100% Great Lakes Fish Initiative

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Marie: You're listening to The Fish Dish, brought to you by Eat Wisconsin Fish, a campaign of the Wisconsin Sea Grant Program. Are you fish-curious? Or are you a fish expert who wants to learn even more about Wisconsin's fisheries and cooking fish? We'll give you the latest "dish" on fish.

Your hosts are . . .

Sharon: Sharon Moen

Marie: and Marie Zhuikov

Together: Two friends who have been working for Sea Grant seemingly forever and who know a thing or two about fish.

Marie: But that's "forever" in a good way.

Sharon: Sharon is a food-fish outreach coordinator.

Marie: And Marie is a science communicator.

In this episode we discuss the 100% Great Lakes Fish Initiative, which is a relatively new campaign aimed at commercial fishers to better use all parts of the fish they catch. Sharon and I speak with campaign leaders David Naftzger and John Schmidt with the Great Lakes St. Lawrence Governors and Premiers organization. Then we travel to Bayfield in search of whitefish livers – a part of the fish many people don't realize you can eat. Joining us for our whitefish liver feast at the Pier Plaza Restaurant in Bayfield is Emma Hauser, Wisconsin Sea Grant's aquaculture outreach and education specialist who works in nearby Red Cliff, Wisconsin. She discusses a way to feed baby fish, which would also entail using more parts of Great Lakes fish.

Now, let's meet David and John.

David: I'm David Naftzger. I'm the Executive Director for the Conference of Great Lakes St. Lawrence Governors and Premiers, and I help lead the 100 percent Great Lakes Fish Initiative.

John: I'm John Schmidt. I manage our maritime work here at GSGP, primarily focused on shipping and port decarbonization.

Sharon: What is the Conference of the Great Lakes St. Lawrence Governors and Premiers, and how did that get started?

David: It's a partnership of the governors from the eight U.S. states that border the Great Lakes and the Canadian premiers from Ontario, Quebec. The organization was started in 1983 and its focus is working together toward restoring our Great Lakes, protecting our environment, and also growing the regional economy. So, as a part of that, we work on a range of different projects as a part of our portfolio. Fishing is relatively newer, but an exciting opportunity and one that's been fun to work on.

Marie: And it came together kind of around water withdrawals in the Great Lakes, didn't it, originally?

David: Originally, yes. There were concerns about long-distance diversions of Great Lakes water. And so that was a uniting force for the governors at the time and the premiers as well. And it kind of grew from that with an economy that was facing similar challenges in the mid-eighties. And then that kind of reinforced a collaborative spirit and enabled them to work on new and different issues. So, it's been constantly changing. I've been doing this for 25 years now, which seems hard to believe, but it's always different. And it's been a lot of fun.

Sharon: I have so many questions, but the big one is how did you guys decide to pursue the 100 percent Great Lakes Fish Initiative?

David: For a number of years we've been thinking about this new idea of the working Great Lakes. The idea basically is we've spent years and years working on restoration and protection of our water. How can we harness the lakes in ways that are inherently sustainable to drive more economic activity and in ways that are either not harmful to the waters, but in some cases are actually restorative? So we've worked on maritime transportation, we've worked on coastal tourism, we've worked on building up cruising on the Great Lakes. When we learned about the 100 percent Fish Initiative in Iceland, it got our minds going about the commercial fishery here in the Great Lakes, and how could we do more with it.

Marie: And how did you learn about the Iceland initiative with fish?

David: It was kind of a happy accident. I was traveling with a group of people to Europe for a maritime transportation project. I was the person responsible for the logistics of the trip and was able to find some flights that went through Iceland for a fraction of the cost of flying direct to Germany or wherever it was we were going.

When we were in Iceland having a day or two to spend as we'd like. I started to do some research on different organizations that were working in and around water natural resources and identified this group called the Iceland Ocean Cluster. So I contacted their chairman requested a meeting and went to their office and we were just blown away by the forward-thinking way that they were looking at fish in ways that were really different than we were. When we think of fish, generally we're talking about a fillet on a plate. And they were thinking about it in terms of this fish value machine with the fillet being one part, but all the other parts being as valuable or even more. Whether that's fish skin or scales or the viscera or other parts of the fish. They were doing creative and amazing things that were profitable. Getting more people involved in employment and bringing in all these non-traditional partners into the fish industry, which we really hadn't seen in our region. So, seemed like a really exciting idea. Took us a few years to kind of figure out how to operationalize it here. But once we got our legs under us, I think we've been really making great progress in a pretty short period of time.

Sharon: What do you envision the Great Lakes fishers and fishing community doing with the products or the non-fillet products?

John: Well, there's a number of opportunities here for the region modeled after the success that we've already seen in Iceland. And the beauty of this 100 percent fish approach is that there are opportunities at all levels of the value chain. From interesting things like fish leather, which is surprisingly the second strongest leather on the planet after kangaroo, your fun fact for the day, to things that are higher up the value chain that are more capital intensive, for example processing the skin and scales into collagen or looking into protein hydrolysates for things like bouillon cubes or pet food or other food uses.

So, there's a lot of these small opportunities, and while some of them might seem a little daunting at the outset, it's important to remember that this is a suite of potential opportunities, and again, really the beauty of it is that you can pick and choose and do what works for you, whether you're one person doing something in your garage to ten, fifteen people, to a three-hundred-person collagen factory. There's a lot of opportunity here.

David: And one nice thing is we're not starting from ground zero. Some Wisconsin companies are already active in this space and innovating. Dramm Corporation, for example, in Algoma, is making a liquid fertilizer product out of fish, and I even hate to use the word, but fish waste. I prefer to call it raw material. But they're making a great organic fertilizer product that can replace petrochemical-based fertilizers. So that's environmentally more sustainable, taking advantage of a natural resource that we have here and managing an issue that some of the fish processing companies have a challenge with, which is what to do with the fish other than the fillet.

We have a network now of 25 companies, including nine in Wisconsin, that have committed to 100 percent utilization. So, by the end of 2025, these companies are all going to be there. Dramm is one of the companies that's been a part of the network, and it's been great for them to connect with some of these other companies to talk about how they work with sourcing raw material, getting it from different parts of the region to their processing facility. It's not the whole answer in terms of how we can manage all of the material from the region but it's an important part of that mosaic and one that's been a success story for them.

Marie: It just started with whitefish in the Great Lakes, right? But now it's gotten larger?

David: We had to start somewhere, and we wanted to walk before we started to run. Whitefish is a really important commercially caught species from across the Great Lakes. The recent catch rates bear a striking and alarming similarity to the Icelandic cod fishery in the 1980s and 90s. Stocks have been really collapsing in most of the open waters of the lakes, although there's some exceptions and populations in and around Green Bay remain at good levels.

But, regardless it's created a real challenge for fishermen in terms of how can they find other species to catch or how can they drive more value from what they are able to catch, even if it's the lower amount. So, we began by getting lake whitefish. We sent them to Iceland for biotechnical testing. And that's a fancy word for basically destroying the fish into its component parts, identifying the underlying chemical composition of the different parts. And then using their network, understanding what are the lake whitefish component parts particularly well-suited for in terms of products.

We were able to identify skin and scales for collagen. We were able to identify the skin for fish leather. Meal and oil basically for everything. And protein hydrolysates as well from the heads and the bones. So, these were all new opportunities and new ideas to us. We then brought those ideas back and talked with different companies in the fish industry and other partners. And there was a real interest because of all these new ideas that came from the whitefish. Well, what could we do with walleye and lake trout, yellow perch and other species?

One part that was also interesting was one of the tribes suggested . . . why don't we look at a species that we don't normally target, but we find we're catching a lot of, and they're abundant in the lake, and that was white sucker.

So, if we can take a species like that, that isn't necessarily very desirable to put on a dinner plate, but still can drive a lot of value, we can then put more money in fishermen's pockets, we can put more money into the processing industry, and we can create a new product that there's a significant demand for so that was kind of an interesting one.

We're now looking at our next phase, which will be doing some testing on cisco and gizzard shad, which are species that are abundant and for which we think there could be some real opportunities. So, the future that we're looking at would be a more diverse fishery, both in terms of the species that are targeted and also more diverse in terms of what we're doing with each of the fish.

Sharon: What happens currently to a lot of the fish waste that's generated in the Great Lakes?

John: Well, unfortunately, right now, a significant portion of that quote-unquote waste or again, raw materials, we like to think of it, is landfilled, which has a number of issues associated with it. On the economic side it costs, same kind of deal with your municipal trash at your house, you have to pay for this to get trucked away and landfilled.

On the environmental side, of course, the decomposition in the landfill creates various greenhouse gases and other pollutants that of course, if you can avoid is ideal. That said, there are some kind of pioneering early companies that are approaching this 100 percent fish idea now, creating fertilizer, as Dave said, and others who are sending it to be animal feed, principally mink feed for mink farms.

So, while that's preferable to landfilling it, of course, if that can be shifted to another higher-value product that can put more money in the pockets of the producers and the fisher people as well that's the more ideal outcome, and what we're trying to target through our work.

David: Compost is another solution, and one that some of the Wisconsin companies are using. So that's another opportunity to make an organic product that can restore soil health, replace some traditional chemical additives, and has been a good option for some companies.

I'll never forget we had a delegation from Iceland come to our region and we toured a number of fish processing companies and if you've ever been to one, they look a lot like they did a hundred years ago with people over a table with knives and taking the fillets off, and then the rest of the material just falls to the ground.

And so, Thor Sigvason from Iceland got down on his knees and picked up this raw material, and he said, “I cannot believe you're throwing away the most valuable parts of the fish!” And, it's so vivid in my mind when he said that, it really was kind of a, “Aha” moment when we were thinking about what they're doing in Iceland, where the other parts of the fish are actually a lot more valuable than the fillet. That was a great moment in the project. And I think John and I won't forget that one.

Marie: So how do companies around the Great Lakes find out about this initiative and sign on if they want to?

David: We did some early outreach through some of the associations and collaborations. So, that included the Wisconsin Lake Michigan Commercial Fisheries Board. We also presented to the Michigan Fish Producers Association, the Ontario Commercial Fisheries Association. So, these are ways that in one meeting we can connect with a number of different fish companies.

We've also done a lot of time on the road. There's not a real replacement for relationship building. I spent a lot of time in Wisconsin myself. We have some family in Door County. So, I've taken advantage of time when I've been in town and local just to just go and pay a visit to some of the fish companies.

We've also been up to Bayfield a number of times and seen the fish processing companies there as well as ones in other parts of the region. At this point, I would say it's largely word of mouth. We've been contacted by a few companies that I wasn't even familiar with. And I think that's a pretty good sign that this is starting to catch on and grow organically. And that's been kind of nice to see. As I think I mentioned, we've got now 25 companies on this 100 percent Fish Pledge. My original goal was about 15, so it's exceeded my expectations. We still have some companies that we'd love to see join on, but that'll be a project for this summer and beyond.

We have a lot of information on our website, which is gsgp.org. That includes our contact information. Anybody can feel free to contact us by email or give us a call at our office. Again, that information is on our website at gsgp.org.

Sharon: So, Marie and I are going to head up to Bayfield right after this call to eat some fish livers. Are you sorry you're not going to join us?

David: I've not eaten that, but we have done two different head to tail tasting events with some, some chefs. And I've eaten some things that I'd never had before, and they were terrific. So, I can imagine that the livers might be equally good. Who knows?

Marie: And what were those things that you ate? Do you remember? *(Laughs)*

David: We had at our launch event in Detroit we had a, I'll call him a celebrity chef, and he made some really creative things that we hadn't really thought about. One was a fish head soup made with a coconut curry broth that was really good. He had an Asian Bao style bun that had a whitefish salad kind of inside of it. And then we also had some terrine with smoked crumbled skin and roe over the top. So, that was all really good. And then we did a competition with students at Kendall College in Chicago. It's a culinary school. And so, we had groups of students compete to make different dishes. We had some walleye croquettes, fish cakes, again another coconut curry kind of a thing. And I think there was one or two other dishes, but, you know, very creative things that you can do with different parts of the fish if you think beyond the fillet and that's really what, what this is all about.

Music from Zenith City by Woodblind

Marie: Now it's time for the Fish-o-Licious part of our podcast, where we discuss fish recipes which you can find on the Eat Wisconsin Fish website (which is eatwisconsinfish.org). You won't find a whitefish liver recipe however, because today we're having someone else do the cooking. As mentioned earlier, we traveled to Bayfield for an appetizer of whitefish livers. It's the closest place to us where we could get them. Several restaurants offer livers on their menu. These include the ManyPenny Bistro, Greunke's First Street Restaurant, and the Pier Plaza, which was our goal. Along the way, we stopped at Halvorson Fisheries in Cornucopia, Wisconsin, to drop off some 100% Great Lakes Fish Project brochures and, because we had discovered that Pier Plaza wasn't serving whitefish livers this early in the tourist season, Halvorson's was good enough to give us a quart of them so we could see if the restaurant would cook them up for us special.

Sharon: We entered the restaurant, whitefish livers in hand, and asked the manager if they could slake our hunger for this delicacy. She said yes! While waiting for the livers, we were seated, and ordered other food for lunch. We were also waiting for Emma Hauser from the Northern Aquaculture Demonstration Facility (or NADF) in Red Cliff to join us. She was giving a tour of NADF and was running a little late. Soon, the livers arrived!

Restaurant noise in background

Pier Plaza Restaurant waitress: Okay, do you want tartar sauce for your livers?

Sharon: I think I do. Okay. Is that traditionally done?

Waitress: I would say about 50-50. Fifty percent of people like it with, 50 percent of people like it without.

Sharon: Have you eaten it before?

Waitress: Once.

Marie: *(Laughs)* Oh, that was enough?

Waitress: That one little bite was plenty for me. Yeah, I'm good. I can't get past the texture. The flavor's good. I can't get past the liver texture, so.

Marie: Uh huh. Can you tell us a little bit how they're cooked?

Waitress: Yeah, so we do coat them lightly with some flour. And then we sauté them with the peppers and onions and olive oil.

Sharon: We've heard they're really good here.

Waitress: I've heard from everywhere else we do them the best here. *(Laughter)* I can't do them. My mom used to cook liver and onion a lot. And I know it's a different kind of liver, but we had to eat it, like I grew up in that era where you weren't allowed to leave the table until you finished what was on your plate. So, I just can't do liver anymore--any kind of liver. I have tried because they're considered a delicacy to the area. I think here and Door County are the only two places that actually utilize the liver.

Sharon: I believe you're right. Yeah. Well, thank you.

Waitress: You're very welcome. Enjoy.

Sharon: So even though whitefish livers weren't the waitresses' favorite food, we had some on our table, so we were going to dig in!

Sharon: So, what do you think of your first taste of whitefish liver?

Marie: I think it's good. I'm like really hungry. So, you know, I can eat anything right now.

Sharon: She eats shoe leather.

Marie: Yeah, it's interesting. The whitefish liver I've had before hasn't been coated with flour. And so, I think that's what makes this a little different. Because I've had them sautéed with the onions and peppers before, but not with flour on it.

Sharon: With just a little bit of flour on each side?

Marie: If you're okay with the texture of liver, you know, liver's sort of mealy if you're okay with that, I mean, I think they're very good.

Marie: What do you think of the livers?

Sharon: You know what? I think they would pair really well with a beer and that it would be a great thing to introduce to all the taverns around coastal communities in Wisconsin as you know, you have your beer and you get your whitefish liver. And that would be like a replacement for chicken wings. I could see that as being pretty popular and kind of a fun “taste of the place” thing to do.

Marie: And I found the lemon really kind of perks it up and is a good accompaniment to it.

Sharon: Yeah, and we also got a little bit of tartar sauce to dip them in. They go down pretty smoothly. They're small. They're about, I don't know, the size of …

Marie: Two quarters?

Sharon: Yeah, two quarters together.

Marie: But they're thick.

Sharon: A quail's egg. They're the size of a quail's egg. I think it's fun and adventurous to try new foods and I could see this becoming part of, you know, it's already part of the Door County and Bayfield culture. But, you know, it could be spread around a little bit further. We do have an excess of whitefish livers in the season.

Sharon: So, after we ate about half of the whitefish livers in front of us, wouldn’t you say?

Marie: Yep!

Sharon: Emma Hauser showed up. She’s our colleague from NADF. She’s involved with this project because of some interest in developing new types of aquaculture feed for larval walleye.

Marie: And she was nearby. NADF is about five miles up the road from Bayfield. So, we invited her along.

Restaurant background noise

Emma: Hello! Hi Sea Grant people! How are you?

Sharon: So glad you could come down and join us.

Emma: Thank you. Thanks for the invitation.

Sharon: Yeah.

Emma: I wouldn't miss the whitefish livers!

Marie: Yeah. Here, have some!

Sharon: Have you eaten them before?

Emma: I've had many a white fish liver, yes. Here I go. Mmmm . . . it's even good cold.

Sharon: I was telling Marie, it's like, I could see this being like, every bar, instead of having the pickled eggs, or like, frozen pizzas, or chicken wings. I will have done my job if I can get this into Wisconsin bars as like a staple.

Marie: Mm hmm. That can be your goal in life.

Sharon: Well, Emma seems to like them.

Emma: People are, they search them out when they come up here. People have to get whitefish livers up here, but…

Marie: You want any tartar sauce?

Emma: Sure. Tartar sauce?

Restaurant noise fade out

Sharon: One of the reasons that Emma is involved with this project and NADF in general is involved is one of the sticky wickets for raising little walleye – so they hatch from eggs, they become larval walleye – and it's hard to find a food for them that they want to eat. So, the University of Wisconsin has been working on this, both at NADF and at the University of Wisconsin-Milwaukee, to develop a new kind of feed. Right now, the only feed that these little walleye really want to eat comes from Japan. Because of supply chain issues and just trying to keep things closer to home, it would be great to have a feed that they could make in the Great Lakes Region, even. And so, Emma's been on some of the calls with the 100% Great Lakes Fish Initiative with me and ah, it's kind of part of this building project of testing larval fish feeds.

Marie: And so Emma explains what it's all about.

Restaurant background noise

Emma: As long as I started at the facility, we've been trying to find a larval diet for walleye specifically. There are larval diets available for other species like trout and salmon that do well. But there's only one larval diet right now that works for walleye. And that's Otohime or Otoheme, and that comes from Japan. So, in the effect of that we can no longer get that diet anymore, if there's an import ban on that diet, there's a major issue for making this walleye a commercially viable species if we can't raise it from fry to kind of a feed train fingerling. So, we need to have alternative diets that are U.S.-based that we can find here in the U.S. and made in the U.S. In the case that Otohime doesn't exist anymore. And larval diets are critical because you know, you're starting with such a small fry having the correct protein and actually the proteins that they can digest properly is critical. So, larval diets are generally also more expensive than the grow-out diets so there might be a potential for using Great Lakes fish or other species in the protein of the larval diets might make sense, economically.

Traditionally we've used things like shrimp or krill, or saltwater species in those larval diets. We have done a project in the past that looked at Asian carp muscle and actually hydrolyzing that into the larval diets to make those larval fish able to digest that better. And we are looking at partnering with Dr. Dong Fang Dang looking at bile acids to help those fish digest those proteins early on. And the bile acids right now are coming from swine that we're looking at. So, if we could get bile acids from, let's say, Great Lakes whitefish or Great Lakes fish instead of, you know, our other agricultural products like swine, that

might be a potential. So that's coming from the gallbladder. So that might be a potential for something that might make more money and make more economic sense than just discarding that or using that as fertilizer. So, there's some options there, and some potential, but it all comes down to the economics.

Sharon: So, these larval fish, I think I've seen them in the Northern Aquaculture Demonstration Facility. And are these the ones that are about the size of an eyelash?

Emma: Yes, so walleye are generally about 6 to 9 millimeters in length, and that is technically the size of your eyelash, depending on people's eyelashes. But they're very tiny, so they're very delicate at that larval stage. And the larval stage lasts anywhere from 15 to 30 days. They're extremely delicate in that first 15 days where we're trying to get them on that commercial diet. Once they come out of their larval system, they're hardier, their survival is better, but getting them on that commercial diet, getting them on that larval feed, and getting them to survive is really a challenge.

And so, starting them on a diet that they can well digest and that they're going to not only is palatable that they're going to eat, but that they're going to survive off of is critical at that first 15 days of life.

Sharon: So how much food does a fish the size of an eyelash consume in a day, would you say?

Marie: Two pieces. *(Laughs)*

Sharon: It sounds like microscopic, like the food has to be microscopic, and it's served up in …

Emma: Yes, and they're literally called micro diets. So, when you start them off on this diet, it literally looks like a powder. And it is a particular size, it's a particular micron size for them to feed. And we do it by the thousand fish. So, we feed a gram per thousand fish, so when they're at that stage. So, we start them off at about four grams of feed of this micro diet feed per thousand walleye fry. And then it increases from there as they grow, and they do grow exponentially. So, they'll start the size of your eyelash and be a little bit over an inch in a month.

Marie: And what do they make it out of in Japan, is it like squid or something?

Emma: There is all sorts of ingredients in Otohime. There's even apple extract. So, you can see the ingredients, but you can't see the proportions of ingredients and they don't tell you how they make it. So, they might be hydrolyzing those proteins but there is squid meal in there, salmon meal. There's, and it's a very bright orange color and it smells very fishy and it's, it seems very palatable to them. Our other feeds in the United States that we've tried, so we've looked at a study not too long ago where we looked at five other micro diets that the U. S., from U. S. companies, and we had very poor success with that. So, it definitely goes back to we need an alternative diet source for this fish.

Marie: Emma ended up finishing the whitefish livers for us. Another thing that we got at Halvorson Fisheries, which is kind of an interesting, unusual fish product, were lake trout fish cheeks. And Sharon, fish have cheeks?!

Sharon: They do, they do! The bigger the fish, the better the cheeks they have. The more robust. And so, you can fillet them out and fry them up like little hors de oeuvres.

Marie: They’re round, of course, and white. *(Laughs)* And known for like, a tender, sweet kind of taste. They’re kind of like little scallops.

Sharon: Mmm-mmm, yeah, that's a good way to think of them.

Marie: A lot of fish have cheeks big enough to harvest: walleye, lake trout . . .

Sharon: Rainbow trout.

Marie: Rainbow trout?

Sharon: I've had rainbow trout cheeks, yeah.

Marie: OOOOh. I wonder if muskie have cheeks? I bet theirs are big! *(Laughs)* They might have cheek steaks!

Sharon: Yes.

Marie: So, I searched the internet for a recipe. I found one for halibut cheeks that sounded good to me because it had capers and white wine in it and spices and things. So, a few weeks after our trip, I cooked that up and ended up writing a blog post about it for the Wisconsin Sea Grant "Unsalted" blog, which you can find at the Sea Grant website, which is seagrant.wisc.edu. Look that up. We'll link to it from the Fish Dish episodes extras webpage.

Sharon: That'd be great. It was such a fun cheeky story.

Marie and Sharon: Ha ha ha ha.

Marie: I call them Marie's Fish Cheeks, or "Marie's Cheeks," for short.

(Laughter)

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Marie: That's it for this episode of The Fish Dish. Thanks goes to David Naftzger and John Schmidt with the Great Lakes St. Lawrence Governors and Premiers, Halvorson Fisheries for the whitefish livers, the Pier Plaza Restaurant in Bayfield for cooking the whitefish livers, and Emma Hauser with NADF.

Thank you for listening!