

[MUSIC PLAYING]

BONNIE I'm Bonnie.

WILLISON:

SYDNEY And I'm Sydney.

WIDELL:

BONNIE And you're listening to Introduced.

WILLISON:

[MUSIC PLAYING]

BONNIE Imagine you decided to get a pet fish. You would go to the pet store and pick out a
WILLISON: fish. And I want to know what kind you would get and what color. And what supplies would you get for it?

SYDNEY I don't know. I think probably just one that's pretty low maintenance. Just like a
WIDELL: goldfish. I'm not sure. I'm not trying to impress anyone with my fish collection I think. I would just try to make them as comfortable as possible. Probably put some rocks in there maybe, some plants, a castle--

BONNIE I like it. That's what a lot of people do when they want to fish. You get your one tank
WILLISON: and a fish or two. And then you're pretty much set. But there's a small, tight knit group of people whose love for aquarium fish runs really deep. So there's this corner of YouTube for the aquarium hobby. And they show off their fish tanks, they go on tropical fish watching trips all across the world, they figure out how to breed all of these different fish, and they sell them.

And I jumped into this world of aquarium hobbyists for this story. I came across a YouTube channel called Ted's Fishroom What would you think of fish room is?

SYDNEY I have no idea. It could either mean one of two things in my mind. And one is a room
WIDELL: like an aquarium the size of a room. Like you walk in and it's just like the fish room. I don't know. I'm not describing that very well. And then it could also mean fish themed room. Either a room where you keep your fish, or room that's themed fish is the mental picture I have.

BONNIE I'm sure all of those things could be a reality. But Ted's Fishroom is-- so it's like
WILLISON: where you have a whole room that's basically lined with fish aquariums so that you just have 100 tanks in one room and you keep all your fish. That's the extent of some people's aquarium hobby.

SYDNEY That's wild. OK.

WIDELL:

BONNIE So Ted's Fishroom on YouTube has 15,000 subscribers and Ted Judy is a former high
WILLISON: school teacher. OK. So can I show you his YouTube channel trailer?

SYDNEY Yes please.

WIDELL:

[VIDEO PLAYBACK]

TED JUDY: Hello. Welcome to Ted's Fishroom. I have taken my viewers to West Africa, to South America, and even the places here in the USA just do a little bit of fish watching. And probably more than anything else, we have looked through the glass at an awful lot of fish in my aquariums. But I hope that the library of videos from the past 10 years will still keep you coming back looking for some interesting things to see.

SYDNEY 10 years?

WIDELL:

TED JUDY: [INAUDIBLE]

[END PLAYBACK]

BONNIE So fish rooms were a new concept to me. Ted's Fishroom started around 2001 as a
WILLISON: home based business where Ted would sell aquarium fish that he's breeding. And he sold some driftwood for people to put in their tanks. But Ted's Fishroom then morphed into a website, and a blog, and a YouTube channel where he would show off his fish room and give advice to other people who are really into fish or want to build big aquariums and stuff like that.

SYDNEY OK.

WIDELL:

BONNIE

WILLISON:

And that opened the door to a job with an aquarium company. So that's what he does now. And he's pretty busy so he doesn't have that much time for all of his fish anymore.

TED JUDY:

And I'm very happy with my one aquarium. It's completely automated. I have to do almost nothing.

SYDNEY

WIDELL:

Yeah. The breeding part is so wild. I've never really considered how a fish would get from the ocean into someone's home or someone's basement fish room.

BONNIE

WILLISON:

Yeah. A lot of fish are, they can be bred by people that are just hobbyists. But hobbyists also will go out into the tropics and particularly for freshwater aquariums you can go on fishing excursions kind of and get live fish and bring them back for your aquarium. And so that's how some of the fish get in people's aquariums. And with the right permits, you can actually ship the fish back to your house or bring them home in your luggage even.

SYDNEY

WIDELL:

So how do you put a fish in your luggage?

BONNIE

WILLISON:

I think they just have special boxes and stuff. I think I asked him this question. How do you ship a fish? And it's like you just have

[INTERPOSING VOICES]

BONNIE

WILLISON:

You just have a special box.

SYDNEY

WIDELL:

OK.

BONNIE

WILLISON:

So I got to see Ted's remaining aquarium.

TED JUDY:

This guy right here I actually collected in Columbia. But that one there, I did not.

BONNIE

That must be really rewarding to catch a fish and then be able to bring it home.

WILLISON:

TED JUDY: It is actually. Some of these things aren't rare in the least. You can go buy these leporinus for \$4 or \$5 each and they're this big. These things are freaking hard to catch. And so when you actually spend an hour chasing one around and you catch one, you want that fish.

BONNIE
WILLISON: I had to ask. And he said he doesn't really consider fish as pets. He does have another pet, a dog named Maggie that was around during the interview. So you might hear her.

I wanted to talk to Ted because he has a lot of experience selling aquatic species on the internet. Fish on the internet is a really interesting topic to me because the internet is pretty new. And it opens the door for fish to be sold all around the world.

So do you still sell fish? Or was that--

TED JUDY: Nope.

BONNIE OK.

WILLISON:

TED JUDY: I don't. I get that question a lot. And my response is, nope. I closed Ted's Fishroom from a fish selling perspective in June of 2016. And yet I will still get messages through Facebook, through YouTube asking, what have you got in stock? Nothing.

BONNIE
WILLISON: What kind of requests were you getting back when you were selling fish? And did anyone ever request something that wasn't legal to have or ship?

TED JUDY: Oh yeah. All the time. They would request things that-- let me see if I can not redirect this conversation but kind of maybe focus this conversation a little bit. There are certain fish in the country that are federally listed you cannot sell and you cannot keep. And any time you make something illegal anywhere in the world, you are creating a demand for it. You just are because there's people out there that they like, well, F that. I'm going to keep whatever I want.

SYDNEY My jaw is on the ground right now.

WIDELL:

BONNIE So a really good example of this is the Asian arowana. Have you ever heard of that
WILLISON: before?

SYDNEY No.
WIDELL:

BONNIE The Asian arowana was once kind of mundane.
WILLISON:

SYDNEY What does it look like?
WIDELL:

BONNIE I'll show you. Can you open the watch this link?
WILLISON:

SYDNEY OK. The Arowana Fish World Championship? Wait, Bonnie what am I watching right
WIDELL: now? What is this fish?

BONNIE I told you there were interesting parts of YouTube.
WILLISON:

SYDNEY That's crazy. OK so it's like--
WIDELL:

BONNIE I'm not sure if there's funny lighting on it in this video. But it is very orange and
WILLISON: almost purple. There's orange and purple.

SYDNEY Existing on this fish's body. It's kind of radiant.
WIDELL:

BONNIE Doesn't it look kind of big too? It's not the size of a goldfish. It's the size of a hand.
WILLISON:

SYDNEY Yeah. Oh yeah.
WIDELL:

BONNIE Would do you say it's spectacular enough to be worth anywhere from \$1,000 to
WILLISON: \$300,000?

[MUSIC PLAYING]

SYDNEY Well I would never ever-- no. I don't know. How do you value a fish?

WIDELL:

BONNIE Well, I'll tell you about this fish because it's an interesting story. So it's native to Asia, Southeast Asia. And it was listed as endangered in the '70s because its populations were declining. And it really wasn't anything too special until it was listed as endangered. And so people started seeing it as really rare.

WILLISON:

And so it became a really sought after aquarium fish. Everyone wanted one in their aquarium because they were so rare. And now, it's known as the world's most expensive aquarium fish. And they can sell for \$1,000. And the rarest fish can go for \$300,000.

SYDNEY Whoa. So the fish itself is super endangered in the wild but there are a lot of them circulating that have been bred within this fish trade?

WIDELL:

BONNIE Yes.

WILLISON:

SYDNEY OK.

WIDELL:

BONNIE And so because they're on the endangered list, they're illegal to import into the US. But there's evidence that some are still being sold here illegally. And other countries interpret endangered species laws differently. And so it just so happens that you can import Asian arowana into Canada but not the US. And so you could see why that would be difficult, especially for a really sought after fish.

WILLISON:

And I should mention that the Asian arowana isn't at risk to become invasive here even though it's imported illegally. But there are other species that are federally banned that are a threat like the snakehead. They can breathe air and they're very competitive with our native species. And they've been banned in this country since 2002. But there's still evidence that they're being sold and imported here.

SYDNEY Yeah.

WIDELL:

BONNIE Ted knows really well what fish people can and can't have being in the aquarium hobby. But not everyone is as well versed.

WILLISON:

TED JUDY: So people who ask me for an Asian arowana, for example, and then I inform them, no. I can't get you an Asian arowana because they're illegal for me to import. Oh, they are? But I see arowanas everywhere. I see pictures of them everywhere. They're all over the internet. Other people are selling them. I said, yes. That doesn't make it legal. And besides, the ones you're seeing in the stores, those aren't Asian arowanas. Those are South American arowanas, a different species.

So it's an education thing. But then a certain percentage of the people that ask are asking because they're trying to find someone to do something for them but they shouldn't do. The most common of those is people who live in a state where fish are illegal to have. For example, stingray's, freshwater stingrays, in Texas. Or a piranha in Florida where I sell those fish because I legally can do it in Wisconsin. But they can't legally have it.

BONNIE So Asian arowana, that deals with countries, a fish being banned from certain countries, not others. But laws look different from state to state as well. And each state has their own laws about what species are prohibited. And that would depend on which species could become invasive in that state.

WILLISON:

SYDNEY That's so complicated.

WIDELL:

BONNIE I know. So for example, one species that is prohibited from Wisconsin is the Chinese trap door snail, also called the Chinese mystery snail. It became popular in the US in aquariums or water gardens because you could put them in your pond and they'll clean up the water and they'll eat algae. And I just thought it was interesting that the mystery part in their name comes from the fact that their babies appear mysteriously and for the longest time just no one knew how they were appearing.

WILLISON:

SYDNEY That they just show up?

WIDELL:

BONNIE Yes. And I'm like, modern science hasn't figured out how snails are appearing? But from what I read, females they're growing multiple babies inside of them in

WILLISON:

different generations. And then once they're old enough with shells, they'll just spit them out or give birth. And the trap door part of the name comes from that they have a trap door-like structure that protects their body so predators can't get to them.

SYDNEY WIDELL: What do the snails do when they're just hanging out in the environment in Wisconsin?

BONNIE WILLISON: They outcompete native snails. And they carry parasites that are eaten by fish and then birds. And so bad news. And these snails are restricted in Wisconsin so you can't buy them.

TED JUDY: If you were a pond keeper in Wisconsin, you read about this wonderful little algae eating trap door snail, and you go looking for it, and you find them available, and you can order them online, why would you not? Maybe you're not going to go and look. And then at the same token, if 30 out of 50 states have this animal as illegal, maybe the person who's selling trap door snails doesn't know that in Wisconsin that they shouldn't have. And is it a burden on that guy to check that state's legislation? Well, in my opinion, if it's illegal in some states that your state or if it's illegal and other states and you're in the business of selling these animals around, maybe you should check if you happen to know that it's an invasive risk.

BONNIE WILLISON: So Ted found his own system for dealing with people when they're trying to buy things they weren't supposed to have. He kind of relied on his own moral code. But I thought, surely not everyone takes the time to educate themselves about all the laws in each individual state. And the fish that Ted and other aquarium hobbyists keep in their tanks and they breed and trade, a lot of those fish are tropical. And they wouldn't become invasive here. So most of them are perfectly legal. So we're not worried about them.

But there is a scattering of invasive crustaceans and tenacious plant species that abound on the internet. You could add one to your online shopping cart right now. After the break, how do we stop people from ordering invasive species and having them shipped right to their door?

[MUSIC PLAYING]

BONNIE Wisconsin Sea Grant and the Center for Great Lakes Literacy are proud to bring you
WILLISON: 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 I love all of the specimens. There's a preserved sea lamprey inside of each pack
WIDELL: which I think is amazing. And the packs also include little resin blocks with a lot of different specimens. 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 I love the cut outs of bighead and silver carp. And they're life size. So I can imagine
WILLISON: 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.

I had no idea how you would even begin to enforce this online trade of invasive species. It sounds so complicated. So I talked to Robert Stroess who works in the law enforcement arm of the Department of Natural Resources, the DNR. Bob spent many years as a conservation warden where he patrolled Manitowoc County in Wisconsin. And now he's effectively a detective for the DNR. And that makes sense. I read this story about Bob. And that's one of the reasons that I wanted to meet him.

In a magazine article, one of your co-workers was saying how there was someone who was leaving bags of trash or litter at a boat landing. And didn't you take in all that litter for years in order to try to find this person?

BOB STROESS: You've done some homework, huh? Little internet searching?

BONNIE You got to.

WILLISON:

BOB STROESS: Yeah. That was a funny thing when I was a field warden in Manitowoc County, somebody was leaving a big bag of Kibbles and Chunks dog food with all the dog food gone and just full of garbage including medical needles, and food, and other

things at this boat landing for years. And eventually figured out who was after a couple of years.

BONNIE Yeah. How did you figure that out?

WILLISON:

BOB STROESS: Well, it's secretive stuff. So-- no. Actually looked at a label that was inside one of the bags and I was able to link it back to the person through another business.

BONNIE Doesn't he sound like a good detective?

WILLISON:

SYDNEY Such a good detective.

WIDELL:

BONNIE Bob is one of only 12 detectives at the DNR. And he's a detective specifically for commercial fishing issues.

WILLISON:

SYDNEY What does he investigate? Because when you say that, I'm picturing people over fishing, or fishing things that they don't have a license to fish.

WIDELL:

BONNIE Yeah. It's a lot of that. So someone might break the law by harvesting too many fish out of season. And he also specializes in wholesale fish dealing which means the people who buy and sell fish to the grocery stores and to pet stores. So that kind of fish trade, he specializes in that.

WILLISON:

SYDNEY Sure.

WIDELL:

BONNIE And lastly, he specializes in aquatic species and trade which means species sold on the internet. And I asked Bob if he thinks the internet has changed things.

WILLISON:

BOB STROESS: Yes. I've seen changes that it's incredibly easy to go on the internet and buy almost anything you want. And the ease of transportation and shipping things makes it difficult to deal with. Many things are maybe illegal to have here. But the person that's shipping it needs to know they can do it. And if they do know, they need to be held accountable for that.

BONNIE So there are a lot of aquatic organisms sold on the internet. But only a small portion

WILLISON: of those could become invasive here in Wisconsin. And there's a law called NR40 which says that you can't import invasive species. So the species that are commonly sold online like non-native crayfish and plants like water lettuce and water hyacinth, those species would become invasive here. So they're prohibited. You can't have them, or sell them, or move them without a permit.

We've talked about crayfish before. You remember the story of the rusty crayfish from episode 1 where Otis brought them here from Indiana?

SYDNEY
WIDELL: Oh, yes. I'm familiar. And those have been here since the '60s. And that introduction happened way before the internet. Just some guy with a bucket who walked up here with good intentions.

BONNIE
WILLISON: Yeah. So that's one species of crayfish that is invasive here. And they're kind of all over. At this point, there's too many of rusty crayfish for us to totally wipe them out. They're established unfortunately. But there is a new crayfish that's causing concern in Wisconsin and the Great Lakes. And it's called red swamp crayfish.

So red swamp crayfish, they're red, they have little raised bright red spots on them, and kind of a black stripe down the abdomen. They're native to the South along the Gulf Coast and the southern part of the Mississippi River Basin. And our aquatic invasive species specialist Tim Campbell told me a little more.

TIM CAMPBELL: Really abundant in Louisiana. So if you ever go to a crawfish boil in Louisiana, I almost guarantee you you're eating red swamp crayfish. But they're slightly bigger than our native crayfish. So they can outcompete our native crayfish. And then, they're known to have a burrowing behavior. So they can cause the failure of earthen dams and some structures there. So they can be both problematic ecologically but also for infrastructure.

SYDNEY A burrowing behavior?

WIDELL:

BONNIE
WILLISON: They can also travel several miles to a new pond, which is apparently a lot for a crayfish.

SYDNEY So they're on dry land just marching along.

WIDELL:

BONNIE Yes. They can march across dry land. So you can see why we wouldn't want them
WILLISON: introduced here. And Bob is really familiar with red swamp crayfish too.

BOB STROESS: Go online and order 100 pounds of it and it'll be here in two days live. So--

BONNIE And people like to eat it.

WILLISON:

BOB STROESS: Yeah. So that's the concern. People like the live fish or the live crayfish because it's going to be consumed in a crawfish boil. But for whatever reason, sometimes they've been released. And also this actually used to be very prevalent with the biological supply houses for the education industry, for high school teachers, or colleges that would order things for dissection purposes, or for some study purposes.

And in the tank or the aquarium the ones that aren't going to be dissected, and you know what? At the end of the semester, little Jimmy takes one home and has it as a pet. Or maybe they're not so little if they're in high school, but maybe it's a younger kid in school. And they take it home, and eventually they don't want it. Mom and dad so they don't want it. Go put in the pond. And they go out and put it in the pond out back. And there's the start of a new invasion.

So there was more of that until some education was done throughout the schools, universities, and biological supply houses. So that is not as much of a concern anymore. But it's still happening. So cases going right now where schools have still been ordering exotic crayfish and using them for study. So I have an ongoing case right now with thousands of crayfish coming to the state.

[MUSIC PLAYING]

BONNIE I was thinking, should we try to see how easy it is to get these online?

WILLISON:

SYDNEY Yes.

WIDELL:

BONNIE Let's do some investigating. They told me that Amazon and eBay you can get water

WILLISON: lettuce and water hyacinth. They're pond species and they rapidly grow along the surface of the pond and form these dense mats so it basically makes any kind of boating, or fishing, or any water activities really hard.

SYDNEY Are you just going on Amazon right now?

WIDELL:

BONNIE I'll go on eBay.

WILLISON:

SYDNEY All right. I just Amazoned water hyacinth.

WIDELL:

BONNIE OK. I'm seeing quite a bit of plants called water lettuce on eBay. Like--

WILLISON:

SYDNEY I'm seeing water hyacinth going for \$4.95.

WIDELL:

BONNIE Oh my God. Amazon deals in water hyacinth. This is crazy.

WILLISON:

SYDNEY 945 in stock. Category, pond plants.

WIDELL:

BONNIE I kind of want to get some too.

WILLISON:

SYDNEY Product description on this website, water hyacinth are great bio filters. Their long roots provide a hiding place for smaller pond inhabitants. They grow extremely fast, especially with a lot of sun exposure. Interesting. Your fish will love them. They appreciate the shade, shelter, and food provided. This plant controls algae and increases oxygen in the water. They are 100% chemical free and fish and shrimp safe.

BONNIE Oh my gosh.

WILLISON:

SYDNEY Cool.

WIDELL:

BONNIE I wonder if there's anything-- is there anything on your site that says like, we can't
WILLISON: ship this to your state?

SYDNEY Well, OK. So it's \$4.95. One product is in the cart. It has been added to cart. OK. So
WIDELL: far I'm not seeing anything. View cart. Oh, OK. So with tax and shipping and everything, it's going to be \$13.35. OK. Check out billing details. OK. So I'm curious what happens if I say I'm in Wisconsin.

BONNIE I'm looking at some water lettuce and it says it excludes shipping to-- or they're
WILLISON: shipping it from New Mexico, which they can probably have water lettuce in New Mexico. But all the places that it can't ship to is countries in Africa, islands, Europe. Wisconsin is not on this.

SYDNEY OK. All right, I'm proceeding to check out. Wait, I want to know what's going to
WIDELL: happen but I don't want to order this plant. So far, no one has told me I can't order it.

BONNIE I think they're going to let you order it. And they're trying very hard to get you to
WILLISON: order it.

SYDNEY It's processing my order.

WIDELL:

BONNIE What?

WILLISON:

SYDNEY I ordered it. Oh, wait, can I cancel this?

WIDELL:

BONNIE If I had to sum that up, that was crazy easy for you to do.

WILLISON:

SYDNEY Yes. I will let you know when my plant arrives.

WIDELL:

BONNIE I want a plant too. OK.

WILLISON:

SYDNEY Wow.

WIDELL:

BONNIE Water lettuce is called pistia stratiotes. And I'm going to get five pieces. Dwarf water
WILLISON: lettuce, how is that different? See, I wish Tim was here. Should we call him?

SYDNEY Should we call him? What if you text him and you're like--

WIDELL:

BONNIE OK. Yeah. That's a good idea. I found something interesting.

WILLISON:

SYDNEY What?

WIDELL:

BONNIE I Googles crayfish, crayfish boil, buy crayfish, or something. And this site that has
WILLISON: live crayfish by the pound. And but they do say on their website, unfortunately we are unable to ship live crayfish to Hawaii, Washington, Michigan, Illinois, Wisconsin, Pennsylvania, Minnesota, Idaho, or Oregon due to depart restrictions.

SYDNEY Well, that checks out.

WIDELL:

BONNIE So-- that's cool.

WILLISON:

SYDNEY Yeah. Go them.

WIDELL:

BONNIE Whoa. I think I could get crayfish from this site.

WILLISON:

SYDNEY Are you looking up red swamp crayfish?

WIDELL:

BONNIE Well, I don't know if they specify what kind of crayfish they include in the crayfish
WILLISON: boil. I think you'd have to know. But they're at least saying they'd ship live stuff to everywhere but Hawaii, North Dakota, Michigan, and Washington state.

SYDNEY It's inconsistent I guess is what we're seeing.

WIDELL:

BONNIE Tim is coming. Tim is coming.

WILLISON:

SYDNEY This is based out of. Yes. Like right now?

WIDELL:

BONNIE Yeah. Do you see him? Hey.

WILLISON:

SYDNEY No. Tim.

WIDELL:

TIM CAMPBELL: Hey.

SYDNEY Tim, I accidentally bought water hyacinth. It's coming to my house.

WIDELL:

TIM CAMPBELL: Was it as research for part of this?

SYDNEY It was. It was. I was like, how far can I get before they say, you can't buy this

WIDELL: because you are shipping it into Wisconsin. And that didn't happen. So now it's coming to my home. I think I should name her probably.

TIM CAMPBELL: Yeah.

BONNIE We don't know, when we're looking at like water lettuce, would you know specifically

WILLISON: if this is the kind that's prohibited? Or what's dwarf water lettuce?

TIM CAMPBELL: So that scientific name there is pretty key, what pistia stratiotes--

BONNIE Stratiotes?

WILLISON:

TIM CAMPBELL: Yeah. Nailed it. Water lettuce and water hyacinth are both very distinctive plants that even fish people like me can be like, yes. That is definitely water lettuce or water hyacinth.

BONNIE OK. So I'm buying this.

WILLISON:

SYDNEY What's the distinctive feature there for you?

WIDELL:

TIM CAMPBELL: Have you seen the Neature videos? It's like, that's pretty neat. I can tell by the way that it is.

SYDNEY Neat.

WIDELL:

TIM CAMPBELL: Yeah. I mean, yeah. I think it's really kind of bright green. And then water lettuce almost had-- I think I should verify this, but it almost has this kind of feathery looking texture.

SYDNEY OK.

WIDELL:

TIM CAMPBELL: But water hyacinth has a pretty distinctive bulb kind of at the bottom.

SYDNEY OK.

WIDELL:

BONNIE And then, for crayfish, for red swamp crayfish, when people go on to buy crayfish for
WILLISON: a boil, most of these sites they just say live crawfish. They don't say the species. So how do you know what species you're even getting?

TIM CAMPBELL: Yeah good question. You see what you get when you show up. So--

SYDNEY So if we ship some to your house, will you identify them for us?

WIDELL:

TIM CAMPBELL: Yes. Please make sure they're frozen. What we hear from people selling these things, it's on the consumer to make it so that way the consumer knows the laws and so somebody shipping this stuff would say that it's our responsibility to ask them what it is and be like, hey, can you tell me what kind of crayfish this is?

BONNIE That's kind of crazy to be honest. Would you be able to identify these crawfish that

WILLISON: are on the screen right now? Can you tell?

TIM CAMPBELL: They look like red swamp crayfish just because they have those really bright red bumps on the claws.

BONNIE Yeah. But all species of non-native crayfish are-- you can't import them.

WILLISON:

TIM CAMPBELL: Correct. So as you guys are buying this stuff and receiving it, so if you receive something-- Sydney since you're in Milwaukee, what might be something good-- so what we would instruct somebody to do if we were doing something like this, would be to contact their local AIS coordinator and then have that local AIS coordinator do the first step of stepped enforcement which would be just reaching out to the vendor and being like, hey. Did you know it's illegal to sell this and ship this to Wisconsin?

And then, normally, and the Wisconsin DNR did research on this to show that most of the time at least the plant vendors came into compliance once they were informed of NR40 regulations which is cool. But--

SYDNEY Yeah.

WIDELL:

TIM CAMPBELL: The DNR has done this kind of a handful of times and people have talked about doing it. But they never do it. So it's--

SYDNEY Do what?

WIDELL:

TIM CAMPBELL: Just order plants and see if they can get them. So it's cool that you guys did. And I know you guys are educated about aquatic invasive species. So I know you're not-- I don't know. Maybe you're going to go put it in the estuary. But I assume that these things are ending up in Milwaukee estuary or Lake Koshkonong or whatever. So--

SYDNEY Well, thanks for talking.

WIDELL:

TIM CAMPBELL: Yeah. Hopefully that was helpful. And--

SYDNEY See you later.

WIDELL:

TIM CAMPBELL: See you.

BONNIE Bye.

WILLISON:

TIM CAMPBELL: Bye.

SYDNEY So once the plants arrive, I guess we'll just call the DNR then and let them know.

WIDELL:

[MUSIC PLAYING]

INTERVIEWER: Water research mysteries. Teachers connecting kids with the great lake in their communities. Erosion and dangerous currents. These are just some of the stories offered by Wisconsin Sea Grant and the University of Wisconsin Water Resources Institute. A monthly podcast series, *Wisconsin Water News*, highlights stories previously available only in print from these programs.

Series narrator in science communicator Marie Zhuikov brings the stories alive by featuring in person and phone interviews with the people behind the news. Listen and subscribe to Wisconsin Water News on iTunes, Spotify, Google Play, or at seagrants.wisc.edu.

BONNIE Invasive species are moved through different pathways. For example, through
WILLISON: ballast water, or people moving their boats from lake to lake, or even hiking when you can have seeds attached to your boots. And as a pathway, the internet is pretty new. And actually, so are invasive species laws in general.

BOB STROESS: Well, the invasive species part of our enforcement program is not very old.

BONNIE So Wisconsin didn't have any laws prohibiting invasive species or telling people to
WILLISON: drain or clean their boat until 2009 which is not that long ago. So for the past 15 to 20 years, enforcement of invasive species spread has focused on boat landings and making sure organisms don't spread from water body to water body. But it has only been in the past few years since around 2018 that law enforcement in Wisconsin

has started looking at species sold online.

With the internet as a new pathway, we've had to look at new technology to investigate this issue. And an example of that would be using a web crawler.

SYDNEY Can you explain what a web crawler is?

WIDELL:

BONNIE
WILLISON: Yes. So a web crawler is a computer program that continually crawls and searches the web. And it looks for websites that match a certain description using certain keywords and stuff. For example, a group called the Great Lakes Commission developed a web crawler to look for invasive species. And I talked to Erika Jensen who manages aquatic invasive species programs for the Great Lakes Commission. And the Great Lakes Commission helps Great Lakes states and provinces manage Great Lakes resources.

And she said web crawlers have been used in other industries before, but when they were developing this web crawler, they hadn't heard of any being used for biological issues or environmental issues. Their software is called the Great Lakes Detector of Invasive Aquatics and Trade. But it has a catchier nickname based on its acronym.

GLDIATr? Is that how you pronounce it?

ERIKA JENSEN: Yes.

BONNIE OK. That's a very great acronym.

WILLISON:

ERIKA JENSEN: Yeah. We spent some time coming up with that one late Friday afternoon.

BONNIE
WILLISON: Yeah. So with GLDIATr, they created this species watch list of Great Lakes aquatic invasive species that are the most destructive or that have the potential to be the most destructive. So in this first version of this list, they had 166 species that they then plugged into the web crawler, into GLDIATr.

ERIKA JENSEN: So that software would then go and essentially automate the process of doing a Bing search, or a Google search, search engine search. So using the species names,

and we included both common and scientific names as well as any synonyms we thought the species might be listed under in the trade. And search for those as well as associated terms like sale or cart that might help narrow down pages to pages that were actually selling organisms as opposed to just a fact sheet or general information page.

**BONNIE
WILLISON:**

So anything that you might find by searching Bing, or by searching on eBay, or Amazon is something that the web crawler might find. And if it's determined that it's a match, that they found this invasive species and they think it's a sale page, it downloads that page for people to review. And then, people can go in and review that. It uses machine learning then to continue to learn what is a sale page and what isn't.

**SYDNEY
WIDELL:**

I guess the only question I have is, why is it looking at Bing? What about a million other search engines?

**BONNIE
WILLISON:**

Yeah. And I don't know why they chose Bing for this. But I think it's Bing, and Google, and all the search engines, they're all searching through the same sites, all the websites that are out there. And so if you search something in Bing and Google, you're not going to get exactly the same results. But it would get you similar results.

So some of the species that they found using GLDIATr, they found a lot of plants, backyard pond plants and aquarium plants, like water lettuce, water hyacinth, hydrilla, and yellow floating heart. Those are some of the common ones that they were finding.

ERIKA JENSEN: I expected to find more fish that we were concerned about than we did. I was surprised that plants was the overwhelming sort of taxa group that we found.

**SYDNEY
WIDELL:**

So what happens after the web crawler finds the site? What's the next step?

**BONNIE
WILLISON:**

Yeah. So after they find a site, the people can review it and take action. So law enforcement agents can contact that business and see if they'll remove that species or if they'll put a note in their website saying that we can't sell to these Great Lakes states. And Erika said that they have had luck with people making changes to their site when they're approached like that.

So what does Bob do when he finds someone selling illegal species to Wisconsin?

BOB STROESS: The realm of what we do can lead anywhere from contacting them on the phone and telling them that they can't do this, to have an in-person contact with them and explaining they can't, or visiting them and educating them about the whole system, or visiting the supplier and educating them. Or it could come to an enforcement type of case where they're issuing some sort of citation or potentially criminal charge if it's a serious violation.

With any type of new laws, because the invasive species laws are really not that old. It's still something that, yes, we know because we're involved in it. But the general public really doesn't know a lot of this stuff yet. So it's a cultural and societal type of issue. The basic part of enforcement is to educate people first so they know what the laws are.

BONNIE WILLISON: So in order to have the biggest impact, Bob tends to address these large wholesale dealers like companies that are supplying thousands of invasive plants to nurseries or dealers that provide live crayfish to schools.

SYDNEY WIDELL: Which makes sense because you'd want to focus on the large dealers. But on the other hand, what about when this happens on a Ted Judy scale? Not Ted specifically, but people who are selling fish or plants out of their home and then get approached. How do you monitor that? The people who would do it without a second thought.

BONNIE WILLISON: Yeah. It's not always from these big wholesale dealers. It's sometimes just someone who has a pond or something. Yeah. So Bob kind of confirmed something that I've been thinking that it's really hard to enforce these kind of things.

BOB STROESS: Yeah. Absolutely. I mean, almost I won't say it's impossible to enforce because if we find out about it, which there's obviously ways that we find out about things here and there, but I'm sure that the amount that it's happening, I'd probably be foolish to say that we even know of 1% of the amount of that type of stuff that's actually going on. It's so widespread. So it's-- laws are set for the public good but not always that they're going to be completely enforceable by everybody because most of them have to be done on our honor as citizens.

[MUSIC PLAYING]

SYDNEY

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BONNIE

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