[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: Last week we were curious how easy it would be to order something illegal online.

BONNIE WILLISON: We found that ordering some types of aquatic invasive species is actually pretty easy, unfortunately. So did you get your plant, Sydney?

SYDNEY WIDELL: So I ordered water hyacinth. And mine actually came like within three days of ordering it. And I named it Tim Campbell, after our Aquatic Invasive Species Specialist Tim Campbell. I think his container is a little bit small. Because he keeps, if you can see, like he's dying a little bit around the edges. But like there's always new growth that comes up, like from the top.

BONNIE WILLISON: Really.

[WATER DRIPPING]

Well, my plant arrived as well. I was getting worried because it didn't come. And then I realized somehow I didn't order it. So I ordered a different one. And I got 5-piece dwarf water lettuce. Do you want to see him?

SYDNEY WIDELL: Yeah, beautiful. I like the little habitat.

BONNIE WILLISON: So they're like five little pieces with roots. And they are fuzzy. They're really soft and fuzzy. And then I had them sitting in my kitchen. And I saw this like tiny little red

worm that was like dancing about the leaves and like eating them.

SYDNEY WIDELL: Did we ever identify with that worm was?

BONNIE WILLISON: I don't know how to identify worms.

SYDNEY WIDELL: Did the worm come on the plant? Or did the worm find the plant afterward? Because if the worm came on the plant, then that's like-- like a co-invasion on our hands.

BONNIE WILLISON: Yeah, I hope that the worm came on the plants. Because otherwise, it would be like in my water. But yeah, and there's also duckweed in here I noticed.

SYDNEY WIDELL: Oh, interesting.

BONNIE WILLISON: Which they sold me as well.

SYDNEY WIDELL: So we have Wisconsin Sea Grant Aquatic Invasive Species Specialist Tim Campbell with us here today to help us figure out what our next steps are.

BONNIE WILLISON: Hey, Tim.

TIM CAMPBELL: Hi, Bonnie. Hi, Sydney.

SYDNEY WIDELL: Do we have to report these plants?

TIM CAMPBELL: Well, technically, they're in NR 40 prohibited. So they're illegal to have. And they must be destroyed.

SYDNEY WIDELL: That's so violent.

TIM CAMPBELL: Yeah, yeah, technically, if you're just a citizen, you would be obligated to destroy it.

SYDNEY Bonnie, I want to read you-- I want to read you this thing that Tim DM'd me on

WIDELL: Twitter. He said-- he said, either way, it would be an honor to have an illegal plant named after me. And then I said, and many plant generations to come. And then Tim said, until it meets its untimely death in a freezer or multiple layers of trash bags labeled DNR invasive plants approved for disposal. I was--

TIM CAMPBELL: Yeah.

SYDNEY WIDELL: I was hurt, Tim, that you would--

TIM CAMPBELL: I mean, I think it'd be good to be an invasive plant for a little while or have one named after me. But I'd really like to see that be its end game. You know, it's kind of like having your pet spayed or neutered. But, you know, I get it. Like there's an attachment to these things, right, just tough to get rid of it. So I get it, Sydney. Yeah you should still probably get rid of it. But I get it.

SYDNEY WIDELL: Fair.

BONNIE WILLISON: Yeah, it's weird because I don't want to like it.

SYDNEY WIDELL: Right. Yeah.

BONNIE WILLISON: Because it's like, oh, you're dangerous. But I also know like it's just a plant trying to live, you know, the same as all my other plants, which I have a lot. And I like a lot.

TIM CAMPBELL: They'd be a really ideal plant. But then it's that feeling of, yep, this is pretty illegal. And they're pretty invasive and could cause problems. And very quickly all of the joy that I might get from this plant is kind of washed away by the potential problems it could cause.

BONNIE WILLISON: I don't know. I feel bad for this plant. Because I know that I might have to end it soon. I feel responsible, too, and like almost guilty that I brought the plant into this existence where now it's going to come to a bad end.

SYDNEY Yeah.

WIDELL:

BONNIE WILLISON: Because I put it in this situation--

SYDNEY WIDELL: Right.

BONNIE WILLISON: --through my illegal activities.

SYDNEY WIDELL: Well, I don't know-- well, you definitely did put it into that situation but also someone sold it to you when it shouldn't be available, right?

BONNIE WILLISON: Right. I was complicit at least.

SYDNEY WIDELL: Oh, yeah. And for that, I'm reporting you.

BONNIE WILLISON: As an AIS Coordinator, how do you feel about the fact that we could very easily order these online and have them shipped to our homes?

TIM CAMPBELL: I mean, it's a bummer but not surprising. It's tough for vendors all across the country to know what Wisconsin specific laws are.

SYDNEY WIDELL: So how do we go about reporting this?

TIM CAMPBELL: So you would report it to your local AIS Coordinator. So--

BONNIE WILLISON: How do you find that person?

TIM CAMPBELL: You can find that on the DNR website.

BONNIE WILLISON: Well, I'm going to Google local AIS Coordinator Wisconsin.

SYDNEY I'm Googling Milwaukee AIS Coordinator.

WIDELL:

TIM CAMPBELL: If you get onto the DNR.WI.Gov website and do a keyword search for aquatic invasive species contacts, if you scroll down to topics and then county or tribal coordinator, and then it just has a list of all the contacts.

SYDNEY WIDELL: OK.

BONNIE WILLISON: Do you know Pete Jopke?

TIM CAMPBELL: I know Pete Jopke.

BONNIE WILLISON: He's my-- I think he's my person that I would call.

[PHONE RINGING]

PETE JOPKE: Hello, it's Pete.

BONNIE WILLISON: Oh, hello. I--

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--

BONNIE WILLISON: --that like this

PETE JOPKE: --well, thank you.

BONNIE WILLISON: Yeah, that this company shipped it to me. Yeah, I got it on eBay, I think. Yeah, because I just-- I looked on eBay just to see if I would find anything. And it was-- there was quite a few water lettuce available. And I'll send you the website.

PETE JOPKE: Yeah, that'd be great.

BONNIE WILLISON: Great.

PETE JOPKE: And then-- and then I'll take a look at that either tonight or tomorrow. And I'll make a few phone calls and see what comes of it. But that's interesting. That's like, I hadn't seen or heard of this for, oh god, it's probably like seven years now where people were able to get any of this stuff. I thought they really clamped down on it. But--

BONNIE WILLISON: Yeah.

PETE JOPKE: I suppose if you look hard enough, you can find it, you know. I find it interesting that they ship that water lettuce. Because we has-- we had an invasion on Lake Mendota, oh, maybe four or five years ago. Did you hear about that one?

BONNIE WILLISON: No, I heard that there's been like sporadic water lettuce found on Lake Mendota. But I didn't know more than that.

PETE JOPKE: Yeah, very good. I really appreciate the heads up on that.

BONNIE WILLISON: OK, well, thank you so much for--

PETE JOPKE: Hey, thanks for reaching out. Have a good rest of your day.

BONNIE WILLISON: Sure. Have a good day. Bye.

PETE JOPKE: All right, bye-bye.

BONNIE WILLISON: So while we were talking to Pete, he mentioned something else that was kind of surprising. That in the fall of 2019, a crate of red swamp crayfish were discovered in

a parking lot near the Wisconsin River like in a boat lunch.

SYDNEY WIDELL: That's weird.

BONNIE WILLISON: Yeah, as we saw, this is a pretty common species that you can find online. And people buy them for crayfish boils. And although you're not supposed to order any non-native live crayfish to Wisconsin, it does happen sometimes. And this discovery was surprising and concerning, because these crayfish reproduce fast. And they outcompete our native crayfish.

They can damage infrastructure with their burrowing. You should listen to last week's episode for more info. We covered that. I had actually heard about these red swamp crayfish before. Because when I was talking about Bob, he told me that these crayfish were left in a boat launch. And there wawas-- immediately, they called the phone tree of invasive species responders.

And I think Tim-- our own Tim Campbell was included in that. And they like, you know, secured the perimeter. They had people out searching that area all night, just like seeing if there had been any crayfish that escaped. And there was an ongoing investigation that Bob was-- could not comment on, because it was ongoing. But--

SYDNEY WIDELL: Oh my gosh.

BONNIE WILLISON: --to figure out-- to figure out like who left these here. But then I heard about the first introduction of red swamp crayfish in Wisconsin. And it was like this investigation but 100 times the amount of crayfish and maybe 100 times the response needed to contain them.

SYDNEY WIDELL: And that's what we're going to talk about today.

[MUSIC PLAYING]

This story starts in the summer of 2009 in Germantown, Wisconsin, which is this little community 25 miles northwest of Milwaukee. And residents of the Esquire Estate subdivision became concerned when they noticed what they described as small

lobsters crawling through their lawns at dusk.

BONNIE WILLISON: Yeah, this story kind of took over our lives. Like we did more interviews for this Germantown story than any other podcast episode we've produced so far. What fascinates you about this story?

SYDNEY WIDELL: I guess it's just like the image is so striking and also kind of funny. I don't know if I'm allowed to say it's funny. But it definitely struck me as funny at first, just because it's like the most normal suburban pond you can imagine. But then it is completely taken over by like basically small lobsters. And it's just like this image of panicked residents who are like suddenly confronted with this like unexpected, really bizarre, like nonhuman neighbor, really just random and kind of like sinister almost.

But the more I learned about this story, the more I realized that like it was actually very serious. And there was a large scale investigation. $1 million were spent trying to contain these crayfish. And yeah, people devote their entire careers trying to make sure things like this do not happen.

BONNIE WILLISON: Another thing that's interesting about this is that I feel like you hardly ever hear about the first time an invasive species gets established here. Like we've done a lot of reporting on invasive species. But a lot of times, it's species that have been here for a while or weren't introduced in my lifetime. And by the time that we discover that they're even there, there's kind of no chance or hope to get them out.

But in this case, it was the first time that red swamp crayfish were discovered in Wisconsin. And so you do have a fighting chance against them. And another thing is that people still reference this today.

SYDNEY WIDELL: So I was surprised to learn about all of this. Because I have unknowingly driven past this development like a lot of times growing up. But after hearing the story, I kind of wanted to go back and see it again. Germantown is kind of a funny community, just in that it's like really, really into its German heritage.

BONNIE WILLISON: What do you mean?

SYDNEY WIDELL: I guess like picture-- picture just like a town that was built like between 1950 and 1970, but like everything is stucco. Like the McDonalds, but like make it German

and stucco. Some of the street signs are in German. It's really funny. I was also hopeful when I went that I could meet someone who was there in 2009 and could tell me a little bit more about what had happened in that place.

So Esquire Estates is right off the main highway. I parked my car in a cul-de-sac and just started walking. So most of the houses in this development, I don't know, they just look like classic subdivision homes. Like this could be literally anywhere in Wisconsin. All of the backyards, they're all situated in a ring around like this kidney bean-shaped pond. And then all the backyards slope down into the pond.

And then the water was like this really striking shade of turquoise blue, which I feel like can't be natural. Yeah, so the pond was a lot bigger than I had anticipated. And there's actually this island in the middle of it with a community swimming pool on it. And you can walk to the island across this little bridge. And I could see people sitting out there on like chaise lounges around the swimming pool.

And there were all these kids laughing and splashing in the water. I really, really, really wanted to see the pond. But I felt like I was going to have to like trespass across someone's lawn to do that. But there was like a sign that was like really clearly stating that like you couldn't go back unless you were a resident or a guest of a resident. So I just kept walking. And the first person I met was this man who was outside his house doing some lawn work.

Hi.

SUBJECT 1: Hi, how you doing?

SYDNEY WIDELL: I'm good. My name's Sydney. Do you have a sec?

SUBJECT 1: Sure.

He lives across the street from the pond. And in 2009, he had just moved into the neighborhood. And in addition to crayfish, he told me that the pond is also home to several species of fish. And actually people like live there specifically to go fishing in the pond.

Do you remember seeing any red sea crayfish or red swamp crayfish?

SUBJECT 1: No, I didn't-- I never saw any. But I'm pretty sure the ones over there, they did. You know what? You would be better off asking someone with their homes with the back on the little man-made lake. They would know more about it.

SYDNEY WIDELL: So I took his advice and I kept walking. The next person I met was a woman named Mary. She was in her front lawn. And she told me that she'd lived in this neighborhood for 27 years.

Do you fish back there?

MARY: Uh, I-- we don't. But a lot of people do, yes.

SYDNEY WIDELL: Yeah.

MARY: Yeah, the kids do a lot. But the water is clean. Did you want to go look back there?

SYDNEY WIDELL: Can I?

MARY: Sure. It was really for fishing in a boat or with the paddleboats or something.

SYDNEY WIDELL: As we walked around her property, Mary told me more about the crayfish problem. She said that the first time she saw a crayfish was actually two years before the 2009 incident.

MARY: I know I saw it. It was kind of near the culvert area that we have in the back where the water drains out. And I had seen it way before it was a problem. But I didn't think much about it, you know. I just kind of thought somebody used it as bait, and it'll die out, you know, kind of thing, you know so. But it didn't so.

BONNIE WILLISON: Oh my gosh, she saw it a few years before.

SYDNEY WIDELL: Yeah, there is something really, really eerie about that to me. I don't know. It feels like one of those moments where two alternative realities just kind of diverge.

BONNIE Yeah, so if the crayfish were around for a while, but no one did anything. What

WILLISON: changed?

SYDNEY WIDELL: Mary said that the winter before, all of the fish in the pond had died. Like at what point did people decide this is a problem and we should--

MARY: I think because they were crawling all over the lawns and stuff, somebody on the other side actually called the DNR, gave them a picture of it, and asked them if this was-- what this species was or anything. Because it was multiplying quite a bit so. And I think that's when they kind of got involved, when they realized what it was actually and stuff and how invasive it was becoming.

SYDNEY WIDELL: The first thing that the Department of Natural Resources did was send someone out to collect a few samples, which they took to this crayfish expert who worked for the Milwaukee Public Museum. And right away, they were able to confirm that this was a red swamp crayfish. Two days later, Heidi Bunk remembers getting an email confirming that there were red swamp crayfish in the pond.

Heidi is a lakes biologist for the DNR, who does everything from coordinating community science programs to issuing building permits to answering phone calls from concerned residents. Heidi has a huge hand in everything that comes next.

HEIDI BUNK: August 25, 2009 is when we get that phone call. There were giant lobsters wandering all over Germantown. That's the call we got.

SYDNEY WIDELL: Oh my gosh, so we saw one of the original emails that had been circulating around the DNR right when this was starting to break. And they mentioned this man named Tim Zabel. He was the first person to call the DNR. And his phone number was listed, too. And honestly, it felt like a huge stretch to call the phone number, because this was like a decade ago. But we tried to reach him.

[PHONE RINGING]

TIM ZABEL: Hello.

SYDNEY WIDELL: Hi, Tim. It's Sydney from the Sea Grant calling back. Is this a better time?

TIM ZABEL: Yes.

SYDNEY WIDELL: Perfect.

TIM ZABEL: So who are you?

SYDNEY WIDELL: Back in 2009 and down the street from where Mary lives, Tim was visiting his sister and nephew.

TIM ZABEL: Well, my nephew, so he would have been 12 at the time. He was-- he always fished in that pond. And that year he was fishing for crayfish, because that's all there were and catching them. And he had, you know, a cooler full, you know, a couple dozen probably. But I looked in the cooler and said that can't be right. But there were so many. I can't-- so I'm not a biologist or anything.

But I can't imagine that-- I mean, there were hundreds for sure and probably thousands. And I asked my sister, would she-- if she minded if I contacted the DNR. And she said, sure, no problem.

SYDNEY WIDELL: So the DNR springs into action Scott Van Egeren was a natural resources scientist at the DNR back in 2009. Now he's a regional lakes biologist in Rhinelander. But back then, he was just finishing up grad school. Scott had some previous experience researching crayfish. And so when he got the email about the red swamp crayfish in Germantown, he knew it was something that he wanted to be involved in.

Along with Heidi, Scott would become one of the main handful of people who focused on Germantown. So the DNR staff went down to the pond and saw what they were dealing with.

[MUSIC PLAYING]

SCOTT VAN EGEREN: The fishery staff, you know, right away started to walk around the pond and net and pull out crayfish. You know, I think at first we were thinking, well, this is-- these crayfish are sold for crayfish boils. Like that-- that could be it. Somebody just dumped their live crayfish that they didn't completely use all of them. And maybe there's not that many. You know, they would catch like 10 as they walked around.

SYDNEY WIDELL: We asked basically everyone we talked to what their first impression of the crayfish was that day. And everyone said they were huge, like the biggest ones were eight

inches long. And they were more aggressive than anyone expected. Like a lot of people that research crayfish are used to like the Wisconsin native crayfish or even the rusty crayfish, which is invasive, which apparently are a little bit more calm and like skittish. They run away from you. But red swamp crayfish will like charge you is what I understood.

BONNIE WILLISON: They're fearless, yeah.

SYDNEY WIDELL: The red swamp invasion in Germantown was a particularly big deal. Because this was the first red swamp crayfish introduction in Wisconsin. Red swamp crayfish had never been recorded in Wisconsin before. But they're kind of notorious throughout the world. They've become invasive in a lot of different places. They become really abundant and they spread fast. And they're really hardy.

We talked to Stephanie Peay. She's a British ecologist and independent crayfish researcher. Because the species of crayfish that are invasive in Europe are the ones that we have native here in North America. Seeing as Europe in total has only a handful of native crayfish species, Stephanie is really impressed with the ones in the US.

STEPHANIE PEAY: The United States is-- and in particularly the Southeast-- is a global hotspot for crayfish biodiversity, in terms of the number of species that are present and a lot of them unique to specific areas, in some cases specific river systems or cave systems. You've got cave dwelling crayfish in some parts of the United States.

I went to a crayfish conference down in Missouri some years ago. And there's over 80 species in that state alone. So you have the most amazing wealth of these weird and wonderful animals.

SYDNEY WIDELL: Because of global trade, people have been moving crayfish around. And some species of crayfish, including red swamp crayfish, are common in aquaculture. Like people farm them, because they're good to eat. And they taste like lobsters. The fact that they can be so large is what makes them popular for boils.

STEPHANIE PEAY: Red swamp are amazing burrowers. They really are. And they're also really quite terrestrial. They live down in, naturally, in southeastern United States, so places like

Florida and that area. And they live in seasonal ponds. So they're used to things drying up. So they have two survival strategies. One is head out. And the other is hunker down.

So head out, they will go and walk over land until they try and find somewhere that's a wet pond they can move into. Hunker down is where they pull up the drawbridge, literally. They're in their burrows. It's drying out outside. So they stop up their burrows with a mixture of mud and spit and try and stay in damp conditions in this deep underground burrow and wait it out until it gets wet again.

SYDNEY WIDELL: We mentioned it in the last episode. But red swamp crayfish, their burrows can destabilize dams and other earthen structures.

STEPHANIE PEAY: So you can see they're pretty tough to control.

SCOTT VAN EGEREN: What we had learned about these crayfish was that, they might be able to walk a couple of miles across land. And there were lots of little stormwater ponds, drainage ditches. The Menominee River was, you know, within a mile or two of this. And if they got in a river system, it would be-- it would be out of the-- the genie's out of the bottle, right. You can't-- you can't put them back in then. We're not going to get them all if they make it to a river or a stream.

BONNIE WILLISON: So this was basically a ticking time bomb.

SYDNEY WIDELL: Yeah, the Menominee River leads to Lake Michigan. And Germantown itself is only a 20 minute drive from the Great Lakes so yeah. For the DNR, the first step was to secure the perimeter, which is blocking culverts and exits and kind of stretching a fabric fence around the whole lake to make sure that no crayfish got out. But that didn't really work.

HEIDI BUNK: And the crayfish were not very impressed with this setup. They just burrowed right under it.

SYDNEY WIDELL: So now the crayfish are clearly out and they're on the move. So the question is like, where did they go? And where are the crayfish now? Because the surrounding area is full of woods and farmland and wetland. And you can just picture like on a bone

dry day, all of this would just look like grass, like these culverts and ditches.

But like add a little bit of water and all of a sudden, you have this network of channels, like ushering the crayfish out into the great wide world. So it was really important to figure out where they had gone. So at this point, the DNR calls in the Water Guard. The Water Guard was this group of conservation wardens who, in the summer, focused exclusively on protecting Wisconsin's lakes, rivers, and waterways.

Chris Hamerla was part of the original response team. He remembers scouting ditches, turning over rocks along highways from the early, early morning until nightfall. The other thing the Water Guard was trying to do was figure out how the crayfish got there. So they would go around to local schools and ask them if they had been distributing crayfish to students. And he would walk around the subdivision and knock on people's doors and ask them if they had seen the crayfish or if they knew anything about where the crayfish might have come from.

And like honestly, I can't imagine outing myself at this point. Like that would be so embarrassing if it was you. Yeah, here's what that conversation would have sounded like.

CHRIS HAMERLA: Hey, good afternoon. My name is Chris Hamerla. And I'm a deputy conservation warden. You've probably noticed the DNR staff working on your pond. We're looking for these crayfish. Perhaps you've seen them crawling across your yard. And that's how you'd open up the conversation.

SYDNEY WIDELL: They were going all over the place asking people for information.

CHRIS HAMERLA: A few people were like, well, yeah, we saw some in our yard. Or we saw some crawling across our driveway. So at that point, it led us-- well, when did you see that? Oh, we've been seeing it for the last month. We're like, OK, well, this is a bigger issue maybe than we think. This isn't a new population. And potentially, these things have spread.

SYDNEY WIDELL: So the Water Guard expanded its search radius. Now they were looking in places roughly a mile or a mile and a half away from the pond, trying to gauge just how far the crayfish could have walked. And that led them to a stormwater retention pond

at the police department, roughly a quarter mile away from the pond and across a busy road.

CHRIS HAMERLA: So what we actually ended up finding first was just some pieces of red swamp crayfish on a rock, like a raccoon or something had eaten it. So it's like, oh, OK. Obviously we need to check this pond out better. So then we kind of looked around the pond. Well, here's an area with some rocks. You start pulling up the rocks. Oh, here's a red swamp crayfish.

SYDNEY WIDELL: As they're evaluating how far the crayfish have made it away from the pond, they also need to evaluate how many crayfish are in the pond and where in the pond are they.

JAKE VANDER ZANDEN: Very distinctly remember going down to the pond, it was late morning. They were just clearly everywhere in the pond. So they were abundant in full force.

SYDNEY WIDELL: That was Jake Vander Zanden, the Director of the Center for Limnology at UW Madison and someone who spent a career researching aquatic invasive species. He came down to help the DNR learn about the crayfish, where they came from, kind of like what their life histories look like, and where they were in the pond. So that when they started trying to remove the crayfish, they would be as effective as possible.

JAKE VANDER ZANDEN: I remember like the first time I went. I was in my swimming suit and going and just poking around and picking up red swamp crayfish and getting bit occasionally. You know, out in the middle of the pond, it was-- it was fairly deep. But around the edges, there was sort of a nice shallow-- shallow area where you could wade and find crayfish. And these crayfish were pretty happy sitting in these shallow near shore areas, just hanging out.

I remember finding it really not that humorous to be in this-- I mean, I just sort of felt that this pond was nasty. I don't even know why I felt that. But it was the blue dye. And then I was also just envisioning all of like the like oils from the road running off into this little pond and everything, you know.

SYDNEY WIDELL: Yeah.

JAKE VANDER ZANDEN: Stormwater pond. And and then I also-- and then there's the element of, OK, I need to get in there. And I need to be snorkeling around. Because I'm the biologist who's supposed to be the one who really comes in with these insights about the location of the burrows and that sort of thing. But this is the kind of thing that biologists do, you know. Like you end up in golf course ponds. And, you know, it's just the way it is so.

SYDNEY WIDELL: Yeah. Most of the work Jake does is really academic. He observes invasions that have already happened, for example, the rusty crayfish invasion that has been going on for the last 60 years in Wisconsin and how they impact lakes. But this time felt different.

JAKE VANDER ZANDEN: We're dealing with a real world situation that we don't have any control over. This is not an experiment. This is a crisis, right.

SYDNEY WIDELL: So Jake sent some of his students out to help. Here's what Scott remembers.

SCOTT VAN EGEREN: So within two weeks, we had students out there catching crayfish with many traps. I think there were like 100 some. And then the catch went up to like 60 to 100 crayfish a day.

SYDNEY WIDELL: They needed someone who was available to lead this trapping. And this person basically needed to drop everything and be able to go to Germantown like almost every day to check the traps for crayfish. And one of Jake Vander Zanden's former students, Erin Vennie-Vollrath, took on the job. So Erin spent a lot of time in Germantown that first summer. Here's how she describes a typical day.

ERIN VENNIE-VOLLRATH: Yeah, so I would usually stop by Cops on my way out of town, out of Madison, and pick up a whole bunch of beef liver because that was what we would use to set the traps. I mean, definitely like the people at Cops thought it was pretty weird when I would be buying-- because I would just buy pound-- pounds and pounds of beef liver and definitely not a good smell once it sits in the water for a while in the traps. That's one of the worst smells ever.

Once we got to Germantown, we'd work our way around the pond, collecting crayfish traps. We would measure the crayfish for their size. We would sex them, determine if they're male or female.

SYDNEY WIDELL: How many times did you get pinched?

ERIN VENNIE-VOLLRATH: Yeah, a lot for sure.

SYDNEY WIDELL: If these crayfish were from a recent crayfish dump, they would have all been about the same size and the same age. But from the trapping that Erin and students did, they were seeing crayfish of all different sizes and sexes and life stages. Clearly, they'd been established longer than a few months.

ERIN VENNIE-VOLLRATH: And looking at the numbers, I think it was within like a two month time span, we were-- we pulled out like 2,000, over 2,300, crayfish out of the pond. And it was-- it was a bit overwhelming to just see. We didn't realize how many were in there.

SYDNEY WIDELL: Once it was clear that there were thousands in the pond, the DNR started thinking about doing a chemical treatment. And by chemical treatment, I mean using chemicals to kill all the crayfish in the pond, just want to acknowledge that there's a lot of euphemisms being used in this episode. Naturally, the DNR looked for other people or organizations that had used chemicals before to control crayfish.

Because Wisconsin hadn't done this before at all. And it turned out not many other places in the US have really done this.

SCOTT VAN EGEREN: You know, there really wasn't much out there in the scientific literature about chemically controlling crayfish. You know, our staff were really kind of trying to break new ground here.

SYDNEY WIDELL: So there were a few chemical options to think about. Like you don't want some-- a chemical that's going to stay in the pond for a long time, you know. And so there was this insecticide that they had thought about using, which, to me, I wouldn't have gone to insecticide. Because crayfish aren't insects, you know. But apparently, they're close enough to insects that we can use an insecticide.

So there was this chemical called Pyronyl that they could use. But the challenge to using any of these chemicals is that there are regulations that prevent you from using them to protect people, I guess. And so like you can't use them on waterways

in the US, unless you have the right permits. And getting those permits takes like a year. So they wouldn't be able to use this insecticide right now.

But they still needed a short-term solution. So they decided to use bleach.

HEIDI BUNK: So imagine a 4,000 gallon tanker truck showing up in your neighborhood on a Tuesday morning or whatever and dumping bleach into your local pond.

SYDNEY WIDELL: Yeah, when I imagine that, I don't think I would be pleased necessarily. Like I guess I would want to-- want to get the crayfish out.

BONNIE WILLISON: I think I would have a lot of questions.

SYDNEY WIDELL: Scott and Heidi said that the residents were really understanding with the gravity of the situation.

BONNIE WILLISON: Yeah.

SYDNEY WIDELL: And also, yeah, the bleach did kill everything else that was in the pond. But they also said there wasn't much else in the pond. Because that fish kill had happened the year before.

BONNIE WILLISON: So they treated the pond with bleach. And they also had someone like go around to each individual burrow and apply bleach into the burrow to make sure that they were getting the crayfish and the crayfish couldn't hide. And the burrows are like pretty easy to spot. They're just like little holes in the ground. And like sometimes there's like a little column of dirt where you can tell like the crayfish has burrowed out.

And they were using like roughly the concentration of bleach that you would want to use if you were going to clean out your shower. And after this treatment, it appeared that there were no crayfish left in the pond.

SYDNEY WIDELL: Heidi showed us a graph of how many crayfish are caught throughout the few months. And after this bleach treatment, the number goes like directly down to zero, flatline.

BONNIE WILLISON: But when the DNR came back the next spring, the crayfish were back, too.

[MUSIC PLAYING]

Picture this, it's a Friday night in the summer in Wisconsin. There's blues playing on the radio. And you're on your way to a fish fry. Are you getting walleye or perch?

SYDNEY WIDELL: I'm a big fan of perch.

BONNIE WILLISON: Interesting.

SYDNEY WIDELL: What about you?

BONNIE WILLISON: I think walleye most of the time.

SYDNEY WIDELL: What do you get, pan fried or deep fried?

BONNIE WILLISON: Oh, pan fried, completely.

SYDNEY WIDELL: Same.

BONNIE WILLISON: Yeah. Did you know that the majority of the seafood that Americans eat each year is imported from other countries? By purchasing fish from Wisconsin fish farmers and Great Lakes commercial fishers, you're keeping your food dollars close to home and supporting local family businesses.

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SYDNEY Wisconsin fish, local, healthy, delicious.

WIDELL:

BONNIE WILLISON: 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.

So it's the spring of 2011 and the crayfish were back in Germantown. Meanwhile, there was another instance of red swamp crayfish being reported in Wisconsin. And that was in a pond in Kenosha, Wisconsin.

SYDNEY WIDELL: It just like makes you wonder how many other ponds had red swamp crayfish that like we haven't detected, you know.

BONNIE WILLISON: I know. I know. Kenosha is also by Lake Michigan so, yeah, not good. But the good thing was that, unlike Esquire Estates, the Kenosha pond wasn't really connected to anything, streams, culverts, ditches, or anything like that. So they decided to bleach that pond, too. And they found that the bleach was killing the crayfish in the water. But it wasn't killing the ones that were in the burrows.

In Kenosha, after the bleach treatment, they tried to dig into a burrow with a shovel. And they found crayfish that were alive and well. Because they had covered themself in mud.

SYDNEY WIDELL: Which explained how all of the crayfish had survived the winter in Esquire Estates.

BONNIE WILLISON: Also you need funding to do any of this work. And in 2010, the funding ran out. They wouldn't be able to continue trapping, unless they got more funding and applied for grants and stuff like that. But the crayfish didn't take any breaks. And the numbers of crayfish climbed even higher than what they initially were.

HEIDI BUNK: You know, sometimes the demand on my time was just incredible.

BONNIE WILLISON: Yeah.

HEIDI BUNK: That was a challenge for me. So if you're working and arriving at the website at 7:00 AM and then you run to your office to do some more bid documents because you ran out of material, because you need to get that approved by a bunch of people, you're in the office till midnight. Then you go home and sleep. And then you come back by 7:00 AM the next day. That was challenging.

BONNIE WILLISON: Once the DNR does get funding again, they start looking for expert advice. They decide to invite none other than UK crayfish expert Stephanie Peay.

STEPHANIE PEAY: They kindly invited me out to come and have a look at the site in 2012.

BONNIE WILLISON: Stephanie was really interested to see the site. Like she had been actually advising them for a little bit on this. So Stephanie gets on a plane, on her way to Wisconsin.

STEPHANIE PEAY: I remember I did have difficulty getting in. Because I-- it was the time of year. Of course, I'd been out doing quite a bit of survey work with crayfish here, some of which is manual survey work. And what had happened was that, because I was turning over rocks and looking for white clawed crayfish, it had caused some wear and tear on my fingertips. And so my fingerprints were somewhat eroded.

And so I had to go through the immigration control. And I have to do this-- these stupid scanner things where you got to put your fingers on them and what have you. And mine did not match. So I was like taken away to a room where I had to be grilled about whether I was a bonafide visitor. And it's like, I'm only here as a guest of the Department of Natural Resources in Wisconsin.

BONNIE WILLISON: Stephanie has experience using pesticides to control crayfish. Her main thought had to do with the fact that the burrows were above the water level.

STEPHANIE PEAY: I said, you've got to deal with the ones that are in the banks. Otherwise it for sure will not work. So that was why I recommended doing a measure which would dig out the banks and put down an impermeable surface. These are techniques that I'm familiar with from big construction.

BONNIE WILLISON: So the question with that was, what can and can't red swamp crayfish burrow into, if they were going to put a new bank on? So they designed what they call this crayfish

condo study, where they take plastic bins and different sizes of rocks and gravel and then put crayfish in there to see what they can burrow into and what they can't.

STEPHANIE PEAY: It was amazingly hot when I was there in Germantown. I think there was a-- there was a heat wave going on. So the temperature was up over 40 degrees centigrade, so up over 100 Fahrenheit. And I'm not used to working in heat like that. But amazingly, despite the fact that red swamp crayfish are, you know, they're an aquatic animal, I think they coped with the heat better than I did. You think, wow, that is an impressive animal.

SYDNEY WIDELL: They also learned that raccoons love crayfish.

BONNIE WILLISON: How did they learn that?

SYDNEY WIDELL: So one thing that Stephanie wanted to do while she was there was run these experiments on the island during the night. Stephanie just left some buckets. There were 10 buckets. And each bucket had 30 crayfish, so 300 crayfish. And they were testing out like these different concentrations of chemical to see how the crayfish would respond. But she was doing this on the island.

And the residents didn't want anyone to stay on the island overnight. So Stephanie leaves. And when she's gone, the raccoons come. Here's Heidi.

HEIDI BUNK: The raccoons essentially had a frat party there. And all that was missing was the crushed beer cans.

BONNIE WILLISON: What did it look like?

HEIDI BUNK: A disaster zone, there were torn crayfish everywhere, crayfish parts up in trees, on shrubs, stomped on. All the containers were turned over. So there was quite a party raccoons that had had a pretty good time.

BONNIE WILLISON: The DNR was also wondering like, could you put pressure on the crayfish if you introduced other predators, so like not just raccoons? So they decide to bring the fish back. And they start stocking bass in the pond. And now they're wondering, are

the bass eating the crayfish? So to see what the bass were eating, they would go out and catch a bunch of bass and then squirt the back of their throat with water. And that actually makes like a fish throw up, which I didn't know was possible.

But the fish will throw up. And you can paw around in that. And if there are crayfish parts, then you know that the bass have been eating the crayfish. But some bass seem to have swallowed crayfish. But that was only a couple. So it wasn't seeming like this was really a good solution. And there was this picture actually--

SYDNEY WIDELL: I can't believe they got a picture of this.

BONNIE WILLISON: I know, I feel like that's invading this poor fish's privacy a tiny bit. But you can see down the bass' throat. And then there's one long crayfish antenna that's sticking out. So it's truly like the crayfish is too big to fit inside this bass. Like the bass ate it and then couldn't swallow it all the way.

SYDNEY WIDELL: Yeah. So the next order of business was to do the bank treatment. The bank treatment was this idea that Stephanie recommended. It was a way of completely altering the shore around the pond to make it inhabitable to red swamp crayfish. So they removed all of the brush and plants and trees along the shore of the pond. They brought in giant diggers and scraped away all of the soil and any remaining crayfish burrows 15 feet around the shore of the pond.

They lined that with impermeable fabric, brought in truckloads of gravel and rocks, and put that on the shore. And the neighborhood had their new shoreline. After that, they were able to use the insecticide.

BONNIE WILLISON: So meanwhile, there are still all of these crayfish across the street at the police retention pond. Which, this pond is completely man-made. It's smaller. And nothing else really lives in it. So if they can't eradicate the crayfish in the pond, they decide that they'll just eradicate the pond and completely fill it in.

SYDNEY WIDELL: Wow. That seems like a very big decision.

BONNIE WILLISON: Right, like just cancel the pond. The pond no longer exists. Yeah, Heidi kind of spoke to that a little bit.

HEIDI BUNK: So decision came because we knew that all the bleach and the Pryonyl were not going to kill them if they were in the burrows. And we wanted to eliminate the habitat for these crayfish. So the idea was to fill in this pond for approximately five to seven years.

BONNIE WILLISON: So when I was in Germantown, I wanted to see the place where this pond had been. And so I went to the police department. And I kind of just like walked around the perimeter of the building. And it looked really landscaped. And nothing I saw struck me as like a space where maybe, at one point, there had been a pond. And so I went inside. And I asked the person who was working there, do you know where this pond was? I just want to see it.

And she had no idea what I was talking about. And I explained like the crayfish. And she said she was working there in 2009. And she was really emphatic that the crayfish had been across the street at Esquire Estates and had never made it over to the police station. And so-- so I was really puzzled. I left there feeling really confused and kind of like maybe I had misunderstood.

But then I went on Google Earth. And there's a feature where you can like look at historical pictures, like satellite photos. And I want to show you this series of pictures. So this picture is from 2020. You're looking straight down at the police station. There is no pond. There's like a tennis court off to the side with a swimming pool that's like probably private property. It just looks like parking lots, and there are some roofs, right.

SYDNEY WIDELL: OK. So that's what you saw.

BONNIE WILLISON: Yeah. OK, now 2010, look at May 2010.

SYDNEY WIDELL: Wait. Oh, I see it. So there's a little kind of rectangular pond.

BONNIE WILLISON: Yeah, except it's not even that little. I would say it's like roughly the--

SYDNEY WIDELL: Oh, yeah, now that I'm seeing the cars.

BONNIE WILLISON: Yeah, so it's like not an insignificant pond.

SYDNEY WIDELL: So obviously, the crayfish and the pond were eradicated at the police pond. But what about the Esquire Estates pond? In 2015, the year after they did the bank treatment and the insecticide, they only found two crayfish that year. In 2016, they didn't find any. In 2017, they found one crayfish. And in 2018, they didn't find any either.

BONNIE WILLISON: How could they go from having 0 to 1? That makes me feel like there could be more than one, even if it looks like there aren't any, you know.

HEIDI BUNK: So in this case, complete eradication wasn't achieved. And to be honest, I'm not surprised. Because I'm pretty sure there were a few red swamps lurking around on the wrong side of the barrier.

SCOTT VAN EGEREN: You know, when you're thinking about eradicating species, like I said, I never want to use that word. I kind of don't think we should. It's almost never possible. So I think the lesson learned for all of us is, you know, if you really think you're going to eradicate something, that's a pretty tall order. And if it's not just something in a little pond, it's probably not possible.

BONNIE WILLISON: Throughout this whole time, there was this ongoing investigation to see how these crayfish got in.

SYDNEY WIDELL: No one really wanted to commit to a single theory. But I'm just curious from what you've heard, are there any that you think sound the most plausible?

BONNIE WILLISON: I don't know. I think leaning towards like the crayfish boil theory. Maybe someone ordered a box of live crayfish and then somehow they got in. Because I don't know, it just seems like it would take so many crayfish initially to create an invasion this big. What do you think?

SYDNEY WIDELL: Yeah, I think the more people have been involved, the more likely it is that we would have an answer right now. And the fact that we don't I think it was like a very small

number of people, if not one person.

BONNIE WILLISON: There are still a lot of lessons that the scientists involved have learned from this. First of all, they've learned just how to contain and control red swamp crayfish, which, you know, there hasn't been much research on. While they were conducting all of these surveys and ditches around the police department, they also made some other discoveries.

For instance, they found a few rare species of frogs and even rarer native crayfish. And that was surprising to Scott, because he doesn't usually think to monitor environments like this. When we were talking to Stephanie, she could only name one place in the world where red swamp crayfish were completely eradicated from a system. And that was the pond in Kenosha, Wisconsin.

The DNR had decided to fill in the Kenosha pond, the same as they did with the police pond. This in-fill method was new as well. Wisconsin was the first ever place in the world to use this method of filling in the pond, according to Stephanie. On June 21, 2019, there was another red swamp crayfish dump that was reported.

An open box of crayfish was left at a boat landing in Sauk Prairie along the Wisconsin River. And the crayfish were all caught within 24 hours of this incident thanks to a quick response. But Scott remembers what it was like to get an email about this, not knowing how far the fugitive crayfish had traveled.

SCOTT VAN EGEREN: My heart kind of sank a little when I saw that. As soon as I read Wisconsin River, it's kind of like, oh, you can't stop that. Had somebody like found a red swamp crayfish in one of the wetlands along Wisconsin River, I would have had almost no hope that we could have really eradicated them. It's just such a big, open, beautiful system. And given these thing's life history and being able to move, I don't know that that would have been realistic.

SYDNEY WIDELL: So I asked Mary, the woman who lived at Esquire Estates, who I talked to at the very beginning, I asked Mary if she had any wisdom for people who might live in communities similar to hers. And she said that the most critical thing someone can do is do not stock crayfish or anything else in your pond or your river. Situations like this are so preventable, just do not stock crayfish or anything else in your local pond or wetland or lake, river. Just do not do it.

[MUSIC PLAYING]

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