit longer to get here, but it's been a really fulfilling process. And I feel like that education background has been really useful to me as a scientist as well.

Regarding hellbenders specifically, I think I just got really lucky. I first got to know hellbenders or at least their relative, the Japanese Giant Salamander, as an undergraduate student when I'd gone back for biology. I did an internship at the Buffalo Zoo, and one of my jobs was feeding the giant salamanders. I totally fell in love with them. Then the internship ended, never really thought about it, never expected to work with them again. And then a few years later I was looking for an opportunity for graduate school, and it just turned out the DEC here in New York was looking for a student to do some research on hellbenders. So everything just aligned perfectly and that got me started with the species and I've worked with them ever since.

Bret: Wow.

Brad: How about you, Peter?

Peter: I got started with hellbenders about 14 or 15 years ago when my colleague suggested that if I went scuba diving with him I'd see hellbenders. I became scuba certified, and the first year after that I didn't see any hellbenders at all. But I was intrigued by that, the idea, so I hooked up with the Fish and Boat Commission in Pennsylvania to go out and do survey work for hellbenders to see where they still occurred and how those populations were doing.

In the last three or four years, that morphed more into the conservation project that we've been doing in New York to try and restart historic hellbender populations. And that's where it is right now.

Brad: And how about you, Jeremy?

Jeremy: Kind of the same as Peter. I hadn't really been aware of the dilemma surrounding the hellbender until probably about 15 years ago when I got out of college. Probably the first time I actually seriously heard about the hellbender was from Peter.

The biggest influence in starting my career was probably my father. He was a New York State falconer and a wildlife rehabilitator. So from a really young age, I was exposed to a lot of different wildlife being rehabilitated at our house. Really lucky to have that at a really young age.

Brad: And hellbenders are really lucky to have all of you guys helping the conservation effort.

Bret: And since those initial forays into conservation, what are some projects that you've each done to conserve hellbenders in New York State?

Robin: Initially, most of my work on hellbenders just focused on finding out where they are and how their populations are doing. I started out working in Western New York in the Allegheny side of things, where we knew a little bit more about them. And then later on I spent six years working in the Susquehanna Region. In the end, we surveyed almost 200 kilometers of stream or a hundred potential sites. We got out and did a lot of snorkeling, a lot of lifting rocks to look for salamanders, a lot of habitat assessment.

Survey work's been one really important aspect of my research, but while I was doing it, I also started to look at a different approach called historical ecology, which just turned out to be one of the coolest things I've ever done. Basically, we used historical records, everything from newspapers, to old cookbooks and old magazines, to archaeology records and paleontological records to try and piece together the history of hellbenders, not just in New York, but all the way throughout New York, Pennsylvania and Maryland.

That turned out to be a really useful approach, and it allowed me to actually visualize and track patterns of decline in hellbenders over a span of almost two hundred years. And then a totally unexpected thing that also came out of that research was helping to shed some light on the relationship between hellbenders in the Susquehanna Watershed and the rest of the range.

So the Susquehanna is a bit unusual. Most other parts of the hellbender's range are all connected by water but the Susquehanna really isn't. So looking at the history also helped to pinpoint the timeframe when hellbenders came to colonize that watershed and sort of track their spread through the watershed and then the subsequent decline that we saw afterwards. So that was really exciting.

My other new project that we're just starting is looking at how we can use the spot patterns on a hellbender's body to individually identify them. We're actually just going next week over to the Bronx Zoo to work with the great folks over there to photograph some of their hellbenders. And that has a lot of potential applications, from helping with captive management to even

being able to use citizen science, getting pictures from the public of when they encounter them to help study populations. So I'm really excited about those things going forward.

Bret: Yeah.

Brad: Peter, any projects you want to talk about?

Peter: Sure. About eight years ago, a journalist came out with us and he did interviews and shot some video footage and I've been showing that film occasionally in different programs. What I say in the film is that I was hoping in the future we'd be able to actually reintroduce hellbenders to historic habitat and create new habitat for hellbenders. And that's kind of interesting to look at because starting about three years ago we talked about how we could actually do that in the Upper Susquehanna. So that project that we've been doing over these last three years actually got started and with Jeremy's help we created hellbender habitat, and with the help of the Bronx Zoo we raised animals and released them into the wild last August. So we have a new population that's been restored. So that's been one of the most exciting parts of my fourteen years of work now to actually start the process of bringing the hellbender back to its historic range.

Bret: That's great.

Brad: Jeremy, do you want to talk about any of the projects that you've done?

Jeremy: Sure. Just to reiterate what Peter said, we've been, over the last three years, in this effort to reintroduce the hellbender to a historic location. And that project is moving along really well and we're excited about the progress that's being made.

I work in a different capacity than my regular job. I'm a stewardship manager for The Wetland Trust, who is a landowning entity of where we're physically working. In that capacity, I've had some luck in being involved in the property acquisition and the easements. And we're going to continue to work, now that we have the property, we're going to work in reestablishing riparian forest buffer and reestablishing shade and canopy over the stream reaches where these critical habitats occur. Having ownership and having easements in perpetuity on these critical areas, I think is one of the key components, in addition to partnering with scientists like Robin and others at the Bronx Zoo to bring the rest of the pieces of the puzzle together.

Brad: So I actually helped construct 12 hellbender huts so far at our office, and I hear you'll be involved with getting the huts out into the water. What are some of the challenges that you expect with getting those out to spots where they can benefit hellbenders?

Jeremy: Yeah, and we've experienced a lot of those challenges firsthand. They're just really heavy. They're cumbersome. There's a lot of logistical stuff in getting them physically from Point A to Point B. We have to use ATVs and we have to bring them over in trucks and trailers

and get them in the water into small boats and rafts, and we move them down into locations. So it's a process.

And getting landowner permission in some of these areas is also a challenge too, which I think ties into some of the outreach efforts that we're working on. What's unique about the wetland hellbender huts, which I don't think was previously known, is that they are a great survey tool. Huts can be placed in reaches where maybe historic locations were known, where a current population is unknown. They can be put in and these hellbenders are occupying these habitats and they become easier to survey.

Bret: Nice. You also mentioned outreach, and obviously it's important to help people understand this isn't a scary species. They're really important for streams. Could you talk more about the outreach that you've done?

Jeremy: Sure. So there's a lot of misnomers and falsehoods associated with the hellbenders, and I think alleviating those misconceptions is a key piece to this species. As Robin mentioned earlier, 150 million years and we're watching these populations become decreased in a very short period of time comparatively. So there's some worry and some concern there. So I think outreach, especially to the youth.

So one of the rearing areas for these juveniles is near a local K-12. So we're taking full advantage of that in having eleventh and twelfth grade students come and learn about the hellbender project and learn about hellbenders and how they can become better stewards of the land, and how they can limit pollution and how they can help the hellbender in our project.

And these are really rural areas and rural school districts. A lot of these students fish and hunt and camp, and they spend a lot of time in the woods. It's also good to gain general awareness for students to say, "This is not something that's going to bite you. It's not something that, if you find it on the end of your fishing hook, it's not something that you need to kill. It can easily just be released." I think that if we, through this entire effort, if we can save one hellbender, I think it will be worthwhile.

Bret: That's great. All right, this question is for Peter. Very recently, the hellbender became the official state amphibian of Pennsylvania. Are there any similar initiatives going on in New York or ways that New Yorkers could better support the hellbender?

Peter: What happened in Pennsylvania was that a group of high school students from Harrisburg area, that's the state capital, worked with the Chesapeake Bay Foundation to develop legislation and eventually push it through the state legislature. So that was successfully voted on and signed on by the governor just recently. So something as important as this, as significant as this, can actually be done by young people. Actually, they probably have an advantage in that everybody wants to work with them. I think that was part of the advantage that they had in getting this through the legislature. So I think this was a successful outcome.

I think two things about it. One is that it raises public awareness of unique species that we have in our region. And it also, hopefully, is going to attract some additional support for future conservation efforts like we're doing in the Upper Susquehanna.

Bret: Nice.

Brad: Cool. So does anybody have advice to anyone listening on how they could support the conservation effort for hellbenders?

Jeremy: I think that anybody can, at most anytime, promote riparian forest buffer through protection against tree clearing or planting trees in riparian areas. Even if it's not in an exact hellbender-known location, it's going to affect the water quality ultimately in the watershed and improve the overall habitat for the hellbender.

And just becoming better stewards of the environment. Educating others, reporting polluters, and just having a general overall effort is important, not only for the hellbender but for all species.

Robin: Yeah, I think Jeremy said it really well. I always tell people that it's important for everyone to keep in mind that we all live in a watershed. Our everyday choices affect the things that live in those waterways, whether we're talking about hellbenders or something else. So everybody needs to play a role just by thinking about the way we manage our land, the products that we use, the ways we dispose of things. Clean water is good for everybody. So just having that mindset is important.

Brad: Yeah.

Bret: This is great information for everyone who might not know so much about the hellbenders.

Brad: And now we're going to get another perspective on the hellbender from Michelle Herman, a PhD student who has done a lot of hands-on research and recovery efforts for the species.

Bret: Okay, Michelle, so we understand that you've done a lot of work on the hellbender with Peter. Could you go into detail about what kind of work you've done on hellbenders?

Michelle: Yeah, absolutely. So I first started working with hellbenders as an undergraduate student at Lycoming College in Pennsylvania. That was where I first met Peter and learned about his research there about the hellbenders. I helped him for two years as an intern going out to his field sites and catching hellbenders and being part of a long-term monitoring study of those populations where we were collecting data on health, and growth, and movements.

Fast-forward to now, the project that I'm involved with is concerned with restoring a population of hellbenders in the Upper Susquehanna drainage. We're trying to get a headstarting program put together where we would rear young hellbenders until they're a few years old and then release them into the wild.

Brad: Cool.

Bret: Awesome.

Brad: I know that hellbenders are a precious salamander species that can often be misunderstood just because of the name alone. What are some of the misconceptions to clear up for our listeners about hellbenders?

Michelle: Yeah, so they can look pretty scary if you've never seen one or heard of one before. But I think the big thing to assure people is they're not poisonous or venomous for that matter. Very rarely do they ever bite. I've handled probably a few hundred animals at this point and I can probably count on one hand how many times I've been bitten. So they have a pretty high tolerance for handling.

I would say the other big misconception is that they eat trout eggs, or trout young, or other game fish, which isn't the case. Probably ninety-plus percent of their diet is crayfish. So that was a big misconception, I would say more so in the 1930s or so when they were actually actively hunting hellbenders and catching them on fishing lines to purposely remove them from streams.

Bret: Yikes.

Michelle: Yeah, so that's a misconception more so with anglers in the past I would say.

Bret: Okay. That's good to know. And now transitioning to the positive perception of hellbenders, can you talk about the important role that they play in their environment related to stream health?

Michelle: That's actually an excellent question because as of now, we don't fully understand the hellbender's significance in these ecosystems that they occur in. But we can speculate based on their life history. We know that, as I said earlier, they mostly eat crayfish. They live for a very long time, upwards of thirty years or more. And they never leave the water, so with that information, we can speculate that they might be important controls on crayfish.

And crayfish are pretty important in streams because they eat pretty much anything, living or dead. There can be a high density of crayfish, so the hellbender being there to constantly feed on these animals might prove that they're actually very important for keeping these dynamics in balance.

Bret: Great.

Brad: In spite of their important role in the ecosystem, the hellbender populations are not what they once were. What kind of other challenges do they face, and what's something that someone who's listening to this podcast can do to contribute to the conservation of hellbenders?

Michelle: Hellbenders are facing a number of threats right now. We don't fully understand why populations are declining across the range, but we do know that some stressors include things like agricultural and industrial pollution, sedimentation in streams is a real problem for them, because that smothers their rock habitat that they need. It makes those spaces underneath the rock unavailable to them.

Other stressors might be things like disease. Right now we're currently facing a Chytrid outbreak, which is a type of fungus that affects amphibians worldwide, not just here, not just with hellbenders.

As far as what people might be able to do to help the conservation of hellbenders, really things that would help hellbenders would benefit a lot of other things living in streams and rivers. They need very clean, high-oxygenated water. Really just things you would do to protect the integrity of a stream, that means volunteering with your local watershed group, or helping restore riparian buffers, or cleaning up trash, or leaving the habitat undisturbed.

Brad: Those are all really simple things that anybody can really be a part of.

Michelle: Exactly.

Brad: And should be a part of!

Bret: And now you've heard yet another Wildlife Word! If you thought we were saying a bad word at first, hopefully now you know about all the good work being done for this special salamander.

Brad: We'd like to say a big thank you from the New York Field Office to our dedicated conservation partners, Robin Foster, Peter Petokas, Michelle Herman, and Jeremy Waddell for joining us today, and working hard every day to protect our local species.

Bret: Stay tuned next month for another episode, and be sure to spread The Wildlife Word.