

Hey, all you fish enthusiasts out there. Whether you're an avid angler or just curious about fish, we'd like to welcome you to Fish of the Week!, your audio almanac of all the fish. It's Monday, February 28, 2022. And this year, we're excited to take you on a week by week tour of fish across the country with guests from all walks of life. I'm Katrina Liebich. With the US Fish and Wildlife Service and Alaska,

My name is Guy Eroh and I really really, really, really, really, really, really like fish. Like 'em all, big and small. Cause I like fishing for them at the National Mall. The rhythm doesn't really work, but it rhymes. And we got ourselves a DC fish today.

This episode is all about snakeheads. And our guest is fisheries biologist John Odenkirk with the Virginia Department of Wildlife Resources. Welcome to the show.

Thank you for having me, Katrina. Pleasure to be here today. And always happy to talk snakes. I can talk snakes for a long, long time.

Awesome. Well, we got a good hour, so we're hoping to talk about them for a long time with you. So I'm going to be honest, I think snakeheads are pretty cool looking fish, and I'm guessing you've handled quite a few of them. What we'd like to do for our listeners first is just have our guests describe what they look like. If you were to have one of these in hand. I know there's maybe a few different species we're gonna be talking about today. But what do they look like? How big are they and do their heads actually resemble that of a snake?

Okay, so what a snakeheads look like. They look like a bowfin. But a lot of people don't what a bowfin looks like. They're cylindrical fish kind of torpedo shape. They're long. They're very slimy, which has to do with their ability to withstand being out of the water for extended periods of time. So they're cylindrical, slimy, hard to hold really hard to even try to hold an eel. A lot of people kill eels thinking there were snakeheads, which are because they really don't look very much alike. But to some people I guess they do. And they get fairly large. We're talking about because of the body shape the dimensions, we're talking about a fish that could be like 36 inches long, and weigh in the neighborhood of 15 to 20 pounds maximum size. Typically they're more like six pounds and 24, 26 inches, something like that. But as you can imagine a long skinny fish like a gar, kind of that shape, but more cylindrical can be really hard to get your hands on. So we recommend bring some boga grips or some other method to hold because you don't want to lip on like a bass either of you bad idea They're hard to hold.

They got some sharp teeth.

They do have sharp teeth. Yes, you don't see a lot of freshwater fish with teeth like some lot of saltwater fish have but the exception might be the Ecocids: the northern pike and muskie group. They have some pretty nice sets of teeth, walleye pretty good sets of teeth. Snakeheads as well, obviously, you definitely don't want to lip a snakehead.

And they got some really neat looking kind of bigger scales on their head. I mean, they do kind of look like a snake in terms of what their face actually looks like.

The patterns are very cool, especially immature fish, a lot of times it seems the colors and the patterns are much more vibrant. And then on females as well, which is it's always kind of confused me. Because in like a bird world of fish world, typically males are going to be a little showy, or just attract males. We have seen repeatedly the biggest individuals and the snakehead population are almost always males. They get huge heads like catfish. And they get black. They just they lose their patterns. They tend to get kind of skinny, so they go really long, skinny. But when you look at a female now, female snakeheads are gorgeous fish they have a iridescence about them like a purply bluish iridescence especially when they're fresh out of the water. When they're younger, even two and just wonderful patterns. And especially on the head. If you look at the way those bands come across the eyes, the very small eyes pig eyes. But those bands sorta conceal where that eye location is because of that pattern. You look at the fish and it does look a lot of people say wow, that looks like a snake. I much prefer the...I think it's Japanese "akamaruchi" which I think akamaruchi's a much nicer name, it probably would do better and markets for snakeheads. Probably better than Korea, they call it mudfish. I mean, that doesn't sound overly attractive. I think akamaruchi is probably the best.

04:11

That's funny that they call them mudfish. Because you brought up the bowfin over here I've heard some people in the US refer to bowfin as mudfish. So you kind of got these two fish with similar looking bodies, similar sort of lifestyles to them that get the same common name despite not being actually related to one another.

04:28

Exactly. Yeah.

04:29

Burbot kind of looks similar too. Are there any other fishes people should be aware of that are native to America and North America, and just how to not get those species confused?

04:41

Well, we've got a really nice post on our website, just dwr.virginia.gov. Once you've seen one, even if it's a picture of you know, educational material, it's pretty easy to discount in the field and this is not that animal. And only really the only time people should have problems if it's above, and that's the only thing that even comes close and then just look at the anal fin. And all the bowfins gonna have that spot too typically down near the caudal, the tail fin. But the the bowfin has a very, very short anal fin was a snake. It's a no fins very, very long almost mirrors the dorsal fin. So right away, you can just make that key distinction. You know, bowfin, snakehead, done. Snakeheads, they have an ability to colonize. One of the ways they colonize is to go down river on freshets. So, say the tidal Potomac, we've got tidal freshwater. The further down you go towards the bay, you know, there's a salt wedge. Salt's denser water and so it's underneath, and so the freshwater rides down. But when you have a hurricane or tropical storm, you have this tremendous influx of fresh water coming down into an estuary, then the snakeheads will ride that down and get to an area where they probably couldn't have gotten to previously and then once the floodwaters start to recede a little bit, the snakehead realizes that and looks for near the nearest tributary with some fresh water coming in and work your way up in there and holds again and maybe reproduces or maybe waits for the next freshet to leapfrog down a little bit more

and so because of that sometimes you find them in areas of salinity. And one of the more common things that we've had recently people calling and saying I got a snakehead it was a fish called an inshore lizard fish.

I've seen those. Yeah, those are cool.

But others for freshwater, basically, it's eels or bowfin.

And eels have that kind of snake shape. But yeah, very different fish.

Yeah. eels are much more snake like then than bowfin and snakeheads.

So we've kind of been shifting back and forth in this description, which I do think is a really good description you gave there. I really loved your enthusiasm, but kind of shifting between the snakeheads as a group, and then the specific species that you guys got there in Virginia. Now, you mentioned that these fish, they're native to Asia, and especially Southeast Asia. But what if you're up in Virginia, what species are you going to find that's been introduced there?

06:58

So we're talking about the United States, including Hawaii, there's only three species that we know of that have actually self sustaining populations. Almost all of them, including this huge conglomerate we have in the mid Atlantic or Northern Snakeheads. That's Argus species. South Florida, as you mentioned, you were lucky enough to catch one of the bullseyes. They're much smaller population down there and not abundant at all. And then in Hawaii, they've had for years over a century they've had, it was a Chevron and originally I think was misidentified as either blocked or chevron. So there's a Hawaii species, the South Florida species, and then Northern. And because of northerns, life history, attributes and their ability to tolerate cold conditions, they're the only one of all the more than two dozen Chana that could essentially colonize the entire lower 48. And they will I believe over time, there's not much to stop them. They're very good migrants on their own, and people are illegally moving them. So you combine two things. And that's what I tell my peers and you know, nearby states, you can't say exactly when but they will be coming.

And how did they get here?

Well, we know for sure this, the northern showed up in a stormwater pond in Maryland, and often a small town in 2002. There's different ideas about why these fish get released. Some of its medicinal, supposedly that the ones in Crofton, an individual had bought these because they have reputed therapeutic healing properties and bought them for a sick family member. And then she got better and he didn't want to kill the fish. So he dumped them into the nearby which happens all the time with piranhas and pacus and oscars and take your pick. So you know, we try not to let people do that or recommend they don't do that. But it happens anyway. So anyway, that was one isolated incident that we had in '02 in Crofton. The next year, we had a very similar incident in Wheaton, Maryland, and another stormwater pond. Another weird thing where somebody just let a fish or to go for some reason. And then all of a sudden, it seemed they spawned and found each other and had a good population

there. Well, these were just isolated small stormwater ponds. And because of genetics work that we've done, we know that those two isolated populations were not connected to what broke out in the Potomac system in 2004. So this was a completely different genetic makeup. And based on the age structure, the few fish we got in '04, it looked like probably around the year 2000, somebody had released a small group of fish, and you know, a couple of them found each other and then we're off to the races. So now, because of that one population that was established initially at the epicenter near Mount Vernon, George Washington's home they're just a mile below DC, so many areas of the Mid Atlantic now, you know, large snakehead populations because of those individuals moving out, you know, from the early colonization.

What part of the Potomac are we talking about? Are we talking about like when I think of the Potomac I think about like Little Falls up in the DC area really fast, really narrow kind of water where you can throw a rock across it. If you want to, are we talking like lower downward starts get slower flatter wider

Right yeah so habitat is the key here. Snakehead habitat when you look at a continuum of a river system like the Potomac you know from brook trout headwaters in the mountains you know getting larger and larger and then the smallmouth sort of habitat with a high gradients. Boulders and the rapids and then you hit the fall on the sluggish vegetation-choked, silty, mucky stuff. Okay, it's the last part, the silty, mucky, vegetative stuff. That's the snake and habitat, okay, they're gonna go through all those other habitats. We found them...I'm here at my home near Sperryville, Virginia in Rappahannock County, we've got the Hazel River, not far from here, which is a trout stream. And a couple times, in the last few years, people have gotten snakeheads up there. And that's just because they managed to get all the way up there. I don't even know what they're doing. They're just trying to go, then they don't do anything. The ones that are they the advantage, because that's not their habitat. They don't want to be in that cold high gradient water with no vegetation and rocky gravelly substrate, that's not their primary habitat. So it's sort of like if the habitats there and they have access to it, they'll colonize.

As a biologist, like what kinds of questions you trying to figure out about these fish, we know they're invasive species. They do well, apparently, you spreading and populating a bunch of different habitat types, what questions are you trying to answer? And what questions do you still have about these fish?

We have learned a lot. Basically, when this thing broke, and '04, there was almost no information. There were no peer reviewed journal articles. There was very limited published information on any aspect. And you would think, based on the hysteria that was heaped on this introduction, that there would have been copious literature suggesting the evilness and the destruction that was the sort of forecasting. And so we said about talking to other countries and states trying to figure out, you know, where they were, what had been the net? What was the result? And early on, you know, talking to folks and biologists in Japan or talking to biologists in Hawaii or South Florida, when we could actually speak with somebody who had Manistee kids for any period of time, we started hearing the same thing. Well, what do you mean, what's not a problem here? And we're like, wait a minute, I thought they were supposed to destroy everything. And that was based on a comic book strip and something that got repeated and then just sort of became gospel, we started doing a lot of investigations. And of course, the big thing was, the tidal Potomac River is not just national but international large mouth bass fishery tournament fishery guys who make a living, you know, on this river. It's a fish factory, and largemouth

bass is the bread and butter fish for these recreational anglers up and down, you know, miles and miles of the freshwater system and all the tributaries, it's a network. And so this is a huge controversy. Oh, my gosh, snakeheads are going to destroy this bass fishery. And so that was the first thing we started looking. What's the snake and population doing? What's the size structure? What age structure? What's the bass population doing in response to that? What we have found out is a lot we've nailed down the aging growth. We've nailed down a lot about spawning behavior, maximum size, movements, there's still a disconnect in the early life phase. When it's young are first hatched there's sort of a disconnect between what happens and what creates a really good year class from a poor year class. And so we're trying to figure out that now, the early life history aspect of it, the spawning the periodicity of this morning, it seems like there's a peak in the spring and a peak in the late summer. We took a group from discovery channel out in January a year ago, and they were so desperate to see a snakehead. I told him I said, we're not gonna find. It's January these fish are hibernating, they're buried in the mud. They're not active. They were so insistent that we went out we had to go anyway for something else. So we went out and this one Creek but we knew we had some good vegetation, Eurasian water milfoil doesn't break down like a lot of the other plants. So if there's any snake it's it's gonna be in this one Creek, we still have a lot before we went in this creek. The water temperature was like three degrees above freezing. We start rolling snakeheads. And they weren't coming out of the mud. Either. When you pull them out of the mud there's just caked mud in their gills. And you know, the slime is encrusted? It's, it's kind of wild. But these fish were not coming out of the mud. And we were scratching our heads. What are these fish doing in late January, in water this cold? I mean, that's just an example. We'd have figured a lot. But we're still we're still learning we're probably still will be learning for another decade.

What are you finding in like diet studies? I mean, what are these fish eating typically?

That's a good question, an important question and one that we have nailed down. This snakehead is the epitome of an opportunist. It will eat, when it's hungry, it will eat whatever is in front of his face. We found well over 20 different species of fish in the snakehead guts as well as reptiles, amphibians, bugs. And so what it eats is largely a collection of what's in his habitat. And what is what is its habitat, very shallow, vegetated water. What type of fish are on those systems? Well, if you're in the tidal Potomac, it's banded killifish. It's a little fundulus minnow, you use them for striper fishing because they stay alive really well. If you're looking in reservoirs where we have a warm water, typical community, bluegill, the Centrarchids, that's sunfish family, bluegill, redear sunfish, pumpkin seed, sunfish, all those lipomis group sunfish sort of round. You know, in for snakeheads, you're looking at a fish. It's anywhere from two to three or four or five inches big. And they're sucking those bluegill or pumpkin seeds down. So whatever the most abundant fish is, wherever it is, is what is going to be eating? They're classified as a vertical thrust predator. If you think about a fish, it's kind of camouflaged. And then it just waits for something to swim right in front of it, yeah. And then it just sucks it in. Literally snakeheads, I don't know why they have teeth. Because I have removed 1000s of food items from snakehead stomachs. And I've yet to see one that was perforated or in pieces, or had marks. And they create like a vortex, so come up, and they have this huge air bladder that runs from right behind its throat all the way to the tail. And it literally looks like a Cuban cigar, its metabolism gets slow. It can go down in the cold bottoms, and just wait buried in the mud or just wait for conditions to improve And it doesn't have to come up to gulp air like it does when it's 90 degrees. There are really extraordinary fish.

I'm curious if you could talk a little bit more about we kind of glanced over that. I remember back when I was a kid in Utah kind of YouTube had just sort of come out and watching all these videos about this Frankenfish. This species that's kind of the ultimate invasive, what features of its biology and ecology made people worry about it so much. And it's gonna just take over the world and then talk about like the bass fishery in the Potomac. What actual effects have the introduction of snakeheads had on those kinds of fisheries?

Okay, good. Two questions. I'll try to remember. First off the attributes. Okay, so I just mentioned one attribute that really scare people, obligate air breathing. You can put this fish in burlap sack, throw in the trunk of your car and drive to California, it probably won't be alive when you get there. That freaks people out. The other thing that got totally overblown was they're believed to walk. Okay, that was that's one of the things that really drew people bat crazy. And we were getting calls at the office in '04, '05 into '06. People didn't want to walk their dogs near a lake because they were because they'd seen the movies, and they're certain that the fish was going to come out of the lake and walk over and, you know, eat their dog. I mean, just, this happened multiple times. So yeah, the ability to walk which was not true. The ability to breathe air, which was true, the multiple reproduction, okay, because typically, the predators in that are, you know, at that trophic level that niche, whether it's a largemouth bass, a bowfin or a snakehead, most of those fish spawn once a year, you start sneaking in the mix, multiple spawn, that's another thing, that kind of mess with people, because if they're obligate air breathers, they don't care about water quality, right? So they can live in the most stagnant oxygen devoid environment. And they do, you're not gonna find any other fish, any self respecting fish is going to be in, you know, 95 degree water in the middle of August, you know, it's a foot deep, but you'll find snakeheads there. So those are the some of the really scary things, I guess.

And then they just the big unknown, I think was most of it because like I said, we didn't have a lot of information. So it was a lot of conjecture and fear and theories about what might or might not happen. So what we have learned though, I presented data from 10 more than 10 years, puts in 20 years now, of large mouth bass and northern snakehead population trends in both the title Potomac and the title Rappahannock systems. And what we were able to see over the time the snakeheads colonize those waters. Our bass fisheries actually got better. When it's good. For one, it's good for the others. So during this period of time, when we had snakeheads colonizing these tidal rivers, we also had good conditions for everybody. Meaning we didn't have droughts, we didn't have floods, we had good abundance of habitat in terms of aquatic vegetation, whether that was native or non native. really matter. Hydrilla, snakeheads, love hydrilla, bass love hydrilla. It's not a native plant, but great habitat. And we go out and we're looking at relative abundance, that is how many fish are there? We use a metric called per hour of electrofishing. So we're out fishing for bass, we're catching maybe around 100 an hour. That's a that's a high level of fish. That's a lot of abundance of bass. And that's a good abundance. So that's what people are accustomed to. And the Potomac River, we're talking about snakeheads now. At the height of this thing. And most of these creeks we won't even at 10 an hour. And now we're back in the single digits and most of these creeks were like, two, three an hour. That's not even on the radar doesn't even show up. Part of it's exploitation. That's a huge part of it. Commercial and recreation. These fish were being hammered. Archery, hook and line. They're being sold for market, people making money on selling these fish and people love eating. exploitation is no

doubt I help to flatten that curve. I think we pass the heyday of snakeheads here. And I've had anglers asking, begging to conserve them, you know, we need a bag limit on them, we need to put a size limit on them. You need to stop these people that are bow fishing for them. And right now it's wide open season, they can go kill as many as they want. No size, no bag limit anything. And at some point, that'll be revisited probably not anytime real soon, because there's still a lot of fear about them getting into other systems and doing other things. Or maybe the productivity is not as high. Maybe there's an endangered species. So there's still legitimate concerns about other systems. But I think what we've seen now, the systems where they are, I'm not overly concerned.

Yeah, it's interesting, I mean, invasive species, they each have kind of their own story. And it can take a long time to figure out what that impact is. We don't want to be, you know, having fish that are from elsewhere, replacing our native fish. But that is an interesting kind of facet of this story that there is information being found out over time.

So you did mention that, you know that there's lots of people out there who they just want to catch fish that around fish that will fight hard fish, they'll taste good, and they don't care so much, whether it's native or not. And I thought was really interesting going out there, I kind of had this frame of mind that okay, people are probably not gonna like the snakeheads. But then I was talking to like the guy who got me on my first couple and stuff and seeing all these Facebook communities that have come up like the snake head outlaws. And all these guys has really kind of become a sport fishery, that people are really feeling like they have all this camaraderie around going and fishing for snakeheads. And so I was wondering if you could speak to that a little bit, and then how that fits in with your role as a state biologist.

Yeah, honestly, it's been a little difficult for me because I see exactly what you're describing. In fact, most people see exactly what you're describing, there is a tremendous excitement that has grown up around this fishery. It it went from being sort of a cult classic to being just like the hottest thing in fishing in kayak anglers because, you know, true snakehead, aficionado hooking line person, it's really only going to be able to really get into good snake and fishing in a kayak. And that's simply because of the habitat, you know, I mentioned a foot of water, you can't get a bass boat, you know, back into most of the areas where the the numbers there are left because they have been hammered. And so that opens up, you know, sort of the refuge, if you will for the kayak anglers canoe, maybe but most of the series, Snake anglers are going by kayak. I mean, you can't draw up a more desirable sporting food fish. I mean, it's so fun, it just check all the boxes. And so you don't want to promote that I've been accused of promoting them or the fishery or whatever too much and it's not my intention, or I don't really want to promote that. I mean, everybody's doing a good enough job on their own. But at the same time, I'm not gonna lie about you know that. So if somebody's asking why they get to eat yes, they're really good to eat. I've even heard so my wife even she couldn't get past him for a while. But then after all her friends kept saying tell her how good it was. He's she's all in

I was so impressed by how long those fillets were too. I was expecting the guts to go much further back I mean, you do have that long swim bladder that you're talking about but the users that that's like all meat in there

Snakeheads feat. John Odenkirk

It goes for close to \$20 a pound and from what I understand I haven't talked to any of the commercial wholesalers recently but for a long time they just couldn't keep up they weren't getting enough product to meet demand what's going on reason the price was so high the point I can make my boss is that you know most agencies are invested in this R3 thing now

Recruit retention reactivation

Right I mean this this fish is a poster child for our three. People are so excited we have created so many new anglers people will never fish want to go out and catch snakeheads and it's sort of like oh we should be taking advantage of this you know this is this is really fueling a fishing resurgence. So it's a difficult from a biologist perspective I guess to try to hitch your wagon to that ride you know as much as you can without overly promoting it which is sort of the spot we find ourselves now.

You know people who are if they want to go out and fish for them you know kayaks, good way to do it. But what kind of techniques are people like...throwing Luers are people doing it on the fly? Bait fishing? What are people use them to try and catch these?

Yeah, so if you ever see a picture of me with a really nice snakehead and I'm holding the fire up, and that was staged. They get on that fly rod and fly. I have talked to people that have caught them on flies. Now it's not easy, because most of the times if you see that fish it's hard to say fish form because they are spooky. The exception to that maybe when they're guarding they're much more aggressive when they're guarding their young which they you know they do. That's another attribute that makes them much more vulnerable during that typically late June into early July mid July window when they're actively guarding fingerlings. What I tell people is just fish like your bass fishing, except fish shallower. Because if you're not in the weeds, you're probably not gonna catch snakeheads. They're going to be in vegetation. So you know like a Sanko like a five inch Sanko with no weight on it just get like a four ot hook or something. And just jig it around in there. When it gets hot, I love to top water frog, also one of the most common and beloved baits for snake heads. We've only seen a couple frogs in food, you know, it's dietary items in their stomachs. But apparently they do like frogs. And that's a good bait. Chatter baits early in the season before the grass gets too thick. A lot of people like to throw a white chatterbait seems to be really effective on snakes.

You gotta use a wire leader, or are people getting away with just heavier like six eight pound tests, maybe 10 pound?

Yeah, I use braid. I mean, I just tie my braid straight to the lure and use like, you know, 20 pound braid. I haven't been cut off by a snake I know other people have, but I have not been cut off.

So you mentioned they can kind of survive that car ride home. If you're gonna cook them. What's your kind of preparation process? How do you cook them? You have a favorite recipe?

I absolutely do have a favorite recipe. What's the first let me say about Yeah, when you catch them. So what we do when we're when we're serving as we just put the fish in an ice bath. And essentially they drown under the weight of the fish on top of them, they can't gulp. And within an hour or two they

usually succumb in the ice bath with a lot of fish and that huge one of those huge charter boat corps. Anglers can't do that because they technically be possessing alive snakehead. So catching the fish and releasing it it's not possession so if you want to catch and release a snakehead, that's fine. Once you take possession of that fish, which means you put it on a stringer or put it in a cooler, a live well whatever it has to be dead. And they're not easy to kill problem especially if you got a nice bass boat or carpet on it. You know, last thing you want to do is to slime it

I was hitting mine in the head with a hammer and they'd start kicking in I guess I was illegal because I had them on a stringer, but they'd start kicking again. And I I felt bad because you know, I'm not out here to harm animals. But I tried my darndest to kill them, but they wouldn't die.

They're hard to kill. There's no question. There. I've called them bada\$\$es before and they pretty much are bada\$\$. So anyway, yeah, it's just however you can try to kill them. I don't know that anybody's ever been written up for taking one home to eat that wasn't dead. At some point, it might happen. So just be aware of that is the law everywhere I think not just Virginia. So once you once they're dead, and you fillet them and cook them, so there's not a bad way to cook a snake. Do though. No ceviche, well, ceviche I guess would be okay, no sushi, because they do have a lot of worms or can have a lot of worms. So I love them fried, grilled, baked. Just as simple as put a little olive oil on them and some Old Bay. I mean just you can't do anything wrong. But my favorite way my wife's favorite way is to steam them with a little bit of sesame oil, scallions and finely shaved ginger on top and some chili flakes and flips over rice. And that is that's like a true Thai dish. And it's very, very good recipes with a guy on Meat Eater. Kevin, the chef there and he had coconut oil, some coconut milk and that was very similar recipe and it's quite tasty.

Right on. What kind of fillet can people expect? Like what other fish might this be similar to?

Yeah, that's a good question too. Um, it's really like no freshwater fish. It's such a thick, firm, chewy kind of meat. And the other thing about it is almost no oil in a cold part of my refrigerator. I've kept snakeheads fillets fresh for two weeks, and they're fine. You know, you put red drum or any, you know, pick some other fish, try to save that for four or five days and it turns into source you know, nasty stuff. But because of the low oil content, and the way that the flip the flesh is just amazing. It's a it's more of like a swordfish steak but without the oil on the surface they can have I've equated it the consistency and the texture porkchop almost on a grill. If you dry rub it and grill it, you know, almost kind of like a pork chop consistency. From a culinary perspective. You know, it's definitely better than for me than crappy. Or while I you know, crappy

They're pretty good.

Those are yeah, those are high standard type benchmarks in other parts of the country.

But I don't know it. I don't think there's a better freshwater eating fish as one of my favorites that I've had.

Is there anything else you'd like to tell the public about this fish in the context of this fish itself? And also just invasive species in general, like any final messages for folks?

Well, you know, when we're talking about invasive species, well, the point I try to make when I talk to people is you can't paint all invasives with one brush. All the bases aren't the same. And so we have to look at each one individually and determine the best way to manage and part of the reason I say that is because I've seen what I call invasive fatigue among some of our constituent groups. Now we're dealing with the physical Alabama bass. And it's bad. And I don't think they're going to believe us as much because we haven't seen the disaster that was forecasted for the snakehead and where we have verifiable issues of ecological harm, such as Alabama bass, that that that's concrete. That's been proven. That's, that's in the literature. And so hopefully, we won't have that for snakeheads. Maybe we will, but moving forward, I think we will just continue to learn and we'll just if necessary, but we have to manage it. As we can, you know, one basin in time as it comes.

It sounds like a pretty nuanced fish. And I guess just tips for folks. I mean, just the common pieces of advice. You know, if you have a pet fish don't release it. Yeah, moving fish from water to water, bad. But yeah, I appreciate that nuanced kind of view of this fish that you've given us. That's pretty cool. This was fascinating. John, thanks a lot for joining us today. And yeah, we hope everyone gets out there enjoys all the fish learn about this snakehead and yeah. Very cool.

Cool. Well, thanks for having me.

Thanks for listening to Fish of the Week! My name is Katrina Liebich. And my co host is Guy Eroh. Our production partner for the series is Citizen Racecar. Produced and story edited by Charlotte Moore-Lambert production management by Gabriela Montequin. Post production by Alex Brower, Fish of the Week! is a production of the US Fish and Wildlife Service, Alaska Region Office of External Affairs, we honor thank and celebrate the whole community, individual tribes, states, our sister agencies, fish enthusiast, scientists and others who have elevated our understanding and love as people and professionals of all the fish.