[MUSIC PLAYING]

BONNIE WILLISON: I'm Bonnie.

SYDNEY WIDELL: And I'm Sydney.

BONNIE WILLISON: And this is *Introduced* from Wisconsin Sea Grant.

SYDNEY WIDELL: Bonnie, where is your water lettuce right now?

BONNIE WILLISON: Oh, the water lettuce that I bought online for experiment last season?

SYDNEY WIDELL: Yes.

BONNIE WILLISON: Yeah.

SYDNEY WIDELL: Like, can I have a visual on it? Is that possible?

BONNIE WILLISON: Well, physically, my water lettuce-- because they are illegal to have in the state of Wisconsin because it's an invasive species I kept it in my kitchen for a little bit, but then it wasn't doing too well, so I threw it away.

SYDNEY WIDELL: Was that hard for you?

BONNIE WILLISON: It wasn't that hard. I know you got really emotionally tied to your water hyacinth, but I didn't feel quite as strongly for some reason. Maybe it's because I have just like a lot of other plants, and this one-- I just didn't know how to feel about it, I guess, just because it is invasive.

SYDNEY WIDELL: I mean, yeah.

BONNIE WILLISON: Where is your water hyacinth?

SYDNEY WIDELL: It died. I think it got cold, and it died. So if you recall, last season Bonnie and I wanted to know how easy it was to buy something that, you know, is technically prohibited, how easy it is to buy something like that online. If you don't recall, you can go back and listen. It's episode seven of our podcast *Introduced.* But here's a little refresher.

BONNIE WILLISON: I want a plant too. OK.

SYDNEY WIDELL: Wow.

BONNIE WILLISON: Water lettuce is called Pistia stratiotes, and I'm going to get five pieces-- is dwarf water lettuce? How is that different?

SYDNEY WIDELL: Tragically, Tim Campbell, our aquatic invasive species coordinator, asked us to report our plants to the Wisconsin Department of Natural Resources.

BONNIE WILLISON: Right. So I looked up my DNR invasive species coordinator, and I found Pete Jopke, and so I called him to report it.

PETE JOPKE: Hello, it's Pete.

BONNIE WILLISON: Oh, hello.

PETE JOPKE: Hello?

BONNIE WILLISON: Hello?

PETE JOPKE: Yep, this is Pete.

BONNIE WILLISON: Hi. So I am a resident of Dane County, and I-- so I bought some water lettuce, and I wanted to report it to you.

PETE JOPKE: Oh, well, thank you.

BONNIE WILLISON: Yeah, that this company shipped it to me. Yeah, I got it on eBay I think.

SYDNEY WIDELL: OK, so that's where we left off. What happened next was this flurry of emails between different branches of the DNR. Here is a timeline of what we know for sure happened. A day after Bonnie reported the plant to Pete, Pete emails a bunch of AIS outreach specialists and some other people in water resources management, and he basically tells them exactly what you told them.

And he asked them what they think should happen next. I had really expected that there was going to be some sort of protocol that-- like, it was going to be very obvious like this is what our next step is, but it kind of seemed like they take these things on a case-by-case basis. Is that what you were feeling?

BONNIE WILLISON: Yeah, although Pete had said that people have-- I think he said people have reported stuff to him before. It hadn't happened in like years, and so it kind of made me think that people aren't like calling these people all the time, and they're having to deal with this.

SYDNEY WIDELL: One of the people that Pete had copied into this email was this person named Matt, and Matt had dealt with stuff like this before. Matt said that this is something that would probably get referred to what the DNR calls stepped enforcement.

BONNIE WILLISON: Isn't that that they would like first communicate the law and then ask nicely to take the species off the internet and then like escalate it from there if they needed to like step in with some other like law enforcement like a ticket or something?

SYDNEY WIDELL: In the email, Matt said, and I'm quoting, "The law doesn't have much teeth at this point." The last time we heard from the DNR was in early July. But they said that this process could take several months, so I wanted to check in and see where all of this stood.

In the end, I was able to get in touch with Bob Strauss. He's the DNR detective we talked to a few times last season. He confirmed for me that he was able to get in touch with the people who sold you the water lettuce, and actually it came from this really small patch up in Miami. And when I went back to check the original eBay listing, it was taken down. So Pete who was the person you contacted, he told me about two other incidents where water lettuce was introduced in Wisconsin.

PETE JOPKE: You know, we know we've had it here before, so it's been recorded. We've had a few instances of it. The last one I was familiar with was-- and if I'm not mistaken would have been University Bay on Lake Mendota. A lake specialist for the region actually led that response. She went out with a group of volunteers and they actually hand pulled it out of there.

Probably someone at the university dropped it in thinking they were going to save this plant, didn't know what it was, and that's how a lot of this stuff moves around, you know. But ironically enough, within the next week, I see this Facebook ad for this woman in Mount Horeb was advertising free water lettuce, and I'm going, what the hell's going on with water lettuce right now, you know?

SYDNEY WIDELL: I asked Pete to give me an estimate for how much interventions like having a crew of people go out on a lake, for example, and pull water lettuce, how much something like that typically costs, and he gave me a really big range. Managing a weed on a small private pond might cost the DNR $4,000 a year, and that project might have a timescale of roughly four years.

But there have been times when Pete's been involved in projects where they've chartered helicopters to dump pesticides over lakes to get rid of carp. Something like that costs $40,000 just up front plus all the years of research and monitoring plus all the DNR time and research.

BONNIE WILLISON: Whoa. Yeah, even $4,000 a year for four years sounds like a lot for just a little private pond, you know?

SYDNEY WIDELL: So there's very little question that the plant you bought-- like, its value is far outweighed by the potential harm and damage it could do if it ever got out in Wisconsin, like ecological and economic damage, which is fundamentally what makes something an invasive species. It's capable of causing economic and ecological harm.

People have introduced species in the past because they thought they could make money off of it or they thought like introducing something would be profitable. And one example that we're kind of obsessed with is this myth about a man who single-handedly introduced rusty crayfish to Wisconsin from Indiana. He brought them up north with him in like a five gallon bucket and then dumped them out into this lake and hoped that he could sell them as bait.

And now, of course, we know that that was such a bad and expensive idea, and it really screwed up the fishery in northern Wisconsin. And Rusty crayfish are still spreading like 60 years after. But we've also found examples of new ideas and businesses growing up around invasive species, and we're going to bring you some of those stories today.

BONNIE WILLISON: We learned all about New Zealand mud snails earlier this season. You told me all about them. They're the tiny invasive snails, and they reproduce asexually, and they're threatening to invade Wisconsin trout streams.

SYDNEY WIDELL: Yeah, I talked to Ellen Voss for that story. She's an aquatic invasive species coordinator with the River Alliance in southwestern Wisconsin, and she told me all about it.

BONNIE WILLISON: Yeah, so she and the DNR are really concerned about these snails. And you mentioned that they're going to be working with some special experts to identify streams that have the snails. I talked to one of them.

[DOGS SNIFFING] You didn't get everything yet.

These special experts are dogs, if you couldn't tell. That was Betty. So--

SYDNEY WIDELL: Betty!

BONNIE WILLISON: We met the Midwest Conservation Dogs, a group that is also called Conservation Dogs Collective, as the dogs were sniffing for New Zealand mud snail on this project. They got samples from different creeks like Black Earth Creek and creeks around the Driftless where Ellen lives and had the dogs sniff to detect invasive species. I am so fascinated by this concept. I wanted to learn more.

LAURA HOLDER: Dogs can do that? That is the most popular response we get when we are at events or if we are just talking to people, regardless if it's a pet owner, general public.

BONNIE WILLISON: That was Laura Holder. She's the executive director and the dog handler for the Midwest Conservation Dogs Inc. She's kind of like an expert dog translator. Like she's so in tune with dogs' behavior. Before she became the executive director, she was really involved in canine nose work, which is apparently like a sport for involving dogs and sniffing things out.

Also on the call was Amy Wagnitz. She is also with the Midwest Conservation Dogs as their director of programs, and she's got more of a background in ecology and conservation. The Midwest Conservation Dogs Inc, they're based in the Milwaukee area, and they train dogs and deploy them for conservation purposes. So basically anything that you can think of that has a scent, you can train dogs to go and find it.

So they can use dogs for invasive species and endangered species. Like, they've worked with endangered bumblebees before, seeking those out. They can sniff for invisible bacterium, insects, plants. Here's Amy Wagnitz, director of programs.

AMY WAGNITZ: For invasive species, for instance, our role is in early detection of species that we don't want in a place. So before humans can locate the species by sight, dogs can almost 100% find them before humans can. They're as far as the opposite end of the spectrum for conservation with the charismatic megafauna. They can track a grizzly bear through wild lands where humans are scratching their heads staring at the same landscape.

So the role of a conservation dog is to find things that humans have a hard time finding, and it can be all across the board. For instance, we did some work with endangered turtles where humans can find turtles, absolutely. But dogs could find them as well, and working together we were able to find more and more individuals and some individuals that were never in the log book before.

When we were doing the wild parsnip project, in particular a couple of people who knew about wild parsnip, they were like, why do we need a dog? You can see that from, you know, outer space. And it's like for the early, early growth of that plant and to help keep those kind of like satellite populations that can pop up, right? So as the early indicators of population control, we can use dogs to help mitigate some of the spread of invasive species.

BONNIE WILLISON: As anyone who is familiar with invasive species knows, that early detection is really key because once an invasive species is established, it's really hard to get them out, and you're often just out of luck.

AMY WAGNITZ: So one of the current projects that we're working on is the New Zealand mud snail, which is a new-ish species. It's been here for a little while, but it has not spread throughout the state yet. Let's say that. We are working with some local agencies to pilot a program to detect the New Zealand mud snail within sediment samples. So stream biologists are going out to the streams, collecting their samples, and we are having our dogs survey the sediment samples to determine the absence or presence of mud snails.

BONNIE WILLISON: Some of the biologists that are taking the stream samples are none other than our former podcast guests, Maureen Ferry from the DNR and Ellen Voss, and a host of all other people.

[CHATTER]

FEMALE SPEAKER: Hello, everyone.

FEMALE SPEAKER: Hey.

FEMALE SPEAKER: How's it going?

FEMALE SPEAKER: Good, how are you?

FEMALE SPEAKER: We're all in glasses.

FEMALE SPEAKER: Yeah, I know, like undercover.

BONNIE WILLISON: They did invite us out to see the dogs, and so we were all going to meet at this park and ride that was near Milwaukee.

SYDNEY WIDELL: Yeah, I was so excited to see the dogs in action.

BONNIE WILLISON: Me too because I still had questions about like what it looks like when they're sniffing for New Zealand mud snails. Like, what do the dog's behavior-- like, what does it look on these days in the field. So once everyone met at the park and ride in this parking lot next to a busy intersection, Laura called us to order and gave out clipboards with these sheets of paper so that we could all take notes and mark down the different specimens.

SYDNEY WIDELL: She also gave us goodie bags with dog treats and stickers.

BONNIE WILLISON: So nice seeing as we were just there.

LAURA HOLDER: OK, thank you guys for-- and gals for coming out today. I'm excited. I'm very, very excited to work the dogs on the sediment samples. And honestly like, full disclosure, they've been performing quite well the past couple of weeks, right? But as a dog handler, like every day is almost a different day with the dog, OK? I'm very-- I'm quite confident they're going to have a pretty great performance today.

BONNIE WILLISON: So behind Laura's car she had a line of Mason jars set up in little holders. And so the plan was to have out seven samples of sediment and run the dogs in a straight line by the sediment so that they could sniff each jar and then be able to signal if they smelled New Zealand mud snail within that sample.

The dogs' fieldwork looks different with every project. Like this time we were in a parking lot because they need a more sterile environment or they're worried about the dogs actually spreading New Zealand mud snail just because the snails are so tiny they could cling on to anything.

But sometimes Laura, Amy, and the others are out in the field like in a forest running by a river. You could even have the dogs in a boat like sniffing around from the boat. It was so exciting to see the dogs finally come out of the car. They were kind of in their kennels until they were ready to work. So Ernie came out first. He is a three-year-old yellow lab, and he's the only male out of the four Midwest Conservation Dogs.

LAURA HOLDER: Personality-wise he's like a total derp-a-lerp when he's not working. He's a very silly boy. He fricking loves food, like a lot. And that is his paycheck for when he is working. His like signature style when he is doing his sniffing, he's very-- like, he's a very wide working dog. So to an untrained eye, it can look like he's like just kind of fooling around and, you know, taking a while. But like this is all part of his signature sniff moves, as I call them.

SYDNEY WIDELL: That's so cute. His signature sniff moves.

LAURA HOLDER: Sniff styles-- it's almost like if you think of like penmanship in humans, like we all have like different penmanship, and that all is a visual representation of just like how our muscles move around in space. Sniff styles for dogs are some of the observable expressions of their body as well as the like audible sounds of them sniffing.

BONNIE WILLISON: I just really loved how Laura was like-- she's just like so in tune with the dogs in how she describes their personalities. It's so cute. Also on the job was Betty White, and she is a one-year-old black lab. So she comes out after Ernie.

SYDNEY WIDELL: Betty White as in the actress.

LAURA HOLDER: She is a fricking-- I sound like a mother, but I'm like, she is like a powerhouse when it comes to detection work, which is incredible to like see her switch over for such a young dog. Like she was bred to be a detection dog. So she's very detail-orientated in her signature sniff moves. She will like sniff every little like square inch of a cupboard or whatever we're working on in a particular moment.

SYDNEY WIDELL: OK, so, so far we've seen Betty White and Ernie. Betty White and Ernie both ran down the line, and they sniffed all the samples. And it's a lot more complicated than I had really thought about because like where the wind is coming determines where the dogs are going to be sniffing and how much sample they're going to smell. And yeah, that was really cute.

BONNIE WILLISON: I know they were working, but it was very cute. So Laura would run the dogs pretty quickly. They would go by the containers once, and then they would come back, and then they would take a rest in the car. So what did you think about watching? Was it what you expected the conservation dogs to be like?

SYDNEY WIDELL: I was kind of taken by the amount of discussion and interpretation that went along with this. Like, I thought it was going to be very clear like, oh--

BONNIE WILLISON: Yeah.

SYDNEY WIDELL: --Ernie is pointing, you know? Or barking or something. This means that there's a presence. But Ernie would kind of-- there was one time where Betty-- we had a long discussion about like the side eye Betty gave. Like did her side eye mean there's snail in the sample? Like, there's a lot of uncertainty. And sometimes like the dogs would have like a different consensus. So it was like, do we default to Ernie? Like, which dog got it?

BONNIE WILLISON: Yeah, that's true. Yeah, I think this was only the first kind of go around on this project, and so Maureen knew that some of the samples for sure had snails in them, some might have been for sure they didn't have snails, and then some were really up in the air.

So things kind of did actually get real for me during the middle of this because at first it was just like, oh, wow, look at the dogs. Like they see snails, they don't see snails. They smell snails, they don't smell snails. But then things kind of get real when you're like, oh, the stream that we didn't think would have any snails, sometimes the dogs are signaling.

Are we learning something we don't know? Is it a fluke with how we scooped up the sediment? Is it a fluke with how we scoop the sediment out of the bag? There's just so many factors that they're going to be trying to streamline as we go along.

SYDNEY WIDELL: Yeah, it was like we were watching them refining this process in real-time, which was exciting and how science happens.

BONNIE WILLISON: I wouldn't have even known that New Zealand mud snails have a specific smell that you could train an animal to smell, you know? But apparently they do.

SYDNEY WIDELL: Well, you smelled one.

BONNIE WILLISON: I actually did. I couldn't resist going up to the jars and being like, let me take a sniff.

SYDNEY WIDELL: What did it smell like to you?

BONNIE WILLISON: The one I smelled smelt like lake bottom. What did you think it smelled like? Because you took a smell after me.

SYDNEY WIDELL: I was getting like straight up dirty shoe from that sample, like old running shoe or bottom of a pond.

BONNIE WILLISON: So I was still curious like, how do you teach a dog to smell a certain type of snail?

LAURA HOLDER: Yeah, we call it like the target odor training. So whether that's New Zealand mud snail, your car keys, a piece of, I don't know, cardboard or something, it's all classical conditioning. So in a nutshell, A equals B. That's classical conditioning.

So this smell, New Zealand mud snail, car keys, whatever, immediately will produce something enjoyable for your dog. So it's that repeated process of just like A equals B. New Zealand mud snail means your ball's going to be thrown. [INAUDIBLE] Whatever. Like repeat, repeat, repeat.

And that process is actually pretty easy. It's quite easy to teach a dog relevance in a target odor. What is not the easiest part is the whole like handler learning to read their dog in all the scenarios of is my dog sniffing the target owner, are they sniffing dog pee, or are they sniffing nothing, you know?

BONNIE WILLISON: One of the reasons that I think this concept is so interesting is because it's like there are professional dog trainers, there are professional natural resources people, but like do those two worlds like come together often? And like what do those two worlds learn from each other? And so I asked Amy and Laura because Amy is the one with the natural resources background and Laura is the one with the dog behavior background.

AMY WAGNITZ: There's a reason why I fangirl every time Laura goes off on a tangent about dog training because it's fascinating to me. And animal behavior was one course that I took throughout my college career. And it's just-- it's inspiring. It's incredible to listen to it because it's science.

LAURA HOLDER: Getting to know the science behind why the species we're working with are important, like it continues to blow my mind. Like oh, like one New Zealand mud snail female can establish a brand new population. You're like, what? And that goes with even the rusty patched bumble bumblebee. You know, I knew bumblebees were a thing, like a species. But I had no idea that there were like over 300 different species of bumblebees.

And then I'm always like, nobody knows about this. Like we need to tell everybody. How did I not know, you know? And the fact that people are actually studying all of that to like document all of it I'm just like, holy Christmas. So much is unknown yet.

AMY WAGNITZ: I love it.

LAURA HOLDER: I just can't. I mean, I would love it if all invasive species were gone or managed or whatever. But the whole endangered, the threatened stuff, I don't think the dogs will ever run out of work.

AMY WAGNITZ: And even if we stop working on one species there will always be another. And even when an invasive species is eradicated from a certain area, there's always monitoring efforts that go on.

BONNIE WILLISON: You can find Midwest Conservation Dog Inc at MidwestConservationDogs.com and on Facebook and Instagram. You can support their work with a like and a donation. MCDI, they're this business, and they have a role in prevention and detection, really important role. I'm also interested in other businesses on the periphery of aquatic invasive species like thinking about how when some aquatic invasive species are introduced it can bring opportunities for other businesses or industry.

SYDNEY WIDELL: Right, and I think like some of the time what we're talking about doesn't even qualify as management, and maybe that isn't the point. Like management for invasive species isn't supposed to be sustainable. Like the end goal is to eradicate or contain whatever is causing problems.

The carp harvest in Illinois is a really good example of that where you have people who are getting paid to remove as many carp out of this river as possible. But once the carp are gone, if the carp are ever gone, that would be like the end point. Tim Campbell, our aquatic invasive species specialist, has a really good way of putting this.

TIM CAMPBELL: It's very clear that the purpose of those efforts are to reduce the abundance of carp. And then anything they can do to sell the fish is just like a byproduct. You know, it's not the purpose of the harvest efforts. It's like a byproduct of the harvest efforts. And I think efforts to harvest invasive species like that probably need to be framed more in that-- I guess, framed like that versus some long-term sustainable way for somebody to really make a living.

SYDNEY WIDELL: After the break, the line between what is management and what is not management-- that line gets blurry.

CAPTAIN NATE WALLICK: You know, I always tell clients, you know, every fish they kill is a potential life saved. So you never know. That could have been the fish that popped out and hit some poor little kid in the tooth. So I guess you can get your good deed through that. It's kind of the American way. I mean, you're basically turning lemons into lemonade.

SYDNEY WIDELL: The Wisconsin Coastal Atlas is your one-stop shop for information about Wisconsin's Great Lakes coasts. Want to learn more about the lakes around you? Or maybe you're a researcher looking for mapping tools. With the Wisconsin Coastal Atlas, you can browse interactive maps, share open source spatial data, or find the tools you need to make informed management decisions. Find the Coastal Atlas by visiting WICoastalAtlas.net.

Silver carp don't have too many natural predators in North American waters, but enter Captain Nate Wallick. He's a firefighter from Peoria, Illinois, a self-described metro redneck, and he's got a less traditional side gig.

CAPTAIN NATE WALLICK: Basically, I run Peoria Carp Hunters, which is a aerial bow fishing charter on the Illinois River. I've been doing that for about 10 years now.

SYDNEY WIDELL: Nate specified that aerial bow fishing is different than traditional bow fishing, and that's because it's aerial.

BONNIE WILLISON: Like, what part of it is aerial?

SYDNEY WIDELL: The part where the silver carp are jumping out of the water and you're shooting at them is the aerial part in this situation.

BONNIE WILLISON: OK. OK.

SYDNEY WIDELL: Do you want to explain what silver carp are?

BONNIE WILLISON: Yeah, they're one of the four species that we collectively call Asian carp. And those are the ones that you see in YouTube videos that jump a lot. Like, they jump into people's boats, right?

SYDNEY WIDELL: Yeah.

BONNIE WILLISON: We consider them invasive because they've really harmed fisheries and tourism in the US. They reproduce super quickly allowing them to outcompete native fish.

SYDNEY WIDELL: Upstream of Peoria, Illinois in the Illinois River, supposedly that's where there are the highest densities of silver carp anywhere in the world, including in China, which is their native range.

CAPTAIN NATE WALLICK: When I saw my first fish jump, I ran back, got my bow, and started shooting at them, and started taking family members out. They started shooting at them. And then I went and told my wife I'm going to blow my life savings on a boat and a bunch of gear and see what happens. So that's what I did. If you build it, they will come.

SYDNEY WIDELL: And they did come. Nate's clients come from all across the United States, and they include people who have had a lot of experience hunting and fishing and also people who haven't. Nate says bow fishing is for everyone.

So how this works is the vibration of Nate's boat agitates the carp when they're underwater, and it makes them jump out into the air. And that's when you can shoot at them with a bow and arrow. And the arrow is on this line basically that's attached to a reel. So you shoot the arrow. It goes-- you probably miss the fish, honestly. And then you reel the arrow back in.

CAPTAIN NATE WALLICK: Best way I can describe it is-- I always tell people like, take your best hunting and fishing experience and then basically just combine the two and then mix in a bunch of steroids. You know, let's face it, the reason why people don't like fishing or hunting is because it can be boring.

Nobody wants to sit in a deer stand all day long, and nobody wants to sit in a boat all day long and maybe catch one fish. But with this, everybody can go out, have a good time, and it's nonstop action. There's something-- it's like-- let's put it this way. It's like whack-a-mole for adults.

SYDNEY WIDELL: Nate's actually been in a few viral YouTube videos. In one he's water skiing in the Illinois River. He's wearing armor and a helmet and swinging a baseball bat at flying silver carp. The more views he got, the more he felt compelled to escalate things.

He and his friend have started carrying swords when they pull stunts like this. In one video he's got his daughter tubing behind a boat in a cage so she doesn't get hit by flying fish. Nate told me that the carp are fine as long as they stay underwater. But once they jump out into the air, they're in his domain, and then they're fair game. We interviewed Nate a few months ago, and we were so intrigued.

BONNIE WILLISON: Oh my gosh, the conversation with Nate was wild. Like he just seems like a very, very adventurous person. Like, always pushing the limits and always like taking people out and showing them, which is also really cool. But he definitely had some really wild stories.

SYDNEY WIDELL: Yeah. Yeah, for sure. So we made plans to go down to fish with him on a weekend, and then Bonnie bailed. It's OK though. You did miss a wild time, but I'll fill you in.

BONNIE WILLISON: I know. I was sad to miss it, but I am so excited to hear about this trip.

SYDNEY WIDELL: So because Bonnie couldn't come I invited two of my really close friends from high school, Celeste and Alison, who you will meet in a second. We've more or less been a quarantine pod. I was nervous personally because I don't know if I oversold it as much as I was just not capable of explaining what was going to happen.

BONNIE WILLISON: OK, I see.

SYDNEY WIDELL: So I was confident no one knew what they were in for. We left Milwaukee at a cool 5 o'clock in the morning. What are you expecting?

ALISON: I am expecting to be really bad at this.

SYDNEY WIDELL: That was Alison.

CELESTE: I just want to shoot the water. I don't want to hit the fish.

SYDNEY WIDELL: And Celeste. We're headed to this town called Lacon, which is a little bit upstream of Peoria.

ALISON: It should be noted that on the drive here as we listened to the radio, we heard two stories that made us a little apprehensive, one about whale harpooning and they talked about how they made eye contact with the whale as it was harpooned, and it was really emotional, and then another interview with David Attenborough where he said we've gotten too good at fishing, and that's a problem. And so that just felt really foreboding--

SYDNEY WIDELL: It did.

ALISON: --as we head to go harpoon living things.

SYDNEY WIDELL: I did not grow up fishing, which is definitely something I regret. And I asked Celeste and Alison, because I feel like we had like very similar childhoods, to tell me about their experiences fishing.

ALISON: I've caught, I think, three fish in my lifetime. And at no point was it ever like a calm ordeal. I always was panicking whenever I caught the fish, and someone had to take over my line for me.

CELESTE: You just freeze up?

ALISON: Because, yeah, I freeze. And it's just never been like smooth. I've never just felt a bite and then worked it into the boat. It's always a situation. I'm just-- I'm freaking out. There's a fish on the other end, and it doesn't want to be caught.

CELESTE: I feel like I've gone fishing a fair amount. Like as a kid, my dad would take us to like the little lakes and like Milwaukee parks, and we would sit there. It was more of just-- I felt like that was fun because of the people-watching really.

SYDNEY WIDELL: And headed in, my goal was to catch exactly one fish, and then I wanted to take it home with me and cook it and eat it. As we got closer, I definitely got more and more apprehensive. Lacon though was beautiful and hilly and wooded. Oh, look at that bridge. That's impressive.

CELESTE: This is kind of-- oh, look at the fall decor. Classic. We've arrived.

ALISON: Ah, is that their old train station?

SYDNEY WIDELL: Oh, it's really pretty. There were a few other cars in the marina parking lot when we got there. It was obvious which truck belonged to Nate because the flatbed was full of buckets and bows and arrows, and you could just like see the arrows sticking up out of the truck bed. Good to meet you in person.

CAPTAIN NATE WALLICK: Throw some stuff on the boat.

SYDNEY WIDELL: So we went down to the docks, and we waited in the boat as he started moving gear around. And it's this big pontoon, which actually has an extra pontoon part on it, so he calls it a tripoon. And it's like a normal pontoon except it has nets on all the sides, which I was assuming was to keep carp from flying into the boats as you're going.

And then the back of the boat was open. Like you know, normally it has a rail, but there is no rail. There were just like some essentially bar stools, and they had like seat belts on them. And Nate said that the safety belts were actually just optional.

BONNIE WILLISON: Course they are. Did the boat have a name?

SYDNEY WIDELL: Yeah, the boat was-- his pontoon was called The Carpocalypse.

BONNIE WILLISON: That is amazing.

SYDNEY WIDELL: I was also remembering how the one and only other time I had been on this river was with you, Bonnie. And we were upstream at the Chicago Ship and Sanitary Canal, and it was just so radically different than this place. Everything up there just felt so--

BONNIE WILLISON: Industrial.

SYDNEY WIDELL: Yeah, it was just funny to consider that this was just water flowing out from Chicago.

BONNIE WILLISON: Yeah, and these are the fish that could potentially swim up closer to the canal.

SYDNEY WIDELL: Before we get started--

CAPTAIN NATE WALLICK: I assume everyone can swim?

CELESTE: Yeah.

CAPTAIN NATE WALLICK: So I'm going to show you guys--

SYDNEY WIDELL: Nate gives us this quick little safety demo.

CAPTAIN NATE WALLICK: [INAUDIBLE] like that. [INAUDIBLE] Perfect.

SYDNEY WIDELL: [INAUDIBLE]

CAPTAIN NATE WALLICK: Yeah.

ALISON: Whoa!

CELESTE: All right.

CAPTAIN NATE WALLICK: Now, hit your brake. [INAUDIBLE] Right here. Don't stare at the arrow or the bow. Just stare right at that fish you're shooting at, and put your thumb right here on your cheek. And the more shots you do, the better you're going to get at it. So just don't be afraid to shoot. People have a hard time just letting go, you know? When they're jumping, they're like no, no, no, no, no. All right.

SYDNEY WIDELL: And then we pull out of the slip.

CAPTAIN NATE WALLICK: Now, before we over there and get away from these fish, we're going to go on a-- I'm going to take us into a rock quarry real quick.

SYDNEY WIDELL: The whole time bald eagles were just circling overhead.

BONNIE WILLISON: What? That's amazing.

SYDNEY WIDELL: As we're going, I'm looking down into this really murky water. And you can't see very far down, but I'm just trying to imagine how many carp have to be swimming around us. Nate told me that at one point, 80% of the fish biomass in the river. So that's like everything in the river that's a fish, 80% of that was silver and bighead carp.

And then there's the statistic that silver carp eat 20% of their body weight in plankton every single day. And I've heard those things before, but to actually be on the river and see the size of the river, it really just put all of that into perspective for me.

BONNIE WILLISON: He's going into a rock quarry?

SYDNEY WIDELL: Yeah, he took us into the rock quarry. He knows all the places where the carp hide out. It was really quiet on the river. There are some barges that were being filled up with corn. And it was only just starting to look like fall down here even though it was like completely fall up in Madison at this point.

I didn't realize how far south we were, but it was like a different season than the one I had left in Madison. So we're going. We're boating into this like little enclave behind like a dredging project. And then the fish just started leaping, and it was-- it sounded like rain hitting the water honestly. And it was amazing.

BONNIE WILLISON: Like, how many fish?

SYDNEY WIDELL: Nate told me, compared to what we would have seen maybe even a month ago when it was warmer, this was nothing.

BONNIE WILLISON: Yeah.

SYDNEY WIDELL: I could have just sat on the back of the boat and watched the fish jump, and that would have been more than enough for me.

BONNIE WILLISON: Like a fish ballerina show or something.

SYDNEY WIDELL: Yeah. Shooting them though was so much harder than I thought. Like, Nate said that the bows were light, but like after the fourth or fifth shot my arm was getting so tired from pulling back on the-- what do you call that part?

BONNIE WILLISON: Drawstring?

SYDNEY WIDELL: Thank you. Pulling back on the drawstring.

BONNIE WILLISON: Is that real? I don't know anything about--

SYDNEY WIDELL: I don't know. It sounds real. My arm was getting so tired like after I missed like my fifth fish. It was frustrating. I was like thinking I would be hitting fish right away, but that was not the case at all. And actually Nate told us that it takes people-- it takes most people about 45 minutes of shooting to really get into the swing of things and start hitting fish. We shot a lot, and I just like kept missing by so much.

BONNIE WILLISON: Yeah.

CAPTAIN NATE WALLICK: Who you think might be the best is never the case with this sport. So I'll take out a family, and the dad's a big time deer hunter and the kid never got into hunting but play video games. Well, the kid's back there slinging arrows left and right. You know, his brain is running a lot faster. The dad's back there basically waiting for a perfect shot all day long. And the kid just smokes the dad because his brain's running, you know, at a faster rate.

BONNIE WILLISON: So how fast was the boat going, do you think, when you were trying to shoot them?

SYDNEY WIDELL: Not fast. It felt fast because apparently I have really bad reaction times. But yeah. Not that fast. A tiny bit more than an idle I'd say.

BONNIE WILLISON: And how do you even begin to aim at a fish when the fish is coming up only for a few seconds? Like I'm just trying to imagine how you even like get one.

SYDNEY WIDELL: Yeah, Nate said that today was harder than usual because the water is getting cold. And when the water is warm, the carp are way more energetic and they'll jump 10 feet into the air, and you can get carp like flying onto the roof of this pontoon. And this summer, the carp were only jumping like a foot or two out of the water. So it's like way less time to aim and shoot.

But yeah, I don't know. Nate was like, just point the bow and arrow at the carp. And I was like, what? It's moving. Did you see? Is it moving for you? Yeah. But I don't really play that many video games, and maybe that would help me. So what are your other questions that I can answer?

BONNIE WILLISON: Those were my questions, I think.

SYDNEY WIDELL: It's getting so cold that Nate thinks that this is really his last week on the water and he'll be done leading trips for the season after this weekend.

CAPTAIN NATE WALLICK: And then I'd say like in another week or two you'll have it to where just their heads are kind of bobbing out of the water and then they go under. They just don't have the energy. Heck, I think cold affects everybody the same way.

SYDNEY WIDELL: I told Nate about my goal, which was to catch one fish. And he suggested I take a net and just stick it down into the water.

BONNIE WILLISON: No way.

SYDNEY WIDELL: Which I do. And I just felt like this tug inside the net, and then I yanked up, which is hard because it's heavy because this fish is huge. And then I'm just like holding this carp, and it's like flopping around in my hands a little bit. And Nate like very quickly just like takes it from me and puts it in this bin.

Nate says that a lot of his Chinese clients will keep their carp, but other people just leave it for Nate, and Nate throws them away or he uses them as compost. An hour and a half into our two hour trip we only had that one carp that I'd caught. And it was OK because I only wanted to catch one, but like it was still a little bit like humbling.

BONNIE WILLISON: For sure. Yeah.

SYDNEY WIDELL: During our interview with Nate, he talked about how he can kind of tell when people are getting like distressed because they haven't caught as many fish as they thought they would. And he said that like sometimes your ego can get in the way a little bit and like you start to care less and not try as hard because you're feeling bummed out about it and that he has like some tricks uses to motivate people.

CAPTAIN NATE WALLICK: You almost have to-- it's almost like you have to be, you know, I don't want to say personal trainer, but you know, almost kind of like a coach. I hate to say it. You know, I mean, you got to pick up on people's body language, and then you got to know when somebody's dropping off and maybe stop the boat, give them a quick pointer, show them a few more things, and then get them back into the game.

SYDNEY WIDELL: And at this point, I was feeling like he was starting to pull some of those tricks on us. At one point, Celeste asked him to shoot a carp, and he said he wasn't going to do it right then. But I could tell that he was thinking about it. And a little bit later, he chokes the engine and just like throws the wheel super hard to one side and--

CAPTAIN NATE WALLICK: I might be able to do this. Let's see.

SYDNEY WIDELL: The boat starts to spin in this very slow circle.

CAPTAIN NATE WALLICK: I've done this before when I've come out by myself, so let's see if I can do it.

SYDNEY WIDELL: And then Nate grabs a bow and arrow, and he leaps to one side of the boat.

BONNIE WILLISON: And he's just like scanning the water?

SYDNEY WIDELL: So Nate expertly threads this arrow into the string and he pulls back in like a swift, confident-- like, he's done this so many times. And then suddenly a silver carp breaks through the surface of the water, and he instantly releases the arrow, and he just misses it by centimeters. And then he really, really quickly reels the arrow back up and grabs the wheel like nothing had happened. He said that he can tell if a shot is going to be a miss before he even lets go of the arrow.

So we reach this point of the river where there's like this really big flood plain lake that's spreading out behind this little spit of land. And further down the river there's this flock of white pelicans that are just standing in this shallow area like up to their knees in water. And Nate said that he has only started seeing pelicans out here in the last few years.

I asked him what he thinks changed, and he almost looked confused by my question. And then he was like, the carp showed up, like I had asked him something so obvious. So we kept floating down the river for a while in silence, and then suddenly--

ALISON: I got one, I got one, I got one!

SYDNEY WIDELL: You got one!

BONNIE WILLISON: Oh my god. I'm so proud of her. That's amazing.

CAPTAIN NATE WALLICK: Hold on a second. Let go of that, and go ahead and pull him in, and I'll reel in the slack.

ALISON: Oh my god.

CAPTAIN NATE WALLICK: Lift him right up in the boat.

ALISON: Oh my god! I feel satisfied.

CELESTE: That's awesome.

ALISON: I can--

CELESTE: I can rest.

ALISON: I can rest now. No, I don't rest now. Now I go hard.

SYDNEY WIDELL: So Nate tosses Alison's carp in a bin with mine, and at that point our trip is almost over.

ALISON: Oh, I thought I would catch more. I thought it would be honestly a little easier than it was. I don't know.

SYDNEY WIDELL: How did it feel when you caught yours?

ALISON: Oh, I was very excited. It had been a long time coming.

CELESTE: Yeah.

ALISON: Yeah, it felt good. Well, we were going through a patch, you know, where they're all jumping out. There were like 20 in the air at the time. And so I just shot my bow into the water. Oh, it was totally an accident. All I had to do was release the bow into a large group of fish, and yeah. And then--

BONNIE WILLISON: It's so funny.

ALISON: --I saw the end of my bow sticking straight up out of the water, and I knew that I had caught something.

CELESTE: Did you feel it in the boat?

ALISON: I tried to reel it in, and it would not budge. So that was new. But I couldn't feel like the impact, which I kind of wanted to.

SYDNEY WIDELL: So I decided to fillet and eat my silver carp, but normally that's not what happens to these fish once they're removed from the river.

BONNIE WILLISON: I've heard from Duane Chapman of the USGS, he's spent his career studying carp in the US. He said that most of the time when the carp are removed from rivers they're really just thrown out, like thrown into dumpsters. Also sometimes they're used in dog food.

SYDNEY WIDELL: OK, Bonnie, what about this. You're at a restaurant and you look at the menu and you see carp and silver fin. What are you getting and why?

BONNIE WILLISON: I would instinctively pick silver fin even if I don't really know what it is, I think. Just because-- I mean, it sounds cool, and also I've just been ingrained with like this random idea that like carp are bottom feeders. They're not good to eat, and I don't really know where that comes from, but it's in my head, you know?

SYDNEY WIDELL: Right. Well, what if I told you that they're the same fish.

BONNIE WILLISON: Are people trying to rebrand carp?

SYDNEY WIDELL: Yes. It's the last home game of the season at Miller Park. It's a super hot day in September. It's Brewers versus Cubs, and the stadium is practically sold out. All of these people from Chicago have driven up for the game.

There is beer flowing. Grills are sizzling. Everything smells like brats, and everyone is outside tailgating in the parking lot. That includes Chris Litzau and Jack the Jumping Carp. Chris' goal is to bring carp to the masses.

BONNIE WILLISON: Wow.

CHRIS LITZAU: So we were aiming for the Asian-- what we called the Asian carp experience. So let me tell you a little bit about that. We wanted to hit all senses of-- or make it a full sensory experience.

SYDNEY WIDELL: There is a taxidermied-- there is a taxiderm-- taxidermised?

BONNIE WILLISON: Taxidermied?

SYDNEY WIDELL: What is that?

BONNIE WILLISON: Taxidermised.

SYDNEY WIDELL: There is a taxidermied carp on loan from Wisconsin Sea Grant. There is a track of creepy Halloween music sounds, which they're playing to try to mimic what it sounds like to be a carp underwater. So they're passing out pamphlets full of carp facts. And Jack the Jumping Carp, the current mascot, made an appearance, but it was so hot that no one could really wear the costume for that long at a time.

Chris and his team stationed themselves really close to the Miller Park entrance early that day. They fired up their grills, and they started passing out Asian carp sliders to people in the crowd. These are mini hamburgers, but imagine ground-up carp instead of ground beef.

CHRIS LITZAU: Asian carp is a clean fish, and so it doesn't taste fishy. And the way we had prepared it with the seasoning and, you know, lemon juice, it seemed more to be like a meat substitute than some kind of a fish, you know, like going to a fish fry. And so I think, in general, it was quite well accepted.

SYDNEY WIDELL: Chris is the director of the Great Lakes Community Conservation Corps, which is an offshoot of the Civilian Conservation Corps. And it deals with anything related to the protection and conservation of the Great Lakes. The Corps recruits young adults. Actually one of its goals is to create opportunities for people who are struggling to find work or who've had limited access to education. So it kind of like gives people job training, that type of thing.

Chris studied real estate and development in college, but he was especially drawn to issues surrounding gentrification and food deserts. Food deserts are neighborhoods where there aren't any affordable fresh food choices. But Chris also has his passion about the Great Lakes and protecting fresh water. And for Chris, all of those interests converged around Asian carp.

CHRIS LITZAU: Let's catch them and do something. Let's get them out of the water, increase consumer demand so that there'd be more of a market-driven approach to harvesting Asian carp and hopefully reducing their supply.

SYDNEY WIDELL: And at the same time, he'd be tapping into this huge low-cost protein source that is being completely wasted right now. He wants to connect people to this food source through small venues like farmer's markets or even the community supported agriculture model. But how do you convince people to eat a fish that has been demonized for such a long time and has so many bad connotations? I mean, when people hear carp, like you said, they think like dirty bottom feeder.

BONNIE WILLISON: Yeah, silver and bighead carp, they are filtering things out of the middle of the water column. So they just eat a ton of plankton and algae. They're not even always on the bottom.

SYDNEY WIDELL: Yeah, this is like a myth we've debunked before. Chris thinks it's time for an Asian carp rebrand.

CHRIS LITZAU: Asian carp, silver fin, silver fin, great silver fin.

SYDNEY WIDELL: He says that people just need to give the carp a chance.

CHRIS LITZAU: They have to try it. They have to believe in it. I don't know if I'd say believe in it, but they have to accept it.

SYDNEY WIDELL: Which brings us to the Brewers game. And Chris saw that as an outreach opportunity where he could introduce this really captive audience to carp.

BONNIE WILLISON: Did Chris tell people that these were carp burgers, or did he just let them taste it first?

SYDNEY WIDELL: Yeah, he was asking them like, oh, have you had Asian carp before? And people were saying yes even though clearly they hadn't because like where are you going to get an Asian carp? But this crowd that was made up of Cubs fans and Brewers fans also covers another demographic. It's this divide between people who have carp in their rivers and people who don't.

CHRIS LITZAU: It was clear that those up north, as far as-- north of the state line, that's probably a better way to put it-- it was clear that they did not have a firm grasp of or even recognition of Asian carp as an invasive species that could cause significant harm to our ecosystem, to our Great Lakes ecosystem. Peoria, Illinois is right there, you know? You live it. You feel it. You touch it. Milwaukee, Wisconsin is a world away, a state away. Asian carp doesn't exist.

SYDNEY WIDELL: The people at this game from Wisconsin didn't really know what carp were let alone that they could be a food source. Can you compare the cost of a pound of Asian carp to the cost of a pound of chicken?

CHRIS LITZAU: Oh, tremendously less. Yeah, tremendously less.

SYDNEY WIDELL: So aside from our aversion to carp, the other obstacles to making carp a widely available food source are logistical.

CHRIS LITZAU: It's a long road figuratively and literally. You know, it's a long road from here to Peoria, for example, and many miles, many bridges to cross to be able to get silver fin accepted. The direction we're pursuing right now is to introduce Asian carp as a low-cost protein that, particularly in food deserts, that through the venue of farmers markets can be a good source of nutrition, affordable, sustainable, if you look at it that way.

I don't know if I'd necessarily consider it sustainable. Hopefully not. But for the near future or foreseeable future it could be and probably will be. So it makes sense from an ecological perspective, from an economic perspective, or socioeconomic perspective.

SYDNEY WIDELL: Chris says, if you can't beat it, eat it.

CHRIS LITZAU: It may not be too far off that you see what looks like a motor home shaped like a big Asian carp and suddenly the window slides open and a hand pops out with an Asian carp slider.

SYDNEY WIDELL: A future where we can buy this, quote unquote, silver fin at the grocery store and where this hugely untapped protein source is being made accessible in communities where fresh food isn't as readily available, that future might be closer than you think.

Talking to Chris and also other researchers across the US and in China, my perception of silver carp has really changed. If our way of valuing carp or any other invasive species, if that began to shift, would we still be able to call them invasive species? Here's Tim Campbell, our aquatic invasive species specialist.

TIM CAMPBELL: Well, I mean, like something can have value and still be invasive. Like silver and bighead carp are definitely still invasive even though like there is definitely a value to them. But the value that you can sell a carp for is far less than their potential negative-- or their current realized negative impacts and their potential negative impacts. I think you'd have to have a lot of value to just outweigh any realized and potential negative impact.

SYDNEY WIDELL: There is always the danger that creating a demand around something like carp would cause people to move them around to places where they might not have been introduced yet.

TIM CAMPBELL: So if we start to imagine this world where carp are really desired because they're these inexpensive high quality food products and that they're providing good jobs for both commercial fishers and carp processors, I think we also need to consider the potential negative impacts or unintended consequences of those actions.

BONNIE WILLISON: The situation Tim is describing, I'm not totally convinced that this is a bad outcome, especially when you consider that hunger and food insecurity are real problems in places that are really close to where the carp are currently. So why does this movement to get a market going for carp, or at least to make these fish available to people who need them, like why are there so many barriers to that?

SYDNEY WIDELL: I guess it comes down to risk and like risk tolerance, however you want to define that. And so far, that calculation has sounded like this.

TIM CAMPBELL: If there's a strong market for carp and people can make a living fishing for, processing carp, maybe it provides people with the incentive to move carp around and start new populations. That's of course, not what we want to happen.

And then I think we can also look too that if there's a market for carp and people's livelihoods now depend on carp or, you know, it's a significant part of their livelihoods, there's not really the incentive to fish them in a way or control them in a way that might get us to, you know, the ecosystem impacts that we want or the net reduction and their potential of spread.

I think once we fully understand carp and then all of the aspects that go into creating a market for carp, one potentially really bad, unintended outcome of a harvest program is that somebody has the incentive to move it around and start a new population. So what's your risk tolerance for that? Is it like zero risk tolerance?

Do you think you could catch somebody while they're thinking about this? Or are you only going to catch them after they've done it? So I think there's a lot of work that needs to go into this and a lot of careful thought, planning, and monitoring to make it happen in the lowest risk way possible.

SYDNEY WIDELL: Those risks Tim is talking about, Chris Litzau sees them too. But he also sees the potential for awareness of those risks to expand as carp become more accessible. Chris thinks both initiatives can be addressed at the same time, so both promoting Asian carp as an alternative protein and also educating the public about the risks and harms that these fish could pose to the Great Lakes.

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