

Alligator Ecotoxicology with Laura Kojima

Ologies Podcast

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Oh heeyyy, it's that neglected hunk of ginger root at the bottom of your crisper, hoping you'll use it before it withers, Alie Ward, back with a very classic, on-brand episode of *Ologies*. Is it about a virus, or a vaccine, or anything relevant to your life? Nope! Not at all! Which is why it's perfect; it's just a murky bucket of slop, holding glimmering science information. Now, I loved every minute of recording and editing it, I wanted to just send it off with a big, long, detailed, and florid intro, but all you need is for me to just shut the fuck up and get the show started. I totally get it. And we will just as soon as I thank everyone on [Patreon.com/Ologies](https://www.patreon.com/Ologies). They make every single week of this show possible from the start in 2017. Thank you to everyone wearing *Ologies* merch, that's available at [OlogiesMerch.com](https://www.ologiesmerch.com); we have masks, should you need them. And thank you to everyone that's subscribed, rating the podcast, and of course reviewing it so that I can read it, such as this review left by Arghie, who writes:

*Nobody will ever see this review. (Oh hi, Arghie!) Apparently review no. 12, 094. Having said that, I would like to give that show *this* many stars.*

Arghie, I'm right here. I told you I read all of them.

Okay, alligator ecotoxicology: is there a topic more perfect for the holidays? [*giggle*] Yes. Yes, there's a lot of them, but we don't care because: gator poisons. What's even happening with those?

The word alligator has roots in Spanish; *el lagarto*, meaning 'the lizard'. Even though alligators are not lizards. 'Eco' means house, and it comes from the Greek *oikos*, which you may remember from the Oikology episode about decluttering your house. And 'toxicology' has some dusty Greek origins meaning 'poisoned arrow'. So, the study of poisoned homes of non-lizard lizards. So much to discuss!

Just quick up top; an alligator is a crocodylian. Not all crocodylians are alligators. There's 26 recognized species of crocodylians, which includes true crocodiles, the alligators, caimans, narrow nosed gharials, and false gharials. But mostly we're going to be talking gators.

This ologist tweeted something about her fieldwork and I clicked on her bio and saw the words 'alligator ecotoxicology'. I lost my shit quietly and then immediately tweeted that the world needed this conversation, and I have never been more correct. She studied Wildlife and Conservation Biology and is currently getting her Master's in Conservation Ecology and Sustainable Development at the University of Georgia's Odum School of Ecology's Savannah River Ecology Laboratory. Her research involves tracking and monitoring toxicology of alligators in an area called the Savannah River Site. It is 310-square mile former nuclear weapons production facility *and* a current nuclear waste storage site in South Carolina.

But in lighter news, when asked on social media she has admitted the celebrity she is most often told she resembles is Meghan Markle. So imagine if Meghan Markle wore a headlamp, and beamed, while clutching a small bouquet of alligator hatchlings, on the lapping shores of a moonlit bayou. So, a cooler Meghan Markle.... No offense, Meghan Markle.

Also audio note: we had some mysterious static here and there, so if it seems like I'm doing extra asides, it's just me cutting out the bad audio, like bruises on an otherwise perfect peach. Thank you for bearing with us. So buckle up your Chacos, slip on your crocs, and grab a can koozie to get comfy for a conversation that covers everything from Nile crocodiles, to airboats, hospitalizations, floating

in a swamp at the witching hour, yeeting, milly rocking, chicken baiting, gator lassos, dipping sauces, flimflam about flimflam, radioactive fish, and so much more, with Alligator Ecotoxicologist Laura Kojima.

Laura Kojima: I'm Laura Kojima. My pronouns are she/her.

Alie Ward: Great! Okay, ecotoxicology. I didn't know it existed until I started following you on twitter. Confession!

Laura: Oh I don't blame you. I didn't know it existed until I started grad school. *[laughs]*

Alie: *[laughs]* What exactly *is* ecotoxicology?

Laura: So, it's the study of nature's interactions with toxic substances that are introduced. A majority of the toxic substances are anthropogenically sourced, which means 'human caused'. So, a lot of well-known ecotoxicological problems are ocean acidification that is a result of pollution, pesticides on pollinator populations – I'm sure people have heard about "Save the Bees" and that's because of pesticides and herbicides – and consequences of heavy metal exposure and ingestion, which is what I'm looking at with alligators.

Alie: Oh! So it's the junk that we put into the earth and how it affects environments and things that eat it and absorb it.

Laura: Yes, exactly.

Alie: *[gasps softly]* Oh my gosh! Okay, on alligators: do they have a lot of, like, silver mercury fillings? What kind of metals are we talking? I know they don't really have dental fillings but...

Laura: *[laughs]* I mean, their teeth are very questionable when they're in very highly toxic areas, so they probably could use some fillings. It's really sad. But arsenic, cadmium, selenium, and mercury are, like, the four main elements. I work with looking at mercury in particular because my project is looking at the consumption risk associated with alligators at my field site. And when mercury is exposed to certain bacteria in aquatic areas, because of the lack of oxygen it gets converted into methylmercury, which is toxic. And I'm sure a lot of us have grown up being told "don't eat too much catfish or salmon, because there's mercury in it." And so what I'm curious is whether or not there's a risk of eating alligator and being exposed to mercury as a result.

Alie: *[shocked gasp]* Do a lot of people eat alligator? How big of a meat industry is that?

Laura: So in Louisiana and Florida there's alligator farms where people will buy alligator meat. I know I had alligator jerky my first time I went to New Orleans. It's definitely an industry. I'm from the West Coast so I know it's not as widespread over here in California, but in the Southeast most people have had gator, or even turtle, something that to me would be kind of out of the ordinary. And in South Carolina where I'm doing my research, people apply for hunting permits annually to hunt alligator and consume the meat. Definitely it's more common than you would think.

Alie: Does it taste like chicken...?

Laura: I did not like it when I had it, it was very fishy when I had alligator jerky, but everyone else I talked to said it tastes like chicken, so I don't know. *[laughs]*

Aside: Okay, so folks have been eating alligator tail for centuries on this continent, long before it was called *Alligator mississippiensis*, before colonization, before alligator wrestling popped up in roadside attractions, before alligators being declared endangered in 1973, and before their rebound and farming. So, as for alligators on your refined pallet: imagine a chicken that lives in the ocean. Also, alligator tail meat: that's going to run you about \$20 a pound, just a few dollars shy of the price of lobster meat. So, it's fancy and funky.

Alie: I think it's probably all about the dipping sauce. Because whatever chicken is... it really just tastes like ranch, or barbecue, or hot wings.

Laura: Exactly! I definitely plan on trying actual, like, well-cooked alligator meat and not just something from a farmer's market in New Orleans that they were just mass producing-selling. *[laughs]*

Alie: And how big do these alligators get? How honking are we talking? *[delighted fright squeal]*

Laura: Oh my goodness. They can get really big. I have had an encounter with an alligator that was missing half its tail, [*"Ouch."*] but he was full grown, and with only half his tail he was over 10.5 feet. We actually caught him in a trap twice and we named him Jabba because he just looked like Jabba the Hutt, just so fat. *[Jabba the Hutt babble]* But you're able to measure their total length even if they're missing part of their tail by doubling their snout to their cloaca, which is where they pee and reproduce...

Aside: You may remember the cloaca from any of our bird or herp episodes, and yes, it's the one-stop shop for peeing, eggs, sperm, poo, you name it! And I've oft' said that if Steve Jobs designed a butthole ... it would be a cloaca. It's streamlined! It's simple! It's clean... Well, it's not always clean, but that's probably an individual thing. Anyway, cloaca. Find them at the underside base of the tail, which is pretty long!

Laura: So with that being doubled he was, I believe, 12.7 feet if he had his full tail. But alligators can get up to 14 feet.

Alie: Ah! How do they lose their tails? I imagine they don't just snap off like a fence lizard's, right?

Laura: *[laughs]* No, not at all! Alligators are extremely aggressive towards each other. I would be scared to be in the middle of an alligator fight. Males are just very territorial, and so likely what we think happened was Jabba got in a fight in his youth and someone definitely got his tail ripped off. But I think that he probably got the better end of that fight, because he's still alive.

Alie: Argh!

Laura: He was also missing... well, not missing. Part of his eye was scratched and that's how we were able to recognize him when we got him again, because of his large size and the fact that his right eye kind of looked like a glass eye, and we knew where his tail was missing. We were just like, "This gator loves his chicken!" because most of the gators do not like going back to the traps.

Alie: What are the traps like? Is it like... Do you have to put a minivan underwater and just load it full of meats?

Laura: *[laughs]* Oh I wish it were that easy! So, these traps are really weird. The best way I can explain it is; the trap has kind of a mouth, that's the shape of a triangle and in the back of the trap I put a piece of raw chicken.

Aside: Oh sidenote: Laura sent me a photo with detailed info on what bungee does what. But essentially, just know this trap looks like two unfinished Ikea bookshelf bases, kind of forming a 'V' with a long stick in the air, like a tail at one end. And it's all set up in the reeds near the banks or the shore, and it all holds a wire loop that tightens once the bait at the 'V' is chomped. But the chomper doesn't get to scurry off so soon.

Laura: And then the lasso is tied off to either a tree or a stake, so they're able to just, kind of, hide in the water or go onto land once they get trapped. But when you're doing it it's very simple, surprisingly.

Alie: It sounds like kind of a bigger scale operation as... maybe like a lizard lassoing in the field, right?

Laura: Exactly! It's literally... Yes, 100%. It's literally like they just go through the lasso and it tightens up once they get the bait.

Alie: You know, there should be some kind of Rube Goldberg where that triggers some kind of... a trombone to just be like "*womp wahpwooommp!*"

Laura: *[laughing]* Facts! I actually was there when Jabba got trapped the second time.

Alie: *[laughs]* Oh no!

Laura: Yeah, it was really funny! We were on the airboat, and it was nighttime, and we were checking my traps, and we noticed that there was an alligator that was right in front of one. So we stayed to the side and all of a sudden we see one of my alligators that I'm GPS tracking...

Aside: It was swimming away, she says!

Laura: And so we're all like, "Oh look, let's go look at the transmitter!" And then all of a sudden I hear some splashing and no one else from on the boat heard it, and we go over and he just, like, had got entrapped literally while we were there. I was so bummed because if we were just, like, a foot to the left, we would've seen it happen, because he's so big. But I mean, better than nothing.

Alie: Ohhh, poor Jabba!

Laura: I know. He really wanted his chicken.

Alie: He's just like, "I've been through so much!" *[Laura laughs]* Okay, so many questions; very, very shameless one I'm going to ask. Alligator versus crocodile. What do we have in North America? I mean I know... Crocodile's got a skinny mouth? Right?

Laura: Yes!

Alie: Okay!

Laura: They definitely have a narrower snout.

Alie: Okay, what else is different about them?

Laura: So the main distinctions are crocodiles actually get a lot bigger than alligators. In North America we have the American alligator, which is distributed throughout most of the Southeast, so from Texas to Oklahoma; there's a small population in Oklahoma. And then the American crocodile is only in Southeast Florida. They're not doing too hot because... I don't know too much about American crocs, but I do know that they are more specific on their climate that they can reproduce and thrive in. Whereas alligators are just very much so

generalists. Crocodiles do tend to be bigger. American alligators and American crocodiles are pretty similar in size. I think American crocs can just get a little bit bigger than them.

Aside: Now American crocodiles can get about five feet larger than American gators! And crocs in North American can reach nearly 20 feet and weigh 2,000 pounds! So many pounds! But saltwater crocs in India, and Southwest Asia, and the Northern coast of Australia, those can top 20 feet and weigh in at 3,000 pounds! About as heavy as your car, give or take a couple of umbrellas and empty travel mugs. So other than the degree of absolute unit-ness, what else distinguishes a croc from a gator?

Laura: Also the snouts are different. American alligators have what we call the 'U-shaped' snout; it's just more robust. Whereas crocodiles have a more narrow snout, which is the 'V-shaped' snout. And then alligators, honestly, look less scary. They have an overbite and it looks cute, in my opinion; whereas crocodiles, their teeth are kind of just all over the place.

The main thing with crocodiles is, they do have an overbite but their fourth lower tooth, on their lower jaw, sticks out. That's another major distinction because alligators just have the overbite; they don't have any bottom teeth sticking out, whereas the crocodiles do.

Aside: So to recap, crocodiles are a little bit bigger, they have narrower snouts, and a lower jaw snaggle situation. Whereas alligators are a little smaller, they have a broader snooter, and a doofy overbite that is very cute. Now, how about a vibe check?

Laura: I do think crocodiles look a little bit more intimidating than alligators. Behaviorally, crocodiles are less chill than alligators.

Alie: [*laughs*] Yeah, you mentioned that alligators are... they love to fight. They'll throw down.

Laura: Yes.

Alie: Can you tell me a little bit about what it's like... especially if you're out there *at night*. What is a night like for you? You're on an airboat, at night?! Looking for alligators in dark water?? How do you even deal with that?! That's amazing!

Aside: Okay, we had a little audio hiccup here, so *apologies*. But Laura says that she feels comfy when she's out doing the fieldwork as a team with her very alligator-experienced and great advisor Dr. Ben Parrott, who, disappointingly, does not also study subtropical birds; and I'm sure that is a joke Dr. Parrott has never once heard, ever, in his life. I'm happy to be the first.

Also, Laura says that the 'get-the-willies' factor kind of depends on your ride. A smaller, lower vessel with fewer lights? Mm... it's kind of a nope-boat.

Laura: So, I just did not feel comfortable because the light can be really sketchy in the dark, whereas when we're in the airboat there's, like, three to four of us and the airboat has much brighter light so we can see what's going on. And I just feel safer with having three other people with me. So, it definitely is an intimidating process the first time around but I've gotten really used to it, and I basically became nocturnal during the summer because all my trapping was at night.

Alie: Really?

Laura: Yes, we definitely did try trapping during the day the first time around, and that meant we left traps overnight, but we ended up getting alligators that were getting attacked by other males. So, we decided to just set traps around... anywhere from 2 to 4pm, and then let them sit until the sun went down, which was usually around 9. And if it was 9 and we didn't get

any alligators, we would just sit on the boat and wait a few hours until they would come into the traps. We knew we would have a better success rate leaving them overnight, but also it was just too unpredictable to do so because they're just so aggressive.

Aside: So after they saw animals getting chomped by other alligators, they stopped leaving traps overnight and instead would just hang out on boats until the party started, Midnight, 1am; gators coming out for nibbles, and then once they're in the trap they would follow up, process them, get their samples, until the wee hours of 5am or so. It's a rough night in the field, but the alternative was leaving these mostly bro-gators snared all night, which is just a one-way ticket to Nibblatown.

Laura: ... but all of them had puncture wounds, and every time we can near a trap we saw another male, like, nervously swimming away. They knew they were guilty. *[laughs]* Just seeing them swim away, I was like, "Get out of here!"

Alie: It's like a chihuahua that's been digging through the garbage! You're like, "Go on, git!"

Laura: Exactly! 100%. But yeah, honestly the worst thing about trapping at night is the bugs, in my opinion.

Alie: Oh my gosh. Okay, that was going to be my follow up question. I want to know: Best bug repellent, and also... Okay, you're on a boat, you're on a lake, it's summer, it's 11:45pm; are you scrolling on your phone? Are you writing in a journal? Are you guys just... Are you gossiping? Did you learn everyone's secrets? What is that kind of camaraderie like when you're on a boat waiting for a huge alligator to nibble on chicken?

Laura: *[laughs]* Oh my god, I love that. Okay, first, best bug repellent for me personally is Picaridin. I absolutely cannot stand the smell of DEET, and I think DEET is known for just destroying clothes as well, and Picaridin actually, like, is meant to be on clothing.

Aside: I looked this up, and Picaridin sounds like a cologne from 2007, but rather, it comes in many brands and forms. Laura says that it works wonders. She mists it on her clothes and she has the skin-safe type for any exposed flesh. But sometimes you just have to accept that bugs will bug you. They're good at it, they love it.

Laura: We get a lot of, like, gnats that just come around us, so bug repellent won't do anything. It's literally like the moth meme. They just love the light.

Alie: *[laughs]* Oh my gosh. I would just want to wear, like, a beekeeper veil. "Just don't get in my face!"

Laura: Well, I did get one in my ear and had to go to the hospital to get it removed. Yeah, I have six earrings on one of my ears, and I had my hair in braids, and I kept hearing them come near, and I think all the headlamps were reflecting off of my earrings. And eventually I just hear "BZZZ" and it gets really loud. I was like, "No! You've got to be kidding me!" This is one of the first days we were putting a GPS tag on an animal. So here's my advisor, basically doing the surgical process to do that, and I'm just twitching my head because I'm trying to get this bug to fly out.

And long story short, I had the bug in my ear all night, had to go process my data with the bug in my ear, *[Alie squeams]* and I went to bed that night with it in my ear because I was so tired. It was five in the morning, I just didn't give a crap. *[laughs]*

Alie: Oh my god! And then when you went to, like, urgent care or whatever the next day, what did pull out? What was it??

Laura: It was the tiniest little gnat. It was so small that the physician's assistant who took it out was just laughing because he saw me take a picture of me flipping it off because I was like, "I need to show everyone the bug that was in my ear, that sent me to the hospital, during a pandemic!" I didn't want to go to the doctor's. Yeah, so bug repellent can only do so much.

Alie: Well, you obviously must like what you do a lot, to have these kinds of adventures and to put up with it. You mentioned you're from the West Coast. What part of the West Coast are you from?

Laura: I'm from California.

Aside: So, Laura was raised in San Diego, and her dad is a Navy vet and her mom has bravely learned to love reptiles. She seems to have had a lot of good moral support to pursue her love, including Dr. Brian Todd, who started her down the path to get her Bachelor's in Wildlife, Fish, and Conservation Biology from the University of California Davis, whose mascot is a horse, and not an aquatic reptile.

Alie: What brought you to do your research in South Carolina and to do it on alligators? Because I also am from California and I do not recall any alligators that were not in zoos here, so how did you cozy up to these beasts?

Laura: Okay, so a lot of people's origin stories usually start with Steve Irwin, and I mean, he definitely was an influence in becoming a wildlife biologist, but my origin story for alligators is a bit more unorthodox. My dad and I would watch this show...

Aside: The show? *Ax Men* on the History Channel. So much banjo music, humidity, and pistols tucked into the waistbands of short shorts.

Laura: And there are a lot of quirky characters on the show, which I think is why they got a show. So, there's this one guy who did a lot of his logging in the bayou of Louisiana. He'd just be down and dirty in the swamp. He was a total character, would have no shirt on, like 50 years old, had the thickest bayou accent, and wore booty shorts, and his name was Shelby. And he would just, like, jump on alligators in the swamp, grab snakes and bite their head off and make a scarf out of them, and just had... This guy gave no fucks. [laughs] He was just hilarious.

Aside: [clips of Shelby from *Ax Men*, with bayou accent and light-hearted bayou music:]

"What the hell was that?"

"I know there's a damn big-ass log down there but I also know there's a big-ass alligator down there too."

"Whoa whoa whoa, gimme my gun!"

Laura says she is Mexican American, and when she turned 15 her mom asked if she'd like to have a quinceañera, which is a celebration of the transition toward young adulthood. There's maybe a ballgown, and a cake, perhaps a DJ, definitely a photobooth, all eyes on you. It might be some teenager's version of Heaven on Earth. Laura's response was:

Laura: "Uh... I don't know. I like going to the parties but I don't know if I want to have my own." So she was like, "You can either have a quinceañera or you can choose a place in the US to go to for turning 15." And I was like, "I want to go to Louisiana and go to a swamp!" [laughs]

Alie: Oh my god. That's amazing! [laughs]

Laura: Yeah, so we went to New Orleans. We did a swamp tour and saw alligators, and I was just like, “This is the coolest thing in the world.” Fast forward to years later, I get my Bachelor’s degree in Wildlife, Fish, and Conservation Biology at UC Davis, and I realized that I really liked working with reptiles. I worked in the reptile lab all throughout my time at Davis. It was just an amazing experience because I was originally pre-vet, but I was bored working with house pets that weren’t herpetofauna. I was just like, “I want to work with reptiles and amphibians.” And I just loved doing research. So, I worked with the USGS for a field season after a graduated doing snake stuff, and as much as I love doing technician work, I realized I still kind of wanted to be part of more of the science and data analysis.

And I saw my graduate position advertised on the Texas A&M wildlife job board and I was like, “I have to apply. I don’t know if I’m qualified for this or not, but I just need to apply because alligators!”

Alie: Amazing! What was it like the moment that you found out that you got it?

Laura: I was shocked. I was kind of speechless, to be honest, because everyone I knew was like, “There’s no way you’re going to move to the southeast. You’re such a Californian. You live, breath, and die California. You wouldn’t last a day in the southeast.” And I was like, “Well, I really loved Louisiana.” I went again a few years after the first time going because my mom and I fell in love. So I was like, “I don’t know. I can’t stay in California my entire life. I probably will come back after I graduate because I love it here, but I don’t feel like I’ll ever forgive myself if I say no to this opportunity out of fear of living somewhere else.”

So, I kind of just said “Screw it! Let’s do it.” My advisor called me and told me, like, “You got the position. You have a week to decide.” And I was like, “I don’t need to decide. I’m going to take this. This is a dream opportunity.”

Alie: Ah! That’s great. Oh my gosh.

Aside: Who is that person that you think is out of your league? Or that job that’s over your pay grade? Or that exciting city you want to move to? What if you took that risk? What would you have to lose?? And think of all that you could gain. I say, just do it. We’re all going to die anyway. No offense.

Alie: And so, now talking about heavy metal alligators. When it comes to the mercury ingestion that you’re finding, is that from eating fish that have eaten fish that have eaten fish? Or is that completely from a different source?

Laura: No, you hit the nail on the head right there. Definitely... That process right there is biomagnification, when it just keeps moving up the trophic levels. And since alligators are apex predators, they’re at the top. At least when they’re full grown they’re at the top. But that basically makes them more susceptible, and since they’re so long-lived... They can live up to 70 years. I think the oldest one in captivity was 83 years old.

Aside: So a chap by the name of Saturn, the long-reigning World’s Oldest Alligator, lived in a Moscow zoo for a long time but just passed away about five months ago. He was known for being an alligator that Hitler enjoyed visiting in the Berlin Zoo, until the Berlin Zoo was bombed and Saturn was found wandering among the wreckage of the war-torn city looking for food.

But now, Muja is the oldest alligator, and he lives in Serbia. He also survived World War II bombings, which is a great reminder that alligators are very hardy *and* we’re not that far

away, historically, from world wars started by homicidal white supremacists. Anyway, alligators eat a lot of rabbits, and fish, and they just snack over a lifetime, right?

Laura: It just means that they're going to bioaccumulate contaminants over time. Bioaccumulation, basically, is that they're ingesting contaminants at a higher rate than they're screening them so they just stay in their system. And then with mercury, specifically methylmercury, it's a super soluble contaminant, which means it will just be very easily ingested and kind of stay in the muscles of whatever's consuming it.

Alie: How does that methylmercury affect reptiles versus mammals, say?

Laura: Reptiles are really resilient. I do know mammals are more at risk with that type of exposure. Reptiles are just kind of crazy. Literally there's a reason why alligators haven't really needed to evolve in the last 80 million years. They're just very resilient. But the problem with that is that people don't want to invest in research towards them when it seems like nothing's wrong with them, you know? In that respect, there's not a lot of literature out on the different effects that some of these metals have on these animals. There's endocrine disruptors that are definitely part of ecotoxicology, and that's pesticides such as DDT.

Aside: Oh, and pharmaceuticals too! From our little amber bottles, to our mouths, to our pee, to the water, to alligators? And just like a game of telephone, some shit is gonna get wacky.

Laura: I'm sure you've heard of birth control getting into the water and causing sex reversal in animals. And other compounds like plastic and PCV that are just not good for the development of some of these animals. But in respect to metals, there's still a lot to be done because there's not really any observable effects in a lot of these animals.

Alie: Walk me through a little bit of what's in the guts of an alligator. How different is it from humans? Do they have, like, livers and spleens and kidneys in the same numbers that we do?

Laura: Yes. We did actually dissect a pretty big sized alligator once and it was kind of shocking how much their internals look like ours.

Aside: One of Laura's colleagues, the amazing Kristen Zemaitis, actually looks at what alligators eat! And spoiler alert: her job is not boring.

Laura: She's found a crazy amount of things in their stomachs. She pumped like 300 alligators' stomachs one summer. I could not imagine doing that. She's a champion.

Alie: Send her a text or something. Ask her what the weirdest thing is that she's found. I'll put it in an aside because I'm sure you'd be like, "Oh my god, it's cell phones..." or god only knows, someone's car keys.

Laura: She's definitely found some weird things. I can totally ask her.

Aside: Yes, I made Laura text Kristen while we were recording and like any good alligator ecotoxicologist, she was down to dish. She said she's found a mango, some weird intestines that she couldn't quite identify. Feral cats are pretty common. And Kristen added that she once pumped a freshly ingested raccoon and she felt bad for having taken the big lug's recent lunch. Like, [*distorted low voice*] "C'mon man, I was digesting that."

She also finds a surprising amount of bugs, leading her to believe that if it moves, a gator will bite it. And yes, this includes dogs, and humans, and deer, and things and people that, trust me, you don't want to google, or visualize, or experience with too many senses.

Alie: When you dissect an alligator, what does that smell like?

Laura: Oh god, it smelled awful. I remember I had a mask with me and I was just like, “I’m going to keep this on because I can’t do this right now.” *[both laugh]*

Alie: Oh gosh. Swamp fish. Amazing.

Laura: It’s just rancid.

Alie: Oh, I bet. Just rancid, swampy fish stuff?

Laura: Yes, exactly. Literally rancid, just like... I don’t know, like a really ripe trash can.

Alie: Oh, ripe. *[laughs with disgust]*

Laura: That’s the best word I can use.

Alie: When you’re checking on them after you’ve trapped them, how are you measuring the levels of heavy metals in their tissue? Are you having to do tissue biopsies? How does that work?

Laura: Yes. So a little background, because I realize I’ve gone on so many tangents I haven’t gone over what my research is in whole. By looking at the human consumption risk associated with eating alligators, I have to think of, like, what are the main parts of alligators that are consumed? And tail muscle is the most commonly consumed part. And I take tail punch biopsies using a circular 10-millimeter biopsy punch. I give them a local anesthetic, lidocaine, in the area where I’m going to acquire the punch so that it’s completely painless for them, and I take a really tiny sample and I take blood.

Every time we get an animal, the first thing we do after restraining them is retrieving blood. And so I’m going to use both blood and tail muscle to see if blood can potentially just be an indicator of mercury levels in the tail so that tail muscle doesn’t necessarily need to be acquired for future studies. And just also to get an idea of how much mercury is in the tail itself and if humans are at risk of consuming it.

Alie: I can’t imagine how you can restrain a tail. I believe you’ve used the term “yeet” on Twitter.

Laura: Yeah. *[laughs]*

Aside: July 25, 2020: Laura tweets, “The yeet heard round the world,” and if you don’t know what ‘yeeted’ means, let’s let her expound.

Laura: My friend, that was his way of describing it. “You got yeeted by an alligator.” So, the first time I went out in the field, there were only three people, and that was because we didn’t think we were going to get too large of animals. Like, maybe eight feet max. Second time I went out, there’s only three of us, and that’s when we first got Jabba. We got two 11-footers and a ten-footer.

I had told my advisor when we were at the first alligator that was 11 feet, I was like, “I don’t think we should just have three people. I think we need a fourth.” And he was like, “We can’t expect people to give up their time to come and help us.” And then we got Jabba and he was like, “You’re right. We need a fourth. We’ll make it happen.” Jabba was dragging him into the water and he was trying to restrain him. It was just a mess.

And with four people, it goes so smoothly because I have me dictating the measurements that I get from these animals, and I have two people restraining it, and then my advisor who’s usually taking blood or helping me with getting measurements and stuff because he and I have gotten to a point which we can read each other’s minds to get all the data we need and we just need two people.

Aside: She says usually the tail isn't problematic. Usually.

Laura: I just had really bad luck the one day that I was out and I was trying to reach for my data sheet. My advisor kept telling me, "Watch for the tail, watch for the tail." And I was like, "I'm fine. I just need to grab this, this, and that." The tail was swaying quite a bit. And he's just like, "Laura, you need to really watch for the tail." [*Alie gasps*] I just dismissed it, and all of a sudden I feel BOOM on my back and I just fly forward and freeze for a second, because I presume that the wind's knocked out of me. And once I realized I'm okay, we just looked at each other and he goes, "I told you to watch for the tail. [*Alie laughs and groans*] Are you okay?" And I'm like, "Yes, I'm fine. But what just happened?"

Alie: Wow. Did it leave a mark?

Laura: No, thankfully it didn't. No bruises or anything. I had my roommate check the next morning. This was at, like, five in the morning too. We had a really late night that night. So I think I was just so mentally numb that I was like, "Okay. Time to keep going with my day."

Alie: Oh, what a trooper. What a badass. That's amazing.

Laura: The bug in the ear was worse.

Alie: The bug in the ear was worse! Oh my god. That is shocking that a gnat, a tiny gnat, is worse. [*both laugh*] Oh my god. That's the best realization ever. Oh my god.

Aside: So yes, yeeted, aka thwacked. In her tweet, she posted a screenshot of a text from a friend, who upon hearing this *tale* of hers, declared that she had been milly rocked by a gator. And fear not, I have researched this term for us. The milly rock is a dance that looks like you're determined to swat away bees, but cooler. It looks like you are yeeting researchers, and you are a giant crocodilian.

Now, despite this, Laura says she would get hit by the tail of an 11-foot alligator every night if it meant not getting another tiny bug in her ear, which honestly sounds like some kind of weird fable or fairytale about how to tell a regular person from an enchanted swamp princess with magical reptilian gifts.

Alie: Now let's say that you were finding high mercury levels in these alligators. Is there a way to chelate that? Is there a way to help the alligators? What would be the next step?

Laura: So my work is at the Savannah River Site, which is a Department of Energy-owned property, and it used to be a former nuclear weapons plant. [*"Pardon?"*] And so in order to produce radioactive material, you need to have bodies of water nearby these reactors so that all the heat effluent – basically waste discharge – can go into that water and let it settle.

Aside: Okay, quick but complicated aside. Laura explains that the contaminants in these waters can come from the former nuclear weapons facility, and also the stores of old coal ash and what's called 'boiler slag' that can settle into the surrounding bodies of water. So, short of draining the lakes, she says, it's a hard thing to clean up. In the area where she does her trapping, the nuclear reactor was only in service for 4 years.

But the alligators are mobile as hell. They can swim up to 20 miles per hour. That's three times faster than Olympian Michael Phelps. So she uses GPS monitoring to see if they get closer to the nuclear facilities or if they leave and are in hunting territory. And she said she does see people fishing on the river, but she isn't sure if the potential danger fazes them. According to some studies I looked into, subsistence fishing in that area is more common for people of lower financial means.

And there was a paper published this year titled “Legacy Contaminants in Aquatic Biota in a Stream Associated with Nuclear Weapons Material Production on the Savannah River Site,” and it found that fish collected from sites adjacent to certain facilities had significantly higher radiocesium concentrations compared to fish from other sites. And although some government-run sites attest that the water is being treated and that mercury in the treated water has been reduced by more than 95%, the South Carolina Department of Health and Environmental Control does state their intentions for the “timely treatment of the 37 million gallons of liquid high-level waste and closure of the storage tanks, some of which have leak sites.” Not only does Laura wrestle alligators at 3am for her job, but she does it in the name of cleaning up ecological toxins and keeping gators and people safer.

Alie: Do you have to take any precautions as someone who works at those sites, for yourself?

Laura: So I always have to call out. We have a security service site, like in order to access the site, you have to be badged and go through an eight-hour training. So it’s very strict, which I think is really good considering the wildlife that is there. And I always have to call out to that security and let them know my grid, where I’m going, how long I’m going to be out there for, and how many people I’m going to have with me, I also have to bring an extra radio out. And they do tell me, “There are heavy amounts of contaminations in the water, be careful,” but that’s about it.

Otherwise, I’m going in this water, I have to get wet to set the traps. I think as long as I’m not having too long-term of exposure, I will be okay. I think if it was like me going out every single day for three years, then I’d be a little bit more concerned. But since it’s just twice a week during the summer and we try to get as many animals as we can.

Alie: And you’re not filling up your Nalgene bottle in the river or the lake, I imagine.

Laura: Absolutely not. *[laughs]* We bring our own water with us every time.

Alie: Smart. Not fishing in there yourself, right?

Laura: No, I’d be way too scared.

Alie: Yeah. Oof.

Laura: I’d have fish with three eyes. That’s for sure.

Alie: Yeah. You’re like, “I’m good.” I have so many questions from listeners. Can I breeze through some?

Laura: Yes, of course.

Alie: This is the first alligator episode we’ve ever done, obviously, and people are pumped!

Aside: But before, of course, you know that we donate to a cause chosen by the Ologist and Laura was so passionate about it going to the Wildlife Conservation Society, which is a non-profit private organization, established in 1895, that saves wildlife and wild places by understanding critical issues and crafting science-based solutions and conservation actions that benefit nature and humanity. In particular, these funds will go directly to the critically endangered Siamese Crocodile Conservation Project in Laos. That donation was made possible by the following sponsors who let us throw money at reptiles.

[Ad Break]

Okay. Your crocodilian inquiries and alligator answers.

Alie: Oh, people are excited. Oh my gosh, okay. This is a weird question so I'm going to ask it first. Angela Clark wants to know: Okay, native Floridian here. The anaconda-eating gator that exploded? Please discuss. Teagen Andrews agrees. Have you ever heard of an anaconda-eating gator that exploded?

Laura: I think... Wait. I've seen a picture of a Burmese python eating an alligator and its body got ripped up from doing it. Because snakes will do that. They'll eat things that are way too big for them and get their entire intestines kinda ripped out. But anaconda-eating alligator?

Alie: I don't know!

Laura: I mean, that does sound like something that would happen in Florida.

Alie: Yes, it does. It really does. *[laughs]*

Laura: However, I'm wondering if she means a Burmese python that got eaten by an alligator or if she meant what I just said about the Burmese python that ate the alligator and exploded.

Alie: It's possible, and I feel like at least one of them was smoking a cigarette at this time. Maybe the alligator was. I just picture in Florida there's an alligator smoking a cigarette and a Burmese python wearing jorts tries to eat it. I don't know what's going on down there. But I love it.

Laura: I apologize, I do not have a scientific answer to that question.

Alie: That was mostly alligator gossip.

Aside: You're dying to know more about this, and I know because you are me, so, I googled for us. October 5, 2005, a day that will live in herpetology, it was a 13-foot invasive python which ate a 6-foot alligator. And in case you didn't get to smell photos of this, allow me to just paint a pic. So, imagine trying to shove a wine bottle into a sock but the sock ripped and died and then was bobbing and rotting on the surface of a swamp, and it was giant.

Also, if you ever build a time machine, maybe don't let anyone release their pet pythons in Florida because scientists estimate there are now up to 300,000 of these giant, loose, hungry pythons and they are eating way too many raccoons, and opossums, and bobcats, and rabbits, and foxes, all kinds of mammals. Oh, and I guess as long as you've got the time machine fired up, just swoop by the zoo and feed Hitler to Saturn. Berp!

Alie: Jeffrey Bradshaw and Hope did ask if the Florida-gator-versus-Burmese-python thing is still going on. And Jeffrey wants to know: Are they eating any of the invasive pythons? And if not, can we train them to?

Laura: I wish we could train them to, that would be awesome! But basically, Burmese pythons are really thriving in the area where American crocodiles are. And the thing with these pythons is they are egg eaters, and they'll go and just destroy a nest. They will also go and eat juvenile alligators and crocodiles. Alligators, they take a while to grow. They need to have a good surplus of food in order to get big. They have maternal care 'til they're five years old, which means they stay near where their nest site is until they're probably about three to four feet. They still will do their little laser beam call to their mom even if they're too big to be doing so if they're under a lot of distress. *[juvenile alligator call; series of little pew-pews]*

I do think Burmese pythons are a big problem in eradicating the American crocodile population. Alligators are pretty abundant throughout Florida and the Southeast in general. So, I can't see Burmese pythons necessarily doing too much damage to them, but it is still an issue for sure.

Alie: Well actually, a lot of people had social and behavioral questions. Kendra St Clair wants to know: What are the social lives of gators like? And Ciara Creagh-Peschau asked: Do alligators have friends? Do they feel love? And Carrie Cimo wants to know: Has an alligator ever looked for some lovin' snuggles from a handler? Do they have a soft side? And a few people wanted to know if they're just grumpy because, it's true, they have a lot of teeth but no toothbrush? Which is probably from a song or a joke.

Aside: Please see the 1998 cinematic opus *The Waterboy* in which Adam Sandler asks that of a biology professor. Also, may I suggest that Patrons Alexa Forsman, Kimberly Cooley, and Xavier Rivera consider getting three-way best friend necklaces for all asking the same question.

Also, really quick, crocodylians can make all kinds of sounds. They do kinda lusty pillow talk, some squeaky pleas for mom, and crocodile tears are not a myth. So, lets bust that flimflam that they're flimflam. I looked it up and alligator scientist Dr. Kent Vliet videotaped caiman eating gator chow and found that five of the seven animals teared up as they tore into their food. Some of their eyes were frothing and bubbling; some real Meryl Streep action happening over here. Nobody really knows why, but I like to think they are having a *Ratatouille* moment each time; just thinking about life, and love, and regret, and beauty, and rats.

Alie: Temperament-wise, what is their social structure like?

Laura: So, the females tend to keep to themselves. I'm only putting transmitters on males because they're more mobile than females. The females will just do their own thing. Usually if it's breeding season they'll stay near a nest or they'll just overall be more discreet. I definitely have had a male bias from what I trap too. I do think it's because males are just out and about. My transmitter animals are always on the go.

Aside: So, in winter months, alligators usually brumate, which is a less sleepy version of hibernation. But even on warmer winter days, they may kinda stumble out of their dens and burrows and soak up a couple of rays. It's November, and Laura says her gators are still cruising around like it's nobody's business. Except that it's very much her business; like, it's her job.

Laura: But they're also grumpy because they don't like being around each other. I get very nervous when I see that there's a movement overlap with my males because I don't want them crossing paths given how territorial they can be. Like I said earlier, Jabba didn't get beat up like that for no reason. They will fight for mates, they'll fight for territory, they just do not like each other [*"I actually just hate you"*] But, females are less aggressive and, like I said, they keep to themselves.

Some alligators will hang out together. We've gotten plenty of big eye shines out at night with a few almost looking like an adult pod. That's what they babies are called, a pod. Otherwise, they tend to keep to themselves. The babies, though, will for sure hang out near each other and it's really cute just seeing them all disperse when they don't want to be captured. But they'll stay in the same territory, whereas the adults will not do that.

Alie: Do they have maternal care as well, like crocodiles?

Laura: Yes. So, they will make little laser beam noises. We actually did some hatchling releases for a PhD student who's doing work with hatchlings in my lab. We found out that a female adopted some of the hatchlings that she released. When we drove up to add to the releases, all of a sudden we hear a giant splash [*splash*] and we see her coming near us. Not close

enough to be scared but she stayed about ten feet away so she could keep an eye on us to make sure that we weren't grabbing any of the babies that were already in that pod. It was really cute.

Alie: Aww! Can they run fast? If a territorial mother alligator were ten feet away from me, I would call a priest, I would write my will, I'd be like, "It's over for me." How fast can they get ten feet away from you until you're in their mouth?

Laura: I've only seen them swim. I've seen one walk in person, and they walk so awkwardly. But if I was in the water, that's just it, you can just say goodbye.

Aside: Remember, these gators can gun it up to 20mph in the water but just 11mph on land, which is pretty slow if you're trying to outrun them in a car, say. But 11mph is fast as hell on foot, people. Unless you smoke a Mountain Dew, there is no way you can pull a sustained five-minute mile to outrun an alligator which is hungry to chomp on your crotch until you die. And, you have less of a chance in the water, which might also be murky and maybe contaminated.

So how do these chonks haul ass when they don't even have asses? Well, I found a 2019 study titled "Divergent Evolution of Terrestrial Locomotor Abilities in Extant Crocodylia" which said that "extant crocodylia" (alligators, crocs) "are exceptional, because they employ almost the full range of quadrupedal footfall patterns," (gaits) "used by mammals. Including asymmetrical gaits such as galloping and bounding." In a word, they have moves. But yes, back to the way they slice through the bayou.

Laura: They swim so fast. We've had to try going after one, and we were in a boat just to snare it, and it was zooming away. It could have gone a lot quicker to make sure that it got away from us, but it was just gliding along, and it was still out running us. They're incredible swimmers. We'll be in the boat coming near one and they'll almost do like a dolphin jump... not quite a dolphin jump but they'll kind of flop over and death roll themselves back into the water because they get so scared of being around humans.

Alie: Aww!

Aside: Okay, by the by, researchers have studied the death roll behavior and I just spent way too long reading a 2007 *Journal of Experimental Biology* article titled "Death Roll of the Alligator: Mechanics of Twist Feeding in Water." It involved a slow-motion video of a few dozen baby alligators who had wooden coffee stirrer sticks – I'm going to wager money they were stolen from Starbucks – but they were taped to their baby gator tails to figure out that when they roll, the arms – I guess they have arms? – and legs tuck in like a figure skater spinning like a top. Then their tails angle out like an L.

Also, the paper said, "Spinning is a mechanism that can tear apart large prey by subjecting the tissue to torsional stresses. Animals and their tissues," it continues, "are weak in torsion." Which, if you just pictured an animal or yourself being shredded in a bog right now, you're not alone. If you are alone, please hug yourself.

Alie: And actually, tell me a little bit about their diet, if you don't mind. Kylie Caromba and Alena Reynolds both wanted to know about diet. Noah Sullivan wanted to know: Are they picky eaters? Bailey wanted to ask: Has evolution affected what they eat? And a ton of people; AngieB, Samantha Heinicke, Monica, and Elle McCall all want to know, first-time question-asker AngieB asks: I went on a swamp boat tour and they fed them marshmallows. Seems like a bad idea? Can they eat marshmallows? Samantha wants to know if they're addicted to

marshmallows. Are they bad for them? What's with the marshmallow habit they have and what do they usually eat?

Laura: So, I've been on two swamp tours. I do not know why they give them marshmallows. I've seen them give them hot dogs and that's like, "Okay, fine." But the marshmallow, as I've gotten in the crocodilian world, I'm just like, "Man, that's kinda insulting." That's an empty calorie that their poor intestines have to deal with.

Aside: Oh. I asked the internet, who has apparently asked people giving swamp boat tours, and it's because marshmallows look like eggs, like floating eggs, and they love eggs. So, imagine someone tossing you your favorite, hearty, healthy sandwich, and you took a bite, and it was mostly air, corn syrup, and boiled pig tendon. Ooh! Such a cruel bamboozle.

Laura: But, in respect to their diet, alligators are total generalists and I think this is why they've done so well through evolution. Their distribution in the Southeast is so wide because of the fact that they're really open to eating whatever.

When they're first hatched, they have a yolk reserve that basically lets them be set for about a year. They technically won't need to eat anything because once they hatch, which is around late summer, it is only a few months until they need to go through a brumation period, which means they're just not mobile during the winter. So, they rely on that egg yolk reserve to hold them over until spring and then they'll go for insects. When a reptile is really young, they usually need a lot of protein, so juveniles will still be somewhat opportunistic in respect to getting insects, amphibians, small fish like mosquito fish, and other inverts like shrimp or maybe tiny crawdads.

Adults, however, will just go for what they can get. We've seen a six-foot adult with a three-foot carp in its mouth. It looked a dog with a giant bone; it was so cool. So, they definitely love their fish. I'm sure plenty of people have seen crazy pictures of a crocodile jumping out of the water to eat a bird or something. Alligators will do the same thing. There are plenty of birds that try to predate on their nests, so they get their revenge when they're older. They'll go after mammals like deer, there's a lot of invasive hogs in the Southeast, so they'll go after those too. Snakes and turtles are victims, and of course alligators love to eat other alligators, unfortunately.

Alie: They do! Oh my gosh!

Laura: Yes. It's awful.

Alie: Ella Thompson wanted to know: Do alligators use spare offspring as snacks? Does that happen? How often do they eat each other?

Laura: Honestly, it seems like it's more frequently than one would like to know. That's mainly from what I've heard from my colleague, who's doing all this stomach pumping. She's found plenty of evidence of other alligators.

Aside: Laura says that sometimes alligators get reared in the lab, cared for, coddled, fostered, and are released into the wild, and they swim away like dandelion wishes in the water. And then sometimes an adult alligator will just breeze through and eat the babies like Pac-Man.

Laura: I wasn't there, but hearing it, I was like, "What is happening?? I can't believe they're that cruel." It's just a cruel world out there. I mean, it's like popcorn. They're just there and they swim so slow. They can't stay underwater that long when they're hatchlings. So, for a big

guy, it's just, like, a free for all if he finds the pod. That's why they need mothers nearby or else they're screwed. The mom can only get to them so quickly.

Alie: Oh my god, that's so heartbreaking. You're like, "We just raised that!"

Laura: I know! It's crazy because, realistically, by being hatched in captivity, we increased their survival by a lot. It's just disappointing when they're in the wild and it's like, "Well, that sucks."

Alie: [*dismayed*] Oh, so sad.

Laura: I know. Those poor sweet little babies.

Alie: [*sad baby talk*] I know. A bunch of people, Anakin Janiak, Euan Munro, and Jack Brownfield all wanted to know about their jaw strength. Euan asked: Why are they so rubbish at opening their mouths when they are arguably the greatest of all time at biting? When you're restraining them, when you're getting whipped around by tails, is there just duct tape around the jaws?

Laura: Yes. So, when we get an alligator, we pull it up onto land or onto the boat with its snare. Its snare is usually tied off to a rope and the rope is tied off to the tree or to the boat because we can't let the alligator go with that around its neck.

Aside: To help calm the animals, the first thing they do – either on the boat or on land is throw a towel over its head because once the eyes are covered, they kind of freeze. Some other people, side note, might subdue an alligator by rubbing their bellies. This is called tonic immobility. It's a little dicey. Don't mistake their chill for a spa day reaction: it's the animal's response to a threat. But the Laura and her researchers simply subdue the critter with a towel, and they work fast.

Laura: They just don't know what to do. Even if their mouth is open while the towel's over their eyes, they can't see anything. They don't know what to do. We just go behind them, and then put all our force on the top of their jaw, and then grab underneath it to restrain it. Someone, if not two people, will always be ready. I always have three rolls of duct tape and electrical tape on me just in case of an emergency situation. We get that mouth taped and then the towel usually stays on because it just relaxes the animal.

Alie: I can't even imagine.

Laura: The whole restraining process is just this mental communication. We just kind of know what needs to be done and go with the flow of getting the animal, reading its body language. Usually restraining them is a lot easier of a process now, especially that we have four people.

If you want to get an alligator to open their mouth, which I don't recommend to people doing, you just gotta boop the snoot. [*laughs*] When we want to get cool pictures of some of our bigger animals, we have a very long bamboo stick and we just tap the nose a little bit. Eventually they open the mouth. It works with the babies too. We just give them a tap with our finger.

Alie: I wonder how that evolved. Like [*wise old teacher voice*] "if something boops your snoot, you better open up."

Laura: I really think it's because they're opportunistic eaters. As long as they felt something touch their nose, they're like, "Okay, we'll eat you."

Alie: [*enthusiastically*] Ohhh my god!

Laura: “Good enough. You might be a marshmallow, but good enough.”

Alie: *[laughs]* No wonder they’ve been around for 80 million years! So many people need this flimflam debunked. Are they dinosaurs? Are they lizards? Are they neither?

Aside: So, alligators are a little newer, less than 40 million years old, but their crocodylian history goes back 95 million years. So, they were around when dinos were stomping about. But many Patrons such as: Rachel Selby, Justin McCormick, Keshie Naffa, Carley Cross, JV Hampton VanSant, Sid Gopujkar, Ginelle Baker, Jenn ‘squirrel’ Alvarez, first-time question-asker Rachael, Danae DeJournett, Mardee Goodwin, and Samantha Steelman all had similar questions. In Samantha’s words: Are they our dinosaur overlords meant to rule alongside the chickens?

Laura: They’re not lizards. There’s a whole evolutionary explanation out there for why they’re not lizards. It’s unfortunately because they’re more closely related to birds than I would like to think. They’re still reptiles, and reptiles rule.

Alie: Yes! So, not dinos and not lizards?

Laura: No, they’re their own special thing. The neat thing about crocodylians, they’re the only reptile to have a four-chambered heart. I mean, it makes sense because they’re so big, but birds also have four-chambered hearts, which is why they’re classified as archosaurs. They definitely have some cool adaptations to them that other reptiles don’t really have going on for them.

Aside: Is this a good time to talk about gator dongs? Too bad! Their dicks live just inside the cloaca and they don’t get inflatable erections: they have stiff, translucent white, collagen fortified perma-boners. Like a cocked a loaded gun in a pocket, or tucked in the waist of some jean shorts. Dang gators, y’all are ready for anything.

Now what about eggs? In the Cheloniology episode about ‘surtles’ (aka sea turtles), we learned that temperature can affect the sex of the babies, which would be like if your confetti explosion display at your child’s genital reveal party sparked a wildfire and your son suddenly turned into a daughter! Ew! Jk, that’s all gross. And as we heard in the Neuroendocrinology episode, endocrine chemicals can shape how we present, how we identify.

As always, my trans and nonbinary humans, nothing in nature is 100% binary and animals – including us humble humans – are gorgeously individual. That being said: what chemically does the rising temperature of Earth do to ancient eggs, asked Alexa Forsman, Forrest Stotts, Biological Anthropologist Dr. Lara Durgavich, Carrie Cimo, Andrew Schell, Vanessa Frey, Lauren Ahrenholz, Megan, and Ella Thompson. As well as first-time question-asker Kassandra Carlos also had an inquiry about adoption among the alligator community.

Alie: So many patrons on Patreon wanted to know about temperature, and clutch, and whether or not that switches the sex of the baby alligators. Does it?

Laura: Yes, they are temperature-sex dependent. They basically incubate as females at extreme temperatures. It’s typically taught that crocodylians require high temperatures to be females, low temperatures to be males. At our lab, we actually found that it’s more of the extreme. So, around 33°C, they’ll be incubated as females and over 34°C they’ll be incubated as females. Then, around 32.8°C, we’ll get males.

Aside: So, if you are an American, I see you out there staring out the window wondering how cold that is, and I also looked it up. Over 93-ish°F, you've got more lady gators. 91-ish°, more gator dudes.

Laura: One of the neat things about ecotoxicology, we're looking at how certain substances in the environment could potentially alter this, especially with endocrine-disrupting chemicals. They've definitely been found to cause sex reversal regardless of incubation temperature.

Alie: What is going to happen population-wise with that?

Laura: It could, depending on where the animal is at, cause a sex bias. That could cause a population to decline. Right now, I would think the bigger concern would be implications for climate change. Small plug for my lab – Parrott Lab at the University of Georgia – Samantha Bock in my lab, she's doing a lot of really cool research with temperature-sex determination, and potential impacts of climate change and endocrine disruptors on hatchling alligators.

Alie: Oh, that's so fascinating. What about in media? James Hales wants to know: How often do you notice alligators in movies that are presented as crocodiles (i.e. *Temple of Doom*)? Also, people asking how you feel about the show *Swamp People*. [from *Swamp People*: "We gonna do the alligator shuffle! Yeah Yeah Yeah!"]

Laura: I've never seen the show *Swamp People*, to be honest, so I'm sorry I can't give an answer on that. I'm basically my own swamp person. [laughs] That's enough for me.

When alligators are incorrectly portrayed, it definitely is triggering now that I'm aware of it. I haven't really seen media where an alligator is being used in place of a crocodile, but also I kind of get it because alligators are a lot gentler than crocodiles. I don't really blame them for doing that. However, I have seen the movie *Crawl* recently, [from *Crawl*: "There's two gators down here!"] and it's the most inaccurate portrayal of alligators I have ever seen in my life. It was just atrocious and I just had to keep watching it because it was that bad. It was like *Sharknado*, but with Florida alligators.

Alie: [exasperated sigh] Did they even attempt to get it right? Or did someone just land on the wrong Wikipedia page?

Laura: Someone just decided that 'alligator = scary' and that 'hurricane = alligators will hunt the humans'. That's literally the entire premise of the movie, alligators going out of their way to hunt humans. [from *Crawl*: "I couldn't save him!"] Like I said, if something boops their snoot, they're going to eat it. If these humans are just out of the way, these animals are not going to go sniff out and hunt a human that's a hundred feet away from them. That's just not how it works. However, hurricanes have seemed to be affecting alligator movement patterns, so there's that to be aware of.

Alie: Are they going more inland?

Laura: Yes. I've seen quite a few articles recently that have been showing all these alligators that have been in more urban areas in Florida from recent hurricanes. This is all new literature that's coming out about this with their movement behavior changing as a result of all these natural disasters. It's kind of scary because I can't imagine people handling it the best. They could potentially kill the animal because they're feeling threatened when the animal is just trying to find its way home.

Alie: Yeah. Does that happen? Does a lot of vigilante "I saw an alligator, ergo I killed an alligator" happen? And is it legal?

Laura: I don't know if it's legal. I know it's not in South Carolina and it's not in Georgia. Most people have to file a complaint and get animal control to come, and then they'll euthanize the animal, which, in my opinion, is a total waste of a life. That animal probably took 40 to 50 years to get to that stage of life and someone younger than it is shooting it because it's a "nuisance." There should be more effort placed into relocating the animal. Regardless, they're going to have a big group of people restraining an animal.

Aside: Sidenote: LA may have lot of famous couples, but perhaps none is more recently beloved than Tina and Reggie. Tina was a saucy single career alligator who lived at the Pasadena Humane Society for 18 years but recently outgrew her digs and was moved to the LA Zoo. She was set up with her new companion Reggie. Reggie was a pet abandoned in a lake by an off-duty LAPD officer who must have lost his damn mind. I don't know what he was thinking!

Anyway, Reggie went on to eat ducks and stuff and evade authorities – including Steve Irwin himself – for several years, costing the city nearly \$200k on the pursuit. One fateful day in 2007, he was basking and they captured and sent him to LA Zoo. And he busted out immediately! He was found chillin' on a loading dock, probably trying to buy weed from a zookeeper. But now Tina and Reggie, both abandoned pets in their 20s, they're cohabitating. They get along *swimmingly*, although they are in a state of mutual friend zone. There's no humping. But if they have babies, or Reggie eats someone, TMZ better cover it. I am invested.

Alie: Ever been bitten?

Laura: Yes, I have. By a one-day hatched alligator baby. Its teeth didn't even drop yet.

Alie: Aw! You got nommed on!

Laura: It was so cute. I could not let it *not* bite me. She was so feisty. We found that our hatchling babies were a lot feistier as females. I respect it. *[laughs]* The males were so chill and never opened their mouths at us, and the females just needed to be stared at and they would just start doing the *[alligator hiss]*.

Alie: Little lizard babies! I love it. Not that they're lizards.

Laura: Yes, exactly. They're basically lizards at that size. *[laughs]*

Alie: Okay, what do you possess? Do you have an alligator key chain? Do you have alligator t-shirts? Do you have an alligator nightlight? What types of alligator paraphernalia have you been given or have you purchased?

Laura: It's funny that you say that because I'm literally wearing a gator shirt right now that says, "Murder Log." *[Alie laughs hysterically]* So yes, I have the most intense collection of gator stuff. I just love anything herpetofauna. Ever since starting alligator research, that's all I want. My sister, for my birthday, gave me a bracelet that's gold with a little alligator on it and then tiny gator earrings. They're very subtle and discreet and I absolutely adore it. And I have a mask from... I don't know if you've seen them on Twitter, @GatorsDaily. He's this really big gator account and he puts the best gator memes out. I purchased a beanie with an alligator on it recently because I love beanies. So yeah, it's a bit much. I'm like that crazy cat lady but with gator stuff.

Alie: Oh god, I love it. That makes me so happy. Okay, one more Patreon question because I would never forgive myself if I didn't ask this. Several people, a shocking number of people, Alanda Kohl, Natalee Bates, Zoe Jane, Evan, and Teagen Andrews all want to know: What is

up with meth-a-gators, or meth gators? Drugged up gators from people flushing their drugs down the sewer? [*Alligators in the sewers.*] Is that part of ecotoxicology?

Laura: I mean, yeah, unfortunately. I feel like when the whole bath salts thing in Florida was going on I heard a lot about this, but thankfully I haven't heard too much. The Everglades just has like a weird amount of contaminants. Honestly, alligator ecotoxicology kind of was birthed because of the contamination going on in Florida. I haven't heard of meth gators, but from a scientific perspective, I would think that alligators that ingest these drugs would just be really delayed and slowed down, but I don't think it would kill them because they're just rocks.

Aside: It's true. In Tennessee, public outreach was launched begging people not to flush their illegal amphetamines because no one needs meth gators on their 2020 bingo cards. Laura says it would take a large amount of that toxic substance to actually kill this animal when it's full grown, and also the toilet meth is very diluted by the time it reaches a water source.

I do need you to know, however, that there is a python in New South Wales, Australia who was addicted to meth because it lived with, shall we say, a drug salesman who smoked it and it seeped through the python's skin. The python was described as very aggressive, but they literally sent it to a herpetology rescue, located in a prison, to be rehabbed, and it's fine now. And I love it and I'm proud of it.

Laura: It's really unfortunate how this affects reproduction and the embryonic stage versus adulthood. These animals are pretty sustainable as adults.

Alie: Hmm. I guess maybe don't eat alligator if you've got to pass a drug test, just in case. [*whispers*] That's probably not true. [*both laugh*]

Laura: You never know.

Alie: You never know. Okay, in all of this, you have had bugs in your head. You've been yeeted by a tail. What is the thing that sucks the most about being an alligator ecotoxicologist? I'm going to guess it's not those things, maybe?

Laura: No, not at all. I think for me personally, I have to spin my blood samples and put all my data collection away in its respective places after I get back from the field. And this is around like 4 or 5am in the morning. And my brain is just like... doing a blood smear is harder than most people would think. And I mean, I've gotten good at it because I've had to do it a bunch of times, but having to have this part of my brain turned on for the sake of just getting my samples processed, I think is one of the harder parts.

My adviser, Ben Parrott, he's amazing. He'll always check up on me and make sure the next morning. He's like, "Are you okay? Did you get home safe?" Or before I go to process my data, he always asks, "Are you okay? Are you too tired or something?" And I'm like, "I'm fine, I can go do it." Because it's just like... it adds an extra hour to the night. And so, depending on what time it is when we're done with the field, it tends to be a process because I either have to drive a boat back to our field site – unclipping the boat from the truck in itself is a process – getting my blood samples spinning. And then sometimes I'll just take a shower onsite - thankfully, we have showers - while it's spinning so I can be able to just go home and go to bed because there's no way I can go to bed all grimy.

Alie: I can't imagine a worse way of getting into bed if you've been literally wrestling alligators, dealing with raw chicken, in an area that might be contaminated with nuclear waste. There is no way of getting into bed grosser than that.

Laura: I hate cooking raw chicken, and I've always hated cooking it, and I hate cooking it even more when it's alligator bait. I used to wear gloves when handling it. Now I'm just like, "I don't care at all."

Alie: Me too. I always just feel like it's a ticking time bomb of all kinds of stuff. And now, this has gotta be so hard, but your favorite thing about alligators. What do you love so, so much about them?

Laura: I love their overbites. That has to be my favorite thing, their overbite. I think it's so cute. I love seeing... I call them their 'teef'. *[laughs]* Even if it's a big one and we're restraining it, I'm just like, "Look at your cute little teef!" Mine have very nice teeth. I know, like in the Everglades and in a swamp called Okefenokee Swamp in Georgia, my colleagues have told me that their teeth are black and that they're pretty gross looking animals. Whereas I think mine are just really cute. And a lot of my animals that I've trapped on the Savannah River Site are really just, like, fat... not like overweight fat, but they're just... They've been eating good. And so, I just love their morphology. Just seeing, like, how well fed they are and their cute little healthy teeth and everything.

I love that their jowls just kind of ooze when we have them restrained. I'll sometimes just kind of pinch them. *[laughs]* These poor animals being patronized by me. I'm just like, "You're just so cute!" [*Just a cutie patootie!*"]

Alie: Well, this has been amazing. I absolutely love alligators more than I ever have before. Thank you so much for letting me ask you so many shameless questions.

Laura: Thank you for having me. These are like my favorite questions to be asked.

So, ask badass, curious people ancient, scaly questions because they light up like river fish. Also, Laura asked that I include some shoutouts to her amazing advisors; Drs. Ben Parrott and Tracey Tuberville for their guidance, Dr. Thomas Rainwater for his expertise and help in all aspects of this project. Thanks for the awesome help she's gotten from her lab, especially from Samantha Bock, Junsoo Bae, and stomach pumper Kristen Zemaitis. So, thank you and hello to the lab!

If you're like, "Boy howdy, I want that life!" I just saw that Dr. Ben Parrott's lab has a job opening for post-doc, and I will link that in the show notes. What if? What if??! Take a chance.

You can follow Laura Kojima on Twitter @[LauraKojima](#), or Instagram @[Laura.Kojima](#), and there are links to that in the show notes as well as links to everything we talked about. That's all up at [AlieWard.com/Ologies/AlligatorEcotoxicology](#). There is a link to that in the show notes too.

We are @Ologies on [Twitter](#) and [Instagram](#) so you can follow us and see photos of Jabba, the traps, the teeny tiny gator that nommed her finger, and more. I am @AlieWard on [Instagram](#) and [Twitter](#). Come say hi! Those are linked in the show notes too. Hi to the folks on the Ologies Podcast Reddit community, I understand there is a Discord as well. I will google how that works.

Thank you to Erin Talbert for adminning the [Facebook group](#). There is a merch available at [OlogiesMerch.com](#), and thank you Shannon Feltus and Boni Dutch of the comedy podcast *You Are That* for managing it. They're so funny. Thank you so much to all the Patrons at

Patreon.com/Ologies. You can join for a dollar a month, and you can submit questions to the ologists, and you can find out what topics are coming up next.

Emily White and the volunteer transcribers put these sounds to print, and those transcripts are available for free for everyone at the link in the show notes in case you know anyone who is deaf or hard of hearing and a science lover. Thank you to Caleb Patton for bleeping episodes to make them kid safe, also available on the website. Jarrett Sleeper is the assistant editor, and this week I would like to acknowledge his beautiful grandma Kay who is no longer with us but will never leave our hearts.

Faster than a speeding gator, Steven Ray Morris, is the lead editor and sews all these pieces together each week and he also hosts the cat-themed show *The Purrrcast* and a dino-themed pod *See Jurassic Right*. Nick Thorburn wrote and performed the theme music and he's in a band called Island.

If you stick around until the end of the credits, you get a nugget of truth, a secret from the boggy depths of my swampy heart. This week it's that, for some reason, these asides took so long to record because I kept messing up. Also, I remember once in seventh grade my sister was eating Frosted Flakes. She came into the room and we were watching MTV or something, and she was like, "Hey check this out. Try it with half-and-half instead of milk," and I was like, "WHAT?" I went and did it and it was the most indulgent, delectable thing I had ever had. And sometimes if I'm at a hotel breakfast bar and they have Frosted Flakes I'll use the half-and-half creamers on it. Luxury.

Okay. You're great. Until next week. Berbye.

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