Hey to 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, June 13 2022. This year we're excited to take you on a week by week two or fish across the country with guests from all walks of life. I'm Katrina Liebich with the US Fish and Wildlife Service in Alaska.

And I'm Guy Eroh and today we're talking about a shiner, a special shiner, the Topeka Shiner, one of many in the genus Notropis.

And we're very pleased to have two guests, we've got Heidi Kueler, a fish habitat biologist with our Lacrosse Fish Wildlife Conservation Office in Wisconsin. She's also the coordinator of the Fishers and Farmers Partnership. And we've got Roderick May and Rod's the hatchery manager at our Neosho National Fish Hatchery in Missouri. So very warm welcome to you two.

Thank you glad to be here.

Okay, so first question rod being at the hatchery, I'm guessing you've had your hands on a lot of fish, seen some Topeka shiners, and we're hoping you could help us imagine if we had one of these fish in hand, what are we going to see? What do they look like? How big are they?

You know, there's nothing really extraordinarily striking about these little fish. They look pretty ordinary, even to your average citizen. They're pretty small, you know, a little bit bigger than your finger. Got a little color. But most people they asked like "where are they?" You know, kind of what they come in expecting to see something really colorful and jumping off the page and they're like, "oh, okay," so that's kind of like the reaction we get from the tourists we were expecting to see something much bigger.

And some fish get real dressed up for the spawning season. Do these fish get any kind of colors or nuptial tubercles or anything like that?

Well yeah, of course you know, you know the males will color up and they get that little orange kind of reddish color on the fin. You know, get a little orangeish reddish around the gills. You know we'll generally pick out our parents, you know, in the spring, you know, when the males are all colored up there and their brightest and most glory. So that's when we do. We do it while they're looking good.

So let me ask why in the world, are we raising shiners in a hatchery? Because normally you think about a hatchery, you're raising sport fish, like trout or sunfish to stock out there. So why do we got these shiners getting raised up?

Well, you know, bigger shatters, so actually an endangered species. We are participating in a non essential, you know, stocking experiment or study or going back to the habitat and trying to fish in their habitat and a little different habitat. But mainly, you know, we're just trying to keep the species going, you know, hatcheries are a wonderful tool. And it doesn't matter the size of the fish, we just care about the fish. You know, when you see where they you know, these little fish reside, they gotta be some tough little fish, you know, some places you can jump across the creek. So, you know, it gets to be

really hot in the summer I'm sure, really cold in a winter weather, you know, influences this population. So, that's why we get involved, see what we can do to help them survive better.

My familiarity with hatcheries, you know, you got people going in there like stripping the trout getting the eggs out, I can't imagine that that's something that you can do with these little fish. I'm just curious about sort of the nuts and bolts of your propagation practices out there.

Believe it or not, we have had some people here strip these little fish by hand, one little squirt of eggs, and one little squirt of sperm. That's all you got to work with. You know, what we like to do is set up beds for them in one of our raceways we're doing this pretty non traditionally. We are not using upon, we're using actually an empty raceway. We stagnate the water, the temperature come up to the right temperature, we put the fish in a raceway, and we let them decide when they want to spawn that traditional way we do it but like I said, we have, we have done some hand spawning here, you know, to see if they could do it. And we did it and raised some fish actually intensively inside a building, you know, so we had some that we actually raised two different ways. It was very interesting.

Are these beds that you're making for them? Do these fish make beds naturally in the wild themselves? Or do they use the beds of other species or what are these simulating?

Oh, that's a good question. They use spawning beds but they don't make their own spawning beds. We actually put perch you know little small perch in with the topeka shiners. Now the perch will make the nest. I've actually seen this happen. I've been standing on the raceway and I've watched on the wall and I've watched this happen. While a male sunfish is guarding the nest, he's got his own nest and you know his own females and so there are other sunfish males that are giving him some problems. While he is fighting the sunfish males the Topeka Shiners come in on the back side. And they actually spawn in the nest and the male sunfish takes care of his eggs and the topeka shiner eggs.

Man. They got it good. Someone's making their nest and taking care of their eggs.

It's a terrible thing, but I've seen it happen.

It seems like a high risk though. Because what if he gets caught with the sunfish? What do you think like, "oh, this is something that might be coming in to try to eat my eggs" and him come in and chase him up and bite him up or anything like that?

You know, from what I've seen. There's such a big fast difference, that the sunfish is more concentrating on the males of his species. He's figured "that's where my threat is coming from."These guys are good." So while he's thinking like, these other shiners are coming in and just doing they want behind him.

okay, so it's kind of a little commits list of relationship there.

Well, I can see how it helps the, you know, the shiner. But you know the sunfish you don't get much out of this deal. Yeah, you're right. Yeah. It's a really cool system. I've never seen anything like it. You

know, the first year we did this, we were like, well, you know, we probably don't need all of those sunfish in there. But with no sunfish you get no shiners.

Yeah, it's important to think about all the fish when you're thinking about conserving one species like this. That's very cool.

I think it's really cool we have both of you on the line because you mentioned hatcheries can be a really good conservation tool, especially for fish like this. We've got Heidi and Heidi focuses more on the habitat. So Heidi we're hoping you could kind of help us understand what habitat these fish need and kind of where they are in the wild?

Sure. So historically, Topeka shiners were found in Missouri and Mississippi, Arkansas, and currently the Topeka shiner is in Minnesota, South Dakota, Kansas, Nebraska, Missouri and Iowa, topeka shiners have been found in low order prairie streams that usually have perennial flow. They're generally tolerant of high water temperatures, low dissolved oxygen, and high levels of nitrate. So you know, they can exist in many of our streams near farms. However, we've had some threats and limiting factors over the years, including habitat loss, fragmentation, and an altered landscape, including changes in hydrology and morphology. So our office works mostly in Minnesota and Iowa, on habitat. But the Fish and Wildlife Service has been working in Iowa on oxbow restoration for many, many years. So where our office comes in is we work with many partners, not just in the Fish and Wildlife Service, our partners in the Fish and Wildlife Service include ecological services, private lands, and then also we work with many other federal state local partners, non government organizations like the Nature Conservancy, and we go in and restore these oxbows.

So oxbow is a term maybe folks have not heard or are familiar with, it's a really neat type of formation off a river, maybe you can just give us a little understanding of what that is. And I know you also mentioned the order of the stream. And just for folks that don't necessarily know some of those terms. Yeah. What does that mean?

So starting off with order of the stream, it's a classification system that we classify streams. So a low order stream would be classified as a 123. Those would be typically more your headwater streams where the streams start out, streams, like the Mississippi River would be a high order stream. So streams meander, you know, streams not only move water, which many of us realize, but they move sediment, and they change over time. So streams meander back and forth, depending on what they're transporting, and how resistant they are. Oxbows are created by the stream cutting off, and most of them are about a quarter acre in size, maybe half an acre. There's a few larger ones,

Just for kind of like a view looking down at a river. If you're flying in an airplane and you're looking at a river and how it meanders you can actually see oxbows we have a lot of them up here in Alaska. And I look like little use basically, kind of surrounding the river as it meanders. They're really easy to pick out once you have a feel for what they are. They're cool.

Yeah, it's awesome. And these little oxbows really do help filter the water help clear up the water, they can remove 47% of the nitrates on average. And some of them can even be up to 100% depending on

how long that water sits in those oxbows. So it's really cool because they're creating spawning habitat for the Topeka shiner, but they're also reducing the nitrates that are going into the stream as well as decreasing sediment going into the stream. So usually when we restore these oxbows we go in with excavators and dig down to the old stream bed because over time these fill in with sediment, you know with rainfall and land use practices, different things like that. So we'll go in and we'll restore these oxbows. It doesn't take any land out of production. So the farmers are, you know, a little more willing to work with us because we're not taking any of their land out of production, they're still able to farm it.

Rod, you mentioned at the beginning kind of how people were like, you know, "where's the fish? They're small." And how do you work with farmers. How do you sell this restoration work to folks like farmers and Ro I guess same question to you, how do you sell the importance of this fish to folks that visit the hatchery.

With us this is a good example of how we can prove to people it's not the size of the fish that matters is the fact that decision is an endangered species and we're about to lose the species from the face of the earth. So we want the species to continue to reside on this earth then that's what we get involved. It's about our our restoration efforts as the agency as a whole.

Yeah, with our work it's funny because we'll have field days where we have farmers come out in all the biologists will get in the stream and insane these aren't supposed to show the farmers the fish and some of the farmers are "oh that's bait, I can use that for go fishing." So at first you know when you say we want to provide habitat for the Topeka, China that they kind of scratch their head and say, well, "it's just bait...why?" And then we talk to them about why it's so important to have all these fish in our streams and speakers are also found in the wild with fathead minnow which often is a bait fish, and then orange spotted sunfish, green sunfish and sand shiners. And not only fish, but waterfowl use these oxbows we have all the other you know, furbearers that use these oxbows in all the other fish and wildlife come in, because it's all one big foodweb right. And so when you do these oxbows restorations, you're also bringing in other fish that the farmers can fish for and that their kids can fish for. And that's kind of one of the biggest things they say I want to leave something for my kids and my grandkids.

We get the bait joke a lot here too. The number one joke is: oh you guys are raising baitfish. No, not exactly.

It can be really hard to look at these fish and tell that there's a difference. Both physiologically and ecologically they serve very similar roles. So you know, you're talking there about you know, you restore the habitat, you get all these other species. And I do think that that's right. And that's a good way to think about but at the same time, you think about okay, if you lost the Topeka shiner, you could, in theory, put in another thing that does essentially the same thing. And ecologically it would probably be pretty similar. So why is the Topeka shiner in particular, so important compared to some of these other ones to have?

I don't know. I mean, if you could say that about any animal, right? But if you look, if you look at monkeys, if you if you tell someone well, what what's the point, if we lose one species of monkey it's not a big deal. But there's a lot of people that would jump on the bandwagon, say, Oh, it's a huge deal. So

why are fish any different? It's so important that we have all of these species, they all play a role. And a lot of it we don't even know, you know, even though we're biologists out there in the field, capturing these species, there's a lot of other things that we don't even realize that they play a part of in the whole ecosystem. Yeah. And so I think it's huge. Also, if you if you lose the pika shiner, there might not be another fish that can just jump right in. And do you know, their role in the habitat because I look at some of the other fish species that we capture with them. And they're different, you know, so it's not quite 100%, what the Topeka shiner can do.

It's a slippery slope to making a decision on losing one and then losing another and then you get into that whole scene of just, you know, gradual change, and at the end, you've lost a whole lot and can't get it back.

Yeah, exactly.

Yep. You know when I'm talking to kids and groups, they asked that same exact question. And I've tried to break it down as basic as possible for them and I, and I generally say something like this: These species and all of us are in a giant whale. Since all these species are connected together. It's like building a house of cards, and you don't know what card but if you pull that card out, it could cause your house of cards to start to tumble. So it's best to leave all the cards in place.

So when we think about fish moving, we maybe think about salmon and some of those really highly migratory species. Are you guys doing any work to help fish like Topeka shiner do their movements as well?

So last month was World fish migration day on May 21 2022, so we have been really trying to improve fish migration of the speaker shiner. A lot of times people talk about Lake Sturgeon or megafauna right big critters. And a lot of times we think about marine fish. But we have to remember too, because shiner is also a great fish in freshwater. And so our office works on fish passage projects, you know, bridges and culverts and different things can have a major impact on the Topeka shiner, especially in our rural areas. So you know, these populations can be disrupted depending on how these culverts or bridges are placed or misaligned. And oftentimes they'll become perched and so the the fish won't be able to migrate to spawn in its historic spawning grounds or to get to the oxbows that they need to so our office has been working with Minnesota DNR and Iowa DNR on on trying to improve fish passage for the Pecos these fish don't really have a voice right and so be the voice of these fish and talk to your local county especially if you live in the areas of Topeka shiners or other fish to talk to your local county folks and your state folks and see how you could possibly play a role in improving fish passage for not only Topeka shiners, but all the fish out there.

I got one final question for you Rod.

Okay.

So if I know national fish hatcheries, we have a whole network of them. Neosho it's pretty old hatchery is my understanding. And I'm guessing folks can come visit this hatchery, like many of the hatcheries?

Absolutely. We're in the southwest corner of Missouri. We always always have put the welcome mat down here. We've been open since 1888

1888. That's like that's early in terms of like fisheries management in the US.

We actually have a file cabinet of some of the early daily written logs. We have the original letter that was sent to the first manager who are from Washington DC. We have logs that he sent back to the commissioner that he had arrived here. So we got a lot of history here.

That's cool.

And we've been a member of this community since the beginning. You know, we've been a place that people come hang out in community, we've got shelters, we've got barbecue grills, we've got everything that you would find in a park right here at our hatchery. We like to entertain, we have our own chat. So come in and walk around Neosho that the oldest operating federal hatchery in America.

And what kind of fish could I see there or other animals

Well you're gonna see a lot of rainbow trout. We're mitigation rainbow trout hatching first of all, but we also have, like I mentioned, you will see topeka shiners. You will see freshwater mussels here. You will see pallid sturgeon, you will see logperch. We have freshwater drum, we have largemouth bass. We have several species, the whole fish along with our rainbow trout here. So while you can, we've raised goodness about 134 different species of fish here in our history. So just about any fish, anywhere that's been cultured here in Neosho at one time or another

Super cool. I put on my list of things to go see. Well, thank you two very much for joining us. This was a fascinating conversation about the Topeka shiner.

It's been an absolute pleasure.

Thank you so much. It's been fun.

Okay, get out there and enjoy all the fish and learn more about the shiners and especially the Topeka shiner. 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 Gabriella 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.