SYDNEY WIDELL: That sound you're hearing right now-- the hum-- yeah.

It's the sound of a sprawling network of high-speed switching systems, rectifiers, and capacitors all working to deliver a pulsing current of electricity to a series of copper cables that run about 25 feet underneath the Chicago Sanitary and Ship Canal.

These cables send a pulse of electricity out into the water up to 34 times per second, which stuns fish and prevents them from making their way upstream. This electrical barrier has been here, about 45 minutes west of the Chicago downtown, since 2002.

The canal is this 30-mile man-made waterway that links the Chicago River to the Des Plaines River, and by extension, connects the Great Lakes to the Mississippi River. According to the Army Corps of Engineers, it's the only known link between the Great Lakes and the Mississippi watershed.

All of this exists here because if you were to follow this river 20 miles to the southwest toward Peoria, Illinois, you'd be on water that contains what we were told is the highest population density of silver and bighead carp anywhere in the world. If any of the carp downstream of the barrier ever made it into Lake Michigan or the rest of the Great Lakes, they would have to swim right past this spot.

[THEME MUSIC]

SYDNEY WIDELL: I'm Sydney Widell.

BONNIE WILLISON: And I'm Bonnie Willison. And you're listening to *Introduced.*

[THEME MUSIC]

BONNIE Yeah, it's good to clarify right away that when people talk about Asian carp, they're

WILLISON: actually referring to four different species of carp. Silver and bighead carp, they are filter feeders. They eat algae, and they kind of are constantly filtering things out of the water. And these are the two species that you hear about that are jumping. They're jumpers. And then black carp, they eat snails and mussels. And grass carp eat aquatic plants.

But lumping them together as Asian carp doesn't represent the fact that each of these fish occupies a slightly different niche, and each has the potential to unleash its own distinct species of chaos into the Great Lakes and its watershed.

SYDNEY WIDELL: Do you get the feeling that when people talk about invasive species in the Great Lakes, like, they talk about Asian carp a lot? Like if I asked you to name a Bucks player, like, there are so many that you could name, but you might say Giannis. You know? Like, kind of like that.

BONNIE WILLISON: Thanks for putting me on the spot and coming up with a basketball reference, because I-- not my area of strong suit.

SYDNEY WIDELL: I was going to let you fill in the blank, and then I gotta-- I didn't want to-- you know--

BONNIE WILLISON: But yeah, I feel like a lot of people talk about them because they're very visible, and it's kind of this, like, looming problem, I'd say.

SYDNEY WIDELL: Where carp have been introduced, they've upended entire ecosystems and caused a lot, a lot of chaos.

BONNIE WILLISON: Yeah, and they all reproduce a lot faster than native fish. And they filter so much every day-- silver and bighead carp, at least, filter, like, 40% of their body weight every day, out of the lakes. And grass carp can eat their weight in plants every day.

SYDNEY WIDELL: Have you have you ever seen videos of carp hitting people in the face when they're boating?

BONNIE WILLISON: I feel like I have, yeah. Do you have one in mind?

SYDNEY Oh yeah, I just looked it up, and there were so many results about that. OK, can you

WIDELL: just google "flying fish slaps woman in the face."

BONNIE WILLISON: OK. And then, is it the 15-second video?

SYDNEY WIDELL: Yeah.

BONNIE WILLISON: OK, let me look at it.

[VIDEO PLAYBACK]

[SPLASH, LAUGHTER]

[BAM]

- Oh!

- You OK, babe?

[END PLAYBACK]

BONNIE WILLISON: Oh wow, that looks like it was really hard. It's like, its face hit her, not even, like, its tail.

SYDNEY WIDELL: I know. Like, why did it do that? That's so scary.

BONNIE WILLISON: Anyway, there is so much fear and uncertainty about what could happen if carp wind up in the Great Lakes.

SYDNEY WIDELL: But as far as we know, bighead and silver carp haven't migrated into the Great Lakes yet. And the barrier might be the reason why.

BONNIE WILLISON: Yeah, the more I learned about carp, I just became more interested in this barrier. And so I started doing a lot of phone calling and emailing. And I was really excited when I found out we'd be able to go down to the canal, and they would give us a tour. And we could see these electric fish barriers for ourselves.

SYDNEY WIDELL: How are you feeling?

BONNIE WILLISON: Feeling-- feeling excited. But also, we're a little lost.

We woke up at the crack of dawn, and me and you and Moira, the communications lead for Wisconsin Sea Grant, we started driving south.

SYDNEY WIDELL: And we drove down to Romeoville, Illinois, to where the Army Corps of Engineers operates this barrier, which was roughly a two-hour drive from where we are in Madison.

It says fish dispersal there.

BONNIE WILLISON: I think we go up there.

SYDNEY WIDELL: OK.

BONNIE WILLISON: This road.

SYDNEY WIDELL: OK.

It was so hard to find. You could see the canal at points along the highway, but then when you got off the highway you were just driving down this road for, like, a very long time. And there was that enormous, enormous refinery that just went on for, like, miles.

BONNIE WILLISON: Also, the world's largest wastewater treatment plant is just upstream on the canal. So it's like, kind of all of this, like, industry. And the back door to everything that's happening in Chicago felt like it was kind of right here in this canal.

We ought to just stay in the car.

MOIRA But I think we should get out and, say, let's make something happen, people.

HARRINGTON:

PAUL: Hi.

SYDNEY WIDELL: Hi, nice to meet you.

PAUL: Nice to meet you. Hello, I'm Paul. Cindy?

SYDNEY WIDELL: Sydney.

PAUL: Sydney.

BONNIE WILLISON: I'm Bonnie.

PAUL: And Bonnie. OK.

SYDNEY WIDELL: We met a few colleagues from Manitowoc and Bristol and Stevens Point.

...Pressing the delivery button. Hello, we're here to see your carp.

[PHONE RINGS]

COLLEAGUE: Oh, that's today? Aw, no, they're not here.

BONNIE WILLISON: Yeah. Uh, yeah, that would be--

EMPLOYEE: Someone expecting you guys, or--

BONNIE WILLISON: We're here for a tour. We're Wisconsin Sea Grant. I'm supposed to be meeting Chuck.

EMPLOYEE: Chuck.

BONNIE WILLISON: Do you know where we should go for that?

EMPLOYEE: Let me go get somebody. You can come in here.

BONNIE WILLISON: OK, thanks.

MOIRA HARRINGTON: Thank you.

SYDNEY WIDELL: [LAUGHS]

COLLEAGUE: Nice.

SYDNEY WIDELL: I sound like a maniac at the end of that. I was just laughing so hard about seeing the carps on the wall.

BONNIE WILLISON: I also feel like it's a little ironic, because it's, like, the one species they're basically devoting their careers to stopping, but they still have them as decoration, you know.

SYDNEY WIDELL: Yes.

BONNIE WILLISON: That's just what I was thinking of.

SYDNEY WIDELL: It wasn't decoration, because they're not, like, specifically-- they're kind of scary-looking fish, I thought. Which is like a--

BONNIE WILLISON: Yeah.

SYDNEY WIDELL: --subjective opinion, obviously.

BONNIE WILLISON: In my head, I thought that there was going to be like an actual physical barrier. Which, there is-- it's just underwater and you can't see it. But I thought that it was going to be obvious. Like, oh yeah, that's where the barrier is. And that was not the case.

SYDNEY The people who are there-- so, so fascinating because, like, they're engineers, right.

WIDELL: They work for the Corps of Engineers. And they know-- they have to know, one, so much about how electricity works, because they're dealing with all of these very complex systems, and these generators, and creating this enormous electric field. But they also have to know about fish biology. So it's just a very interesting niche of people who spend time down there.

Yeah, using electricity to control fish is not a new thing. So you know how you probably wouldn't want to drop a hairdryer in a bathtub because you would get shocked. Yeah, it's kind of like that, except you have, like, part of the water that has a current, and the fish starts swimming toward it.

The charge on the front of the fish, it's going to be greater than the charge on the back. And that's going to move all this electricity through the fish's body. And that actually doesn't-- if it's the right amount of electricity, that'll just stun the fish. It doesn't harm the fish at all. The fish just kind of like floats.

BONNIE WILLISON: Once the fish floats out of that field again, it'll be fine, and it'll just snap out of that.

SYDNEY WIDELL: But using electricity to control aquatic invasive species is something that the Army Corps of Engineers pioneered here in Romeoville with this barrier project.

CHUCK SHEA: Hi there!

BONNIE WILLISON: Hi.

CHUCK SHEA: You folks, I assume, are with the Sea Grant?

SYDNEY WIDELL: Yeah.

CHUCK SHEA: All right. Well, I'm Chuck Shea. We can go in here and sit down for a minute. Let's see if we can grab somebody else here. I'm the project manager for the barriers. So I usually work at our-- well, I'm down here visiting quite a bit. But I'm actually stationed in our downtown Chicago office.

SYDNEY Chuck said that the scale of this project makes it unique.

WIDELL:

CHUCK SHEA: It's fairly unusual to pulse electricity like this. It's not completely unheard of, but it takes some specialized equipment. Well, I don't know the details of all the frequencies and things like that. But they do a lot of radar stations, the big military radar stations have a lot of pulsed electricity in them, is my understanding.

One of our contractors that we're using, I know also works in the field of doing pulsed power with military radar stations. So there's something there too. And probably some other activities. I would imagine some of these places like Argonne National Laboratory, or some of the people that are doing this, like, really advanced research on electrons, and these accelerators for electrons and stuff, probably have some of this type of high level electrical equipment too.

BONNIE WILLISON: We also met with Joe, who is an engineer at the carp barrier. And he works there every day on the ground to keep the electricity running.

SYDNEY WIDELL: So then we get a quick orientation.

CHUCK SHEA: There's a couple of basic things we need to be careful with on site.

JOE: Right. So basically, we're putting all this electricity into the canal, and not all of it stays there. Some of it is coming back up into the ground. So any kind of metal could be energized. So we try not to have two hands touching things. I mean, nobody's getting shocked out here, but that's-- we've got to be aware of things like that.

The train tracks-- the gates don't always go down when a train's coming, and don't always go up when there's no train coming. We have a refinery right here. And if we start hearing horn blasts, we get out of here. There's nobody here with a pacemaker, anything like that? Other than that, we'll be all right.

COLLEAGUE: What would that feel like if I'm in a boat and I touch that water? I mean, what impact would that--

JOE: Well, don't do that.

CHUCK SHEA: No, we start with that.

COLLEAGUE: I'm assuming that, but--

BONNIE WILLISON: Yeah, that's the question that probably is biggest for everyone when they hear about the electric barrier. It's like, if I fall in, will I die? Or what does that feel like?

SYDNEY WIDELL: Well yeah, and he said-- Chuck said that if you touch it, you're probably not going to die. But it's, like, the pulsing that like freaks your heart out. And so if you're in the water-- and then, like, if you're in the water and your body is freaking out, you could drown easily.

So the barriers are here because if any of the carp downstream of the barrier ever made it into Lake Michigan or the rest of the Great Lakes, they would have to swim right past this spot. But the barrier is really here because back in 1900--

[BACKGROUND MUSIC BEGINS]

--the city of Chicago had this major problem. Because up until that point, it dumped all of its sewage into the lake, which was also were it got all its drinking water from.

And that was all fine until, in the 1800s, the population just started expanding really rapidly. And a lot of people started to get really sick-- things like cholera. A lot of illness from drinking that water that was also where all the sewage was going. And so Chicago had this genius idea. It was like, we should just dig a canal that reverses the flow of the Chicago River and sends all of that sewage out toward the Mississippi. And so they started digging.

So St. Louis, which is down the Mississippi a little bit, was like, absolutely not, you cannot do that. So they tried to set up this injunction. They took Chicago to court. And Chicago, meanwhile, was like, oh yeah, we actually are going to be doing this. And so it was this whole controversy. And the engineers who were building the canal ended up finishing it extremely, extremely quickly. They opened it in the middle of the night.

And then by the time the case made it to court, Chicago basically said, well, the river is flowing already. I don't know what we can do about this now. And so that is the way it has been since 1900.

BONNIE WILLISON: And a wild origin story.

SYDNEY WIDELL: I know. And for nearly a century all went according to plan. And the sewage went out toward St. Louis and the Mississippi River. And it opened up Great Lakes to transit coming up from the Mississippi. So there's a lot of exchange happening along the canal and between places on the Great Lakes, and now places on the Mississippi, who could easily move goods back and forth because of the canal. But the really unintended consequence was, not only were goods moving back and forth, but so were living organisms.

CHUCK SHEA: Why don't we walk this way. And we can stop and talk about more questions when we look at some things in barrier 2B.

BONNIE WILLISON: And then it's time to actually enter the barrier. Basically, we walk outside until we get to-- there's just a set of, kind of, littler buildings that have all the equipment that is needed to run the electric barrier.

SYDNEY WIDELL: They take all the electricity from just the municipal grid, and then they have to run it down into these copper cables that run underneath the canal 25 feet down. And those create this electrical field in the water, which is what deters the carp.

And there's a series of three of these barriers along the river. And one thing that was really emphasized is that redundancy is critical to keeping this operation successful

BONNIE WILLISON: Yeah, I feel like a lot of their job is just making sure everything is running. And that if something goes down, we have a backup generator. And then if that backup generator goes down, there's a backup plan for that.

SYDNEY WIDELL: The canal itself is 160 feet across, which is just big enough for two barges to pass each other. Actually, while we were there, we kept seeing barges coming up and down the river.

BONNIE WILLISON: And then, finally we got to go see the site of where they're building a new barrier. And the voltage is higher in this one. So it's just to add more defense.

[MUSIC PLAYING]

Wisconsin Sea Grant and the Center for Great Lakes Literacy are proud to bring you the Aquatic Invaders Attack Pack, a grab-and-go teaching tool to educate students and the public about aquatic invasive species.

Sydney, what's your favorite thing in the Attack Pack?

SYDNEY WIDELL: I love all of the specimens. There's a preserved sea lamprey inside each pack, which I think is amazing. And the packs also include little resin blocks with a lot of different specimens, like they have rusty crayfish, and round goby, and a lot more. And it was my first time seeing some of these species in real life, which is kind of cool. How about you?

BONNIE WILLISON: I like the cutouts of bighead and silver carp. And they're life-size, so I can imagine a kid standing next to one and getting a sense of how big that these fish can get.

Each pack includes these items and more, along with a guide with curricula and activities. If you're a Wisconsin resident, you can borrow an Attack Pack, and have it delivered to your local library free of charge. Visit the educational resources tab at seagrant.wisc.edu for more information.

SYDNEY WIDELL: So back in the 1960s, people began to bring Asian carp from China to the US to control weeds in their ponds. And this was happening a lot in the southern United States. And a little while ago, we asked our Sea Grant Aquatic Invasive Species Specialist Tim Campbell to tell us more about how carp became so widespread in the US. And he actually had experience carp-stocking, personally, growing up.

TIM CAMPBELL: I know when I grew up in Iowa, fishing IN one of our friends farm ponds, it was a great day when we stocked our grass carp into those ponds, because it was so overrun with plants. And they couldn't afford to continually treat it with herbicides, and didn't want to. But two carp really helped keep the plants under control, and made it so we could fish and enjoy the small farm pond, which is pretty cool. Little did I know--

BONNIE WILLISON: Yeah, it is interesting, because that really shows why people were importing these fish. They are really useful to people who want to have, like, really clear ponds. The grass carp will eat all your weeds. And then I'm sure Tim, now, would absolutely

never do that. But when people don't know, I guess is the thing.

SYDNEY WIDELL: Yeah. And one way or another, the carp escaped from those ponds. And some of them wound up in the Mississippi River and swum up its tributaries, including the Des Plaines. But they've also found their way into lakes and rivers across the Midwest.

BONNIE WILLISON: So I told you that I've been to Kentucky before for an Asian carp conference, right.

SYDNEY WIDELL: Right, and I'm so intrigued. The more I learn about carp, the cooler that sounds to me.

BONNIE WILLISON: I know. It's really funny to look back on, because I didn't really know much about Asian carp at that point. I was just going there to film it. So this is-- it's really something that I never imagined myself going to. So we get there, and I'm suddenly surrounded by all these carp experts.

And immediately, I started hearing stories like-- Duane Chapman, he was showing me, or a group of people, like, he was pointing out these white stains that he had on his baseball cap. And he was saying it's because he was hit by a carp when he was out on a boat. And the carp are slimy, and so they leave these white stains. And he was saying that on a lot of his clothing he has these white stains on them. And I was immediately like, what is happening here?

[MUSIC PLAYING]

And during this conference, we actually got to go out on boats on Kentucky Lake and Lake Barkley, which are in Kentucky-- really big lakes. And so it was there that I witnessed silver and bighead carp for the first time. And when we were driving the boat, when we got to go, like, a slow to medium pace, these fish started just jumping out of the water. And I was really amazed at first. So I want to show you this video of Asian carp in Kentucky Lake.

SYDNEY WIDELL: Oh my god.

BONNIE What do you think? You don't have to watch the whole thing if you don't want.

WILLISON:

SYDNEY WIDELL: I need to. That's absurd.

BONNIE WILLISON: Like, all of a sudden, the water is-- the water is super, super calm, and then all of a sudden it just starts foaming. And so many carp are just flying out of the water. Like it looks like carp are potentially, like, five feet in the air. Do you think that's accurate to say?

SYDNEY WIDELL: I feel like that's accurate. It also seems like-- in this one little area, it seems like there's a thousand carp that are jumping at once. This is the most carp that I've ever seen. Like, they obviously have a ton of bighead and silver carp. And I just wanted to know more about how that has affected life in the region. Like, the just everyday life, the economy, and tourism.

So I started looking. And I looked into the Kentucky Lake Convention and Visitors Bureau. And I thought maybe I could interview their executive director. But as I was googling, one of the first things to pop up was this article from late November 2019. And the article is really short, only five sentences.

And it said, "visitors have declined at the lake over the past few years due to the infestation of Asian carp, an invasive species that has negative impact on fishing. Because of the decrease in revenue, executive director Randy Newcomb says he talked to the board and decided it would be best to resign." So I couldn't talk to him, obviously.

Oh, I can hear you now.

ELENA BLEVINS: Oh, can you hear me?

BONNIE WILLISON: Yes.

ELENA BLEVINS: OK.

BONNIE WILLISON: But fortunately, I was able to talk to Elena Blevins.

ELENA BLEVINS: My name is Elena Blevins, and I am currently serving as the Interim Director for the Kentucky Lake Convention and Visitors Bureau. Due to budget constraints, unfortunately we had to slim our workforce. So our executive director had to resign. So I have now stepped into that role, and will be the official executive director come July, once we begin our new fiscal years.

BONNIE WILLISON: For someone who's never been to Marshall County, what is it like there? And what do the lakes look like?

ELENA BLEVINS: Our lakes are beautiful. A lot of people-- the most common response I get is, wow, I didn't realize it was so big. We actually get-- we have just about as much miles of shoreline as the state of Florida along our lakes.

BONNIE WILLISON: Oh my gosh, really.

ELENA BLEVINS: So it's a beautiful, beautiful area. Some of the best sunsets, I believe, that you can find, in my opinion. But Marshall County itself is, I would say we're kind of your average, sort of rural, small town America. We're very unique in that way, that we are just kind of a good old-fashioned small town, with a lot of small town charm and vibe. And a lot of good mom and pop shops, whether they're restaurants that are locally-owned, or resorts that are locally-owned.

BONNIE WILLISON: I'm curious about Asian carp in Kentucky Lake. Could you talk about what the lake was like, kind of before they came in, if you know? And then that process of them kind of becoming a big population.

ELENA BLEVINS: I think, if memory serves me correctly, I think the first carp was spotted in Kentucky Lake-- I think it was 2007, 2008. And for a long time it went unchecked. And for a long time it didn't seem like a threat. It wasn't until the fish started getting big that it became a really noticeable problem. I think people just underestimated the size that they would grow.

For the average boater, and the average sort of family who's just hanging out at the lake on the weekend, I would say that that has remained pretty consistent. What

really sort of took a hit was our fishing industry.

BONNIE WILLISON: Have you ever been to a fishing tournament?

SYDNEY WIDELL: No. Have you?

BONNIE WILLISON: No. I really knew nothing about them. But apparently--

SYDNEY WIDELL: How does that work? I have a lot of questions.

BONNIE WILLISON: I know. So anglers use special instruments like side scan sonar. So it's this instrument you have in your boat that kind of like maps out populations of fish that you can kind of see through the water. They know these fish inside and out. And they use all kinds of really intense rigs and lures and everything.

There's actually a pretty big flogging population for fishing competitions and competitors. So I was looking through those a little bit. But I was kind of imagining, like, in Kentucky Lake, that there might be, like, one really big fishing tournament a year. But actually, Elena clarified that they actually have them all throughout the year at Kentucky Lake, from March to October.

ELENA BLEVINS: When those tournaments happen, it brings more people into your restaurants, more people into your shops, more people into your hotels, your lodging establishments. So, I mean, it had a ripple effect. It really did. We went from having two of our most profitable years to, now, one of our lowest on record, unfortunately. I mean, it really just kind of came to a halt.

And I wouldn't-- and the crazy thing about it is the Asian carp, it's an issue. No one's downplaying that. It is affecting the fishery, because just of this year, masses of them. It is creating some sort of food competition, dietary competition for the bass and the crappie, because they rely on the same food sources.

But there's also a number of other things that have attributed to the bass population being in such sort of a fluctuation over the past couple of years. It's also

due to weather patterns and water levels. The Asian carp just became such a loud issue--

[MUSIC PLAYING]

--that it just sort of became undeniable. And I mean, we weren't necessarily prepared for the effect that the PR-- that the public relations side of it-- we weren't necessarily expecting the gravity of what people were saying

BONNIE WILLISON: Was it mostly anglers that were coming that were kind of giving this PR? How did how did this word get out so loudly?

ELENA BLEVINS: I mean, yeah. I think it really sort of originated within that angling community. Not to-- and I'm not trying to place blame or anything. They were the one who saw it. They saw it becoming an issue. And they are the ones who said you guys need to do something about this. I mean, it had to be done. It happened in a blink of an eye.

BONNIE WILLISON: Really?

ELENA BLEVINS: I mean, all it really took was one sort of live streaming of a weigh-in at a tournament, where the anglers were voicing their frustration. And just kind of, we hate to see this happening here. And it really-- social media is just-- it's a scary thing.

And it was-- I mean, it just really kind of brought things to a screeching halt within 18 months. Which you really just would not think could happen. Sure enough, six months later, we were like-- it was just-- tournaments were backing out. And within a year, it was just-- we had sort of where were at now, where our budget had fallen by 25%.

And I think local businesses have felt-- they may not necessarily be to putting two and two together, but I think everyone in our community is kind of feeling, where is-- why are we down. Or why are we-- seem to be doing worse this year? It doesn't seem any different. But a lot of it is just because those anglers that they had become so dependent on to come year after year, tournament after tournament, haven't been within the last year to two years.

In 2013-- I pulled that report, and we had 55 tournaments on Kentucky Lake alone. And then in 2018 we had 30 on Kentucky Lake. Let's see, in 2013 the number of bass that were recorded as caught during these tournaments was 11,325. And in 2018, it was 3,237.

SYDNEY WIDELL: That's a wild decrease.

BONNIE WILLISON: It's a really big decrease. And that was for 2018. And 2019 tournament numbers are likely to be lower. But Elena is confident that the lakes will improve for anglers and vacationers. You know, they had a really good spawn last year. And they've been putting time into mitigating this Asian carp issue. And I asked her what she would say to a community upriver which hasn't experienced Asian carp yet.

ELENA BLEVINS: I think the biggest thing that I can tell someone with who's in my shoes, or similar to in my shoes, is to have a communication plan and a PR sort of crisis management plan. That's what really hurt us the most, is just not having a prepared response for once the attention hit. We just didn't have a way to respond effectively that was going to preserve our fishing industry.

If you are getting rumblings of carp in your waters, then you need to immediately start working on a PR crisis management communication plan to help navigate the conversation on social media.

[MUSIC PLAYING]

BONNIE WILLISON: So at this point, silver and bighead carp, they've been in the Mississippi, they are still moving north. They're moving into tributaries, and they're really close to the barrier. And the same for grass carp. They're even a bit more widespread, like, scattered throughout ponds and streams, where bighead and silver carp are not.

And seeing as the carp are getting closer and closer to the Great Lakes, I just wanted to know what would happen if they made it into Lake Michigan, and beyond, into all the rest of the Great Lakes. Titus Seilheimer, Wisconsin Sea Grant's fisheries outreach specialist that we talked to you in the last episode, talked to me about how carp would affect the Great Lakes.

TITUS SEILHEIMER: Yeah, that's a good question. There has been research. As a wetland ecologist who studies fish habitat, the grass carp are concerning because they eat plants. They disturb plants. And that is-- the underwater plants and wetlands are really what makes those habitats great fish spawning and nursery habitat.

So kind of my first warning sign with grass carp are-- that could be pretty big impacts to those coastal wetlands. And lots of species rely on coastal wetlands in the Great Lakes, either for one of their lifecycle-- life stages, or they go in there to feed, or some of the food they eat comes from there.

So at the same time, they are-- silver carp and bighead carp are filter feeders. They swim along with their mouths open. They eat algae and zooplankton. And when we think about the current condition of the Great Lakes, where we've had a lot of changes, a lot of shifts in the food web from quagga mussels, which filter feed algae. Maybe there's not a lot of food for the Asian carp in places like the middle of Lake Michigan.

BONNIE WILLISON: But the bigger concern, at least in Lake Michigan, is that silver and bighead and grass carp would thrive more near the shores, where there is nutrients from runoff, rather than in the middle of the lake. I was thinking about how we could actually figure this out. And there's actually a whole network of scientists who work on similar lakes around the world, like really big freshwater lakes.

[MUSIC PLAYING]

And maybe we can see what is happening in their lakes to get a sense of what would happen in the Great Lakes. So take Lake Balaton. It's in Hungary. It's the largest lake in Eastern Europe. But it's still one-fifth the size of Lake Erie. So, you know, not Great Lakes big, but big for Eastern Europe.

I got in contact with Duane Chapman, one of the US Geological Survey's leading Asian carp experts. And he told me about the bighead and silver carp that are causing trouble in Lake Balaton.

DUANE CHAPMAN: And they have these enormous bighead and silver carp running around in there, and they're eating up all of the food. And they would like to be rid of them. In much the same way that we would like to be rid of them here.

BONNIE WILLISON: Have you found what the effects of the silver and bighead carp would be in the Great Lakes at all? Or in Lake Erie?

DUANE CHAPMAN: Well, we don't have enough data yet. And again, they haven't reached super high abundances there. They were at much higher abundances in Lake Balaton, because they were being stocked there.

BONNIE WILLISON: Silver and bighead carp were initially stocked in Lake Balaton so people could farm them. But it turns out that they don't reproduce well in Lake Balaton for some reason. So they stopped stocking them. But ever since, the carp have been outcompeting native species.

But fortunately, the carp populations have been declining on their own in that lake. And it's too soon to say how they would fare in Lake Erie. But at least we have the opportunity to see how these fish behave in really large lakes across the world.

And before I let Duane go, I just had one more question. It would be interesting to interview someone who was there when they caught the carp above the barrier in Chicago. Do you know who was there at that point?

DUANE CHAPMAN: Well, I don't know of all the people that were there. In fact, Kevin Irons is right here. He may-- he was probably involved in that.

BONNIE WILLISON: Oh!

DUANE CHAPMAN: He's sitting there across the room. I could ask him, if you want some information on that particular time when they caught that one fish. Actually, there's been two fish caught above the barrier. I'll ask him if he'd be willing to talk to you.

BONNIE WILLISON: Sure.

DUANE CHAPMAN: Hold on a second.

BONNIE WILLISON: OK.

DUANE CHAPMAN: Would you be willing-- yeah, just take the phone.

KEVIN IRONS: Hello, Kevin Irons, Illinois DNR.

BONNIE WILLISON: Hi, Kevin. This is Bonnie. I'm from Wisconsin Sea Grant. I was just talking to Duane, and I'm looking to interview someone who was there when they caught the two carp that were above the barrier in Chicago.

When I talked to Duane, he was at a meeting about aquatic invasive species.

SYDNEY WIDELL: Did he know that when you initiated the phone call?

BONNIE WILLISON: I knew he was going to be at a conference. I guess I didn't exactly realize that he was going to be around all these invasive species experts, which I should have milked that opportunity more than I did. But--

SYDNEY WIDELL: Just pass me around.

BONNIE WILLISON: I know, right. I kept being-- I wanted to be like, you know, next, next. But they were like, we have to go to a panel now. And I'm like, all right. But yeah, Kevin Irons was apparently right across the table when I spoke to Duane. And Kevin leads the Asian carp efforts for the Illinois DNR. And so he told me about what happened in 2010.

KEVIN IRONS: The one in 2010 was in Lake Calumet. And one of the first times we-- it may have been the first day we used contracted commercial fishermen. Hey, come here, use your skills. Let's see if you can catch or detect some fish. And that first day, he caught this bighead carp.

BONNIE WILLISON: Yeah.

Kevin wasn't in his current position back in 2010, but he said that at that point they had detected some eDNA from silver carp, when they were testing above the barrier.

SYDNEY WIDELL: What's eDNA?

BONNIE WILLISON: So eDNA is a way to test the water for fish cells to see what fish are in that water. So even though they thought there might be a silver carp that got through the barrier, they found a bighead, which was surprising, and also really alarming.

But Kevin said he wasn't surprised to see that the fish was in Lake Calumet, which is 6 miles from Lake Michigan. It's above the barrier, and it has a lot of plankton, a lot of algae blooms. It's kind of a good place for carp to survive. And so after that really alarming moment, they searched and searched but they didn't find any other carp.

So then since 2010, you had been testing the area-- or fishing the area, still, and then what happened when they found the silver carp in 2017?

KEVIN IRONS: Yeah, so I was sitting at my desk. It was an OMG moment. 9:44 in the morning, I believe. June 22. The same day--

BONNIE WILLISON: No way.

KEVIN IRONS: --that they caught the one in 2010. No really. So anyway, the-- and the same fisherman. And they called me and they said, uh, we caught ourself a carp. So immediately-- I mean, that's a concern to us, so we were in response mode.

They put a net around the-- it was in a marina. They put the net around a marina. They stopped. They took some photographs. They put it in the cooler. Didn't want those fish to get away. We dispatched CPOs. We handle it like a criminal investigation.

BONNIE WILLISON: What's CPOs?

KEVIN IRONS: We put a tag on. Conservation police officer.

BONNIE WILLISON: Oh, OK.

KEVIN IRONS: So we dispatched them to go then take possession of this. And then we take that to

Southern Illinois University, where they can do some additional tests.

BONNIE WILLISON: Do you want to hear the postmortem on this fish?

SYDNEY WIDELL: Uh, yeah, I want to hear the postmortem.

BONNIE WILLISON: So it was a four-year-old male silver carp. It originated in the Illinois and middle Mississippi watershed. It spent a quarter of its life-- so, I guess, a year-- in the Des Plaines river watershed. That's where it was found, and they still don't know how it got there.

Kevin is still mystified about how an adult fish could get through three electric barriers, 12 to 13 miles worth of fencing, as well. And so after they found that carp in 2017, they had an aggressive response where they captured 20,000 additional fish, just looking through to see if there was any more carp, hoping that there wasn't. And they didn't find any other ones. So obviously, this was a really big moment for Kevin. And I bet it must have been huge at the barrier, back at the barrier, too.

SYDNEY WIDELL: Yeah, that is such a cursed story. Like, that it happened on the same day.

BONNIE WILLISON: Right. Back at the barrier, we asked Chuck about those two carp, too. And he seemed just as mystified. But one thing that he emphasized was that it would be, one, like Kevin said, extremely hard for the carp to make it through this system of barriers unaided.

And two, between Romeoville and Lake Calumet, the channel, it passes through these extremely industrial areas. The water is very polluted. I mean, it's, like, four miles down from what is truly the largest wastewater treatment plant in the world. 70% of the water coming through that canal is effluent apparently.

So there's not a lot of food in there for carp to eat. Just very, very poor habitat-- like, a carp would have to be very desperate or out of its little carp mind if it wanted to make that journey. So he was puzzled by it as well.

He also said that they track the population front rigorously. So that's, like, where the carp are now. And that has remained roughly 20 miles downstream for a pretty long time.

KEVIN IRONS: It seems like the location of the Asian carp has been pretty stable for some time now. And that's the good news for us.

SYDNEY WIDELL: But do you think that it's inevitable that one day the carp are going to make it to the barrier? And what do you think that day is going to be like?

BONNIE WILLISON: I don't know. It's hard not to be cynical, and just say, like, aren't they going to keep trying to get to new territory. And I just feel like it is kind of inevitable. What do you think?

SYDNEY WIDELL: Right. There is something-- we were talking about this earlier, there's something about it that just feels like a doomsday countdown, almost. Like watching the progression of these fish moving up from pool to pool to pool, like past these dams and locks.

BONNIE WILLISON: As we visited the barrier, I just kept thinking about that very thing. Like, these people are spending their career waiting for this one day. And trying to prevent this one species of fish from coming. And what they think is going to happen, I guess. So I did ask Chuck about what he thinks about if the carp are going to make it, and what that would be like for him

CHUCK SHEA: Well, in general, any advance would be a bad thing, for everybody. So yeah, I would say we wouldn't be happy to hear that. But we've done a lot of research. And we have a lot of redundancy now, and more coming. So I think we're in a good position to stop them, should they get here. We're ready. We're ready if they do get here. We hope they never do. But we're ready if they get here.

BONNIE WILLISON: In fact, the Army Corps is in the process of building another even more powerful barrier. And that construction was underway when we visited. This one is slated to go online sometime in 2021.

CHUCK SHEA: This is the new barrier. It is going to be more powerful than even either part of barrier two. And it is under construction right now.

BONNIE WILLISON: But the whole time we're hearing about this, the real obvious question in our minds is, why we keep spending more and more money building these systems, when the alternative would be to just shut the canal?

CHUCK SHEA: That's often the first question that people-- and a good first question-- is well, if you're worried about it, just plug it. And then the problem's solved. It's a complicated issue.

BONNIE WILLISON: Some people argue that it's complicated because this closing the canal would hinder all of the trade that moves up and down, up and down it. But what Chuck said that struck me as the biggest obstacle is that all of the Greater Chicago area, since 1900, has been built so that all of its wastewater gets channeled through this wastewater treatment plant. And then that wastewater eventually ends up in the canal.

So if you closed the canal, you would essentially have to replumb Chicago, and all of its suburbs. As long as electricity is flowing into the canal, the hope that everyone is relying on is that the carp will not make it past Romeoville.

CHUCK SHEA: I mean, everybody understands that that's the ultimate mission. That's what this is all about. I think the biggest thing we all focus on is maintaining power in the water. That's the number one credo out here. Never, ever, ever, ever, ever let there be no power in the water.

SYDNEY WIDELL: So as long as there is electricity flowing into that water, in theory the carp are not going to make it past this point. But in the event they did, is Wisconsin prepared?

TITUS SEILHEIMER: Yeah, I don't think we're-- I don't think we're prepared. I think one of the challenges-- and it's the same with something like climate change-- when you talk to fisheries managers about what they're worried about, it's what's happening this year. It's maybe five years. And, you know, I think this is still-- it's kind of a big question mark. And I don't know how much-- actually, I don't know how much you could even prepare for it.

[MUSIC PLAYING]

[THEME MUSIC]

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