Swimming in Circles: Aquaculture and the End of Wild Oceans: A Special Interview With Paul Molyneaux

By Dr. Joseph Mercola

JM: Dr. Joseph Mercola
PM: Paul Molyneaux

JM: Hi, this is Dr. Mercola, helping you take control of your health. Today we are joined by Paul Molyneaux, who is an expert. He's written a book about aquaculture and some of the dangers of eating farmed fish. He's an insider, so he's not just an investigative journalist, but he's actually an insider. The book comes from a different perspective. It really highlights the dangers of most of the seafood that we're eating, and some of the things we reviewed on the site before, but some will be new to you.

From my perspective, there are two very dangerous foods when you're going out to almost any restaurant – not all, but most restaurants. The first would be chicken. You do not want to eat chicken in a restaurant. They're almost invariably raised in confined animal feeding operations (CAFOs), very high in infections. There chickens are raised under absolutely inhumane conditions. You want to avoid that unless you know where the chicken was raised. And then, of course, farmed fish, which we're going to get in today. Welcome and thank you for joining us today, Paul.

PM: I left home at a young age at 17 and got into the commercial fishing industry. The opportunity came up and I got to work in aquaculture in the late '70s. I was working in California, growing oysters. I always had an interest in aquaculture, although I primarily was a commercial fisherman. In the late '80s, I was working, running a fish processing plant for the Passamaquoddy tribe in Eastport, Maine, on Cobscook Bay. There was a sudden push to do salmon farming in the bay. The way they sold it to us was –

JM: Who is "they?"

PM: The promoters. At the time, it was a company called Ocean Products.

JM: Okay. So this is the industry for farmed fishing.

PM: Yes. Right. Also with people from the state, the extension office, the Department of Marine Resources in Maine, were promoting this to fishermen, saying, "You can become farmers of the sea. You can start giving back to the ocean." We bought it. Hook, line and sinker, we were like, "Okay. Let's do this." You know, it's a funny thing. Last summer, there were about six of us standing on the dock in Eastport. We were saying, "Geez, we thought this was going to be great." But what happened –

JM: Was this the beginning of the farmed fishing industry in the early '80s?

PM: Yeah. Well, in the late '80s, it's when it really hit in Cobscook Bay, Maine.

JM: Okay.

PM: We thought that this was going to be our new industry, what was going to see us out, right? As fisheries had gone down. What happened was the economics of it, it quickly consolidated into the hands of just a few players. Now, it's in the hands of one. But when it was in the late '90s, what happened was they had so many pens in the bay that they got a disease in there – infectious salmon anemia virus. That just wiped

out the fishery. Two million fish had to come out of the bay overnight. That pretty much set the industry back. Now, it's owned by one company with pretty much everything automated.

JM: What's the name of the company?

PM: Cooke Aquaculture.

JM: Cooke Aquaculture. Interesting.

PM: Yes. Yeah. They have a tremendous sea lice problem. They're pouring tons of SLICE into those pens. They're coming up with new systems now, because they're finding the sea lice medication is now in the mollusks, like the scallops that are also harvested from the bay, the clams and the scallops that come out of the bay.

JM: Yeah, of course. That's not the solution – just to throw a drug at it – just like it isn't a solution in humans.

PM: Yeah, yeah.

JM: If we go back to the '80s, basically 10, 20, 30 years ago –

PM: Thirty years ago.

JM: Thirty years ago, basically, wild fish dominated America's top 10 favorite sea foods.

PM: Yeah.

JM: Then it just fell off the charts, because you couldn't get it. It essentially disappeared, literally by not much after the turn of the 21st century. They just dropped off the list because you couldn't get them. Why don't you discuss that a little bit and really help us understand the options we have when we go to a typical restaurant? Not necessarily a restaurant near the ocean that specializes in freshly caught fish.

PM: Right. Well, what I do a lot in *Swimming in Circles: Aquaculture and the End of Wild Oceans* is look at the economics of this. Okay. When we have an industrial food distribution system – For example, a friend of mine said, "I want to do a local seafood dinner in your area, just to educate people about local seafood. What can you get?" I said, "If you went into your local supermarket and went to the seafood case and said 'I only want local,' the seafood case would be empty, or it would only have, in our case, clams, lobsters and mussels, and maybe some periwinkles." There wouldn't be cod fish, because the industrialization – Do you talk about this much? The industrialization?

JM: We do, but it would be useful from your perspective to review it, especially as an insider in the industry. You've basically been doing this for most of your life.

PM: Right. As the economy of scale distribution systems expand, you have no more fish markets in town. It's all at the Hannafords or the Shop 'n Save or whatever your chain is in Chicago or wherever you are in the country. They have systems. They're all computerized. They have certain products that they need coming in at a certain rate.

In dealing with the vagaries of wild fisheries, where maybe today you have one species, tomorrow you have another. "I went out and I caught pollock. Today I went out and caught haddock. Then I got blown in by a

storm. I couldn't get out because of a storm." These companies were going, "Oh, geez. We can't deal with this, but we can deal with farmed salmon. Boy, that's right there. We can have a schedule of set price. Everything." Because of the availability of wild fish, the price varies. These larger companies are saying, "Go ahead with that aquaculture, because that's perfect for us."

JM: Yeah. And this process – Go ahead.

PM: Our favorite seafood, actually, in America is shrimp. Most of which comes out of Thailand. This is also in the book. The book looks at shrimp aquaculture and salmon aquaculture. One of the things I thought was where we take these industrialized aquaculture shrimp and salmon production systems and we locate them. We sort of impose them on places where they're desperate for jobs. We come in selling them as jobs and economic development. What they really do is destroy healthy fisheries in those areas.

In fact, in Eastport, in the late '70s, we actually were still catching wild-caught out of skiffs. Guys were going out with 20-foot skiffs and catching wild-caught. We were processing those at the Passamaquoddy reservation, at a processing plant there, and shipping them downstate. I ship to a friend of mine in Rhode Island. He calls me up and says, "Paul, what's wrong with these fish? I've never seen fish like this before." I said, "Carter, wait a week and you'll recognize them, because you've never seen fish that fresh before. They're less than 24 hours out of the water."

But when the salmon farms came in – I can't say it's corollary evidence, right? But when the salmon farms came in, those wild fish disappeared. And there was high mortalities of lobsters. Why? Because the chemicals that they use to fight the sea lice that attack the salmon also destroy the shells of larval lobsters.

JM: It's exactly what you'd predict. I mean this is not rocket science. Essentially, they're abusing the system, seeking to maximize their profitability by harvesting this form of supposed food. I call it cereal food. It brings completely abnormal circumstances. The feed they're giving them, some of it is toxic. It's loaded with toxins, like polybrominated diphenyl ethers (PBDE), flame retardants and higher chemicals are in there.

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PM: Sure.

JM: I mean this is exactly what they're feeding these fish. They're not much different than chicken raised in CAFOs. They're just highly dense populations. They don't have the freedom to move around and swim. To predict that they're going to get diseases is not rocket science. It's exactly what you would suspect.

PM: Most people know that. But there's one scene in the book where one guy, who's been in the business forever, says, "Disease is a bottleneck that every aquaculture system has to get through." Another guy who is proposing offshore fish pen's saying, "We're not worried about this disease." It's like, "If you're not worried, then you're going to have disease, of course."

The point that you make about the bioaccumulation of toxins in the farmed salmon is exacerbated about the fact that when those salmons are that big, they're eating feed made from fish that are that big. They're getting these toxins in them. Wild salmon, you'd think, that big would be eating plankton. But the farmed fish is ingesting those toxins from day one, as opposed to a wild fish, which is going to probably get exposed to some toxins as well, but not at that concentrated level, and not at that early stage of development.

JM: From your perspective, would it be safe to summarize that if you're in a restaurant and you're looking at the menu and deciding what you're going to eat and knowing in the back of your mind that omega-3s

from fish are typically considered to be a healthy food. But if you find out and – Sometimes the waiter's not going to know. You've got to find out from someone in authority in that restaurant.

PM: Right. Yes.

JM: Most waiters do not know, in my experience.

PM: Yeah.

JM: Sometimes they will say on the menu that it's farm-raised.

PM: Yeah.

JM: And then they'll go, "This is organic farm-raised." Yeah, right. But if it's farm-raised, would you say that you need to avoid it like the plague? There's just no reason you should ever put that in your body.

PM: Not just for your own health, but for the health of the planet, for the health of the communities that have had these shrimp and salmon farms imposed on them. One of the things you mentioned earlier, and I think it's important because there was a – Do you know Sam Eaton from Marketplace?

JM: I don't believe so. No.

PM: Anyway, he was interviewing me and we were talking about trawlers. He said, "Is there no place, in your view, for trawlers?" You could just as well say "salmon farms," because the answer would be virtually the same.

JM: For those of you who don't know, can you elaborate on what a trawler is?

PM: A trawler is a boat that takes a huge net out into the ocean and drags it across the seafloor. It catches fish that way and brings up everything, throws back the bycatch dead. There you go. When a salmon farmer goes and says I want to be a salmon farmer and goes to the bank, he lists all his productive capital, his net, his fee, all his netting and his boats that he's going to depreciate. But the water that flows through that pen and basically flushes the toilet.

The value of that water going in is much higher than the value coming out. That's part of his productive capital, but nobody depreciates that. That's how they get a profit. If they have had to depreciate what they do to the quality of the water, the bank would say, "It's not profitable. You're not going to get the loan."

JM: It would appear to me that the trawlers might produce a bit healthier fish, because they're not raised in these highly adverse metabolic conditions that the farmed fish are in aquaculture.

PM: Yes. But there are other ways to catch those fish.

JM: Sure.

PM: Yeah. There are hooks, gillnets and stuff that have much less impact. In fact, you see, the trawlers, if you want to talk about that. Again, I'll go back to the economics because it's the economics that are driving a lot of these unhealthy – The reason we have unhealthy food, I often, in my analysis over the years as a fisherman and as a writer, is I look at the economics and I go, "This just isn't sustainable."

It first occurred to me, actually, when I was on a trawler out in the Gulf of Maine. We were landing hake that was just under market size. We were throwing half of what we were catching back. We were only going to get 15 cents for them. I was standing there on that boat, on this 100-foot trawler, surrounded by white bellies of hake floating around us, as far as you could see, and realizing that we were going to be out there for 10 days, working 8 or 9 of them just to pay the expenses of that boat – the fuel, the ice and the food. And then if we were lucky, we were going to get a paycheck. We made 350 dollars for 10 days out there.

JM: Yeah. That doesn't make sense. It doesn't make sense.

PM: No, no. It just struck me. The economics that's driving this is the problem. What we're doing is cascading down a declining ecosystem. The trawlers came at the beginning of the 20th century, when we'd already depleted the fishery.

The ecological impacts drove down fisheries, and then they bounced up again when we got the technology after World War II, synthetic twine and whatnot. And then they bounced up again in the '80s when we had kicked out the foreigners and started utilizing their technology. And then the next step of this, as we've depleted the fish, as you said earlier, is aquaculture. It's the next technological rabbit that we pull out of our hat to increase or to get what's left of the ocean's productivity. When you talk about going into a restaurant, the best thing they could do would be to order a can of sardines, right?

JM: Yeah. You don't have to go to a restaurant for that. That is my travel food. Literally I pack three or four cans of sardines. I'll order a salad at the restaurant. You know, salads are pretty safe. I mean even if it's not organic, you're not going to be loaded with a bunch of crap, typically. You can be more careful in your salad selections, and certainly avoid the oils. The protein source is canned sardines I always bring with me.

PM: Yeah.

JM: Let's extend that, since you brought it up. As an insider in the industry, do you have any specific recommendations on how to select, perhaps, the highest-quality canned sardines? Because there's a variety of them. Some of those sardines can be pretty big. They can be 4, 5 or 6 inches.

PM: Right. The Beach Cliff is our local brand. Of course I would say that they're produced –

JM: Is that available nationally in the U.S.?

PM: I have found Beach Cliff in India.

JM: Okay. Alright. Great.

PM: Yeah. A lot of the North Sea sardines too. If they're coming out of the Baltic, then they're going to have the same problem of heavy metals and whatnot.

JM: Now, are sardines just a generic term for a small fish?

PM: Yes. Small herring. It's a small herring.

JM: Typically it's herring.

PM: Yeah. It's a herring.

JM: Okay. Is it almost always, or does it have to be herring?

PM: No, no. There are – Geez. I'm getting too comfortable with you. There's an actual sardine. It's a different fish. But our fish that we produce here that we call sardines are herring.

JM: Okay. How big are they typically?

PM: They can get over a foot long.

JM: Foot. Wow.

PM: I've caught them on hooks. But the best ones that get in the can. Well, the cannery is closed now. But there used to be, when there was a load of them, word would get out and everybody at work there would tell us the lot number. We'd go and get a case of those. "We want lot number this," because we know it would be the small ones.

JM: Wow. Is there any way to find those, that a consumer can find those now?

PM: No. Not really. That's the beauty of local.

JM: Yeah, Yeah.

PM: Really, I would say to people, "Eat local. If you can't put a face to the fish, like the producer of that fish, whether it's a fisherman or some sort of sustainable aquaponics system that's growing fish using truly sustainable feeds." But it's really hard for me to think about our society, how they're going to get healthy food, unless we actually overhaul the distribution system. We are doing that. I've been working with some people.

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Slow Fish is a movement. We're working on that. There are different sea-to-plate restaurants in New York, community-supported fisheries, where you buy a share and you get a package of fish, whatever the boat caught. You might be eating fish that you wouldn't normally eat, like Acadian redfish, monkfish or cusk, which nobody's ever heard of, but here in New England, they're common to catch. But you're going to pay the same price as you would for a cod or a haddock.

JM: Now, you mentioned earlier, and I've discussed this previously too, is that the shrimp is America's No. 1 favorite seafood.

PM: Yeah.

JM: Unfortunately almost all of it comes from Thailand. You could be pretty darn safely assured that you do not want to order shrimp in a restaurant, most or all restaurants. If it's a specialty restaurant, of course, that may be an exception.

PM: Yeah.

JM: But can you help us understand a little better of how we identify healthy shrimp? Is the shrimp from the Gulf in the U.S. okay? Or has corexit and the gulf oil spill from Exxon a while ago contaminated them? What are the concerns?

PM: Yeah. I think it depends on where you live, right? But if I'm going to eat shrimp, then, yeah, I'm going to – Actually, to be honest with you, I eat Maine shrimp, which is a northern Pandalus borealis. Have you ever heard of that?

JM: No.

PM: It's the transsexual shrimp. It's born as a male, and then after two years, it turns into a female.

JM: Nice.

PM: They smarten up, as my wife says. We harvest them. They come on shore and drop their eggs, and we harvest them later in the season. Once they've dropped their eggs, we go and harvest those shrimp, most of the shrimp I eat or I buy from local fishermen when I'm in Mexico. I'm down in Mexico living. But if I was going to go into a restaurant and buy shrimp, the best shrimp you're going to get is going to probably be Gulf shrimp or wild shrimp out of Mexico, out of the Gulf coast there.

The problem with the government and studies is that they spend a lot of time studying what goes on inside shrimp ponds. They don't spend much time studying what goes on outside them. If there were problems with the gulf shrimp in terms of contamination, even the fishermen would be trying to squash that, right? I don't really know and I can't really speak to that. I know that they've certainly had plenty of issues. There's a lot of industry down there.

JM: Yeah. In your book, you mentioned that in 2003, U.S. imported about a billion pounds of shrimp from Thailand, India and other Asian countries. Now, you mentioned Thailand specifically, but I imagine like Indonesia and India would also be guilty of farm-raising these things and essentially producing toxic food that you do not want to eat. Hold that thought, and then the cost of these shrimp on importing them was around – the production cost was less than a dollar, whereas the ones imported from Mexico, which are a healthier version, was about twice that. They were about 2 dollars.

PM: Right.

JM: With those costs in mind, what should the average consumer in 2018 expect to pay for healthy shrimp per pound?

PM: Oh, geez. I don't know. I'm not following the market rate at the moment.

JM: Well, you would know better than most of us. I mean they don't give you the shrimp for free, right?

PM: No. It depends. Geez, I haven't even checked it in the seafood case. To be honest with you, you've caught me off-guard there with that question.

JM: Okay. I like to get people off-guard. That's my specialty.

PM: Yeah. I can tell you again that it's certainly not the cost of production, you know? I mean when I was in Thailand –

JM: What do you mean by that? The charges and multiples of what the cost production is. Is that what you're suggesting?

PM: The charge is less than the cost of production, because the cost of production –

JM: They're charging the consumer less than it costs to produce? How could they stay in business?

PM: Exactly.

JM: You can't.

PM: Exactly.

JM: I mean that's inevitable catastrophe. The business will fail.

PM: Right.

JM: Unless they're subsidized by the U.S. government.

PM: Right. That's exactly right. You've just hit the nail on the head. Thank you. This is why we have boom-and-bust. It booms while they're not counting cost. Again, it goes back to the depreciation. You're not counting the cost of the water that you – These businesses that are depending on clean water and polluting it at the same time, eventually they go out of business. In Chile, they had a 2-billion dollar hit when infectious salmon anemia struck down there, because they had polluted the water so badly.

JM: Just to highlight things. The actual disease that the sea creatures develop is almost irrelevant. It's just a disease. Again, it's exactly what you'd predict when you raise them in these unsanitary conditions. They're going to get sick and die prematurely. There's no mystery here.

PM: Yeah.

JM: Whether it's sea lice or the salmon anemia, it's going to be something. I don't care.

PM: Yeah.

JM: There's no magic bullet for it, other than to wild catch a fish.

PM: Well, actually, it's interesting. Infectious salmon anemia is a flu virus. The only thing that's separating it is – It will live up to 70 degrees. The only thing separating us from infectious salmon anemia is 26 degrees of body temperature.

JM: Yeah, yeah. There's a whole variety of other components in the immune system that assist that from occurring.

PM: Yeah.

JM: If we had comparable conditions to these confined fishing operations, we'd be just as susceptible to getting exactly these. This is what we're seeing. We're raised in highly dense urban populations, eating highly processed foods, not exercising, not being exposed to sunshine and drinking polluted water. You're going to get sick and die prematurely.

PM: Right.

JM: No mystery.

PM: Yes. A guy who walks to the shore with his cast net and catches 3 kilos of shrimp with his cast net and brings them home and sells them for the equivalent of 8 dollars a kilo and feeds his family, those shrimp –

JM: Is that in the U.S.?

PM: No. That's in Mexico.

JM: Yeah. Because those prices would seem pretty low. From my experience, fish is anywhere from mid-teens to 20 dollars a pound.

PM: In Mexico, I pay about 10 dollars a kilo.

JM: Yeah. That's 5 dollars a pound.

PM: For large shrimp.

JM: Wow. That's amazing. These are wild-caught shrimp?

PM: No. With the current exchange rate, that's about 2.50 a pound.

JM: Wow.

PM: Yeah.

JM: That's like almost free.

PM: Yeah. It's sinful at the moment. It's like you want to say, "Don't you want more?"

JM: Yeah, yeah. These are wild-raised shrimp, wild-raised and caught shrimp.

PM: Yes.

JM: Interesting. I didn't realize that.

PM: Yeah. They're trawler-caught.

JM: They're trawler-caught.

PM: Yeah. They're trawler-caught for the most part, or they're gill-netted. Yes. Because the farms went out of business there, because of disease. As you said, they don't count all the cost of production. They don't count the pollution.

JM: You were the one who said that. Essentially your prediction is that, essentially, every aquaculture operation is going to go out of business because they have financial improprieties and they're not factoring in the pollution that they're causing, which is essentially going to decimate their business down the road.

PM: Right. They survive by basically robbing the future and coming up with technological rabbits.

JM: It sounds just like the U.S. Government, man.

PM: Yeah. The Chileans' or our salmon industry here, for example, basically, you had 2 million fish come out of the water. It's never going to see 2 million fish again. They basically went out of business. They were rescued with a government bailout of something. Millions of dollars went to these foreign companies to help prop them up, because they had basically gone out of business.
With that government help, they're able to continue. They get tons of government help. I don't know why. But our state government and the federal government, if you look at Saltonstall-Kennedy money, which is research money that's supposed to help fishermen, the majority of it now goes into aquaculture and thin fish aquaculture, figuring out how to grow fish.

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JM: Yeah.

PM: With these kinds of subsidies, not to mention overestimating stock abundance on forage fish, so that they can be fished to dangerous levels of overfishing, that keeps this. Now, the next thing that's coming down the road is genetically engineered feeds.

JM: I was going to mention that. Right. Well not the feed, but the fish themselves.

PM: Right.

JM: There are genetically engineered salmon now that are like two to three times the size of normal salmon.

PM: If you read in the book, I predicted that.

JM: Yeah. I know. They exist. They're being sold. Maybe not sold. I think it's coming up next year. It would be legal to sell them.

PM: Yeah. But as far as I know – I might have to double-check this – but you can't grow them in the open ocean. You can't grow them in net pens. What do we have going on now? Land-based salmon farming. We have two proposals here in Maine. I just went down and spoke, right? There's a company that wants to buy 200 million gallons of aquifer water a year from the town of Belfast, Maine. That's just a fraction of what they're going to need to flush these land-based toilets basically.

This is what people need to understand. This water that you need for aquaculture, this free water – They put them in the ocean because it was free water to flush their toilets. Okay. Now, land-based, maybe they have to pay like percentages of pennies. Basically they're giving them the water again to flush these huge toilets. It's all still going into the bay.

JM: Well, let's go down a different path, mostly theoretical. But from your knowledge deep in the industry, would it be theoretically possible to construct this sort of land-based operation, and then filter the water? Yes, it's a toilet, but capture those waste products and actually use it as manure if you're feeding them healthy food and not full of toxins, because then their manure is going to be toxic too –

PM: Exactly.

JM: That would seem to me a relatively sustainable process, if you have an enormous amount of infrastructure built out that it would require to pull it off. But it would certainly be a possibility, from my perspective. But I don't know the –

PM: Exactly, exactly. In fact, I wrote a brief article on this. I said exactly that. "Why are they putting this valuable fertilizer out into the ocean?"

JM: Terrible.

PM: "Why aren't they putting it on farmland?"

JM: Yeah. Exactly what I said.

PM: That's exactly what I said. Because I, myself, I practice aquaponics. I have a little aquaponics system. We could go out to my greenhouse and I could show you my aquaponics system. But I have a wild-caught catfish that I put in a little pond. The pond is basically 4 feet by 2 feet by 1 foot and 1/2 feet. I just dug a hole in the ground, lined it with plastic, and then put these fish in there. I feed them bread. I feed them organ meat from chickens that we raise here and harvest.

JM: Maybe you should be eating the chicken liver.

PM: Well, yeah. My wife does. She likes that. But there's only so much of that you can eat. But there's a problem. The problem with the land-based salmon farming – Now, some friends of mine ran a commercial aquaponics system down at Yarmouth, Maine. They didn't even focus on the fish anymore. They said, "We need so few fish to produce nutrients for our entire greenhouse system that we eat the fish when they're raised." They eat them. They don't even sell them. They eat them. So when you're raising 33 million fish in a land-based pond, the amount of nutrients that you're producing could fertilize way more farmland than is available there.

JM: From your perspective, it is a rational project that could be enabled?

PM: Most definitely.

JM: With just some engineering and obviously a massive funding of the infrastructure to pull that off. But it would seem that's got to be the direction. Because you can't do it in the open sea. You just can't. Even though you would continue to do it, and we haven't even discussed the dangers. It's just like genetic engineering with Monsanto's claiming that, yes, there's never going to be any resistance to these pesticides. Now you've got 60 million acres of superweeds that are resistant to them.

But the same thing. The claims that they're making in the aquaculture industry is that these fish will not escape our pens. Why don't you address that? Because you have these massively sick fish going out there, let alone the engineered fish, which I suspect they have different rules for those. But they're escaping. Not just ones or twos, millions are escaping.

PM: Right. These genetically engineered fish are – what do they call them? What's the word? Jesus. Triploids. These are triploids. What they do when they're raising these genetically engineered salmon is they pressurize the eggs. It sterilizes them.

JM: That's one way of doing it. But they've also actually introduced genes from another species that actually grow them two to three times as big. I mean they don't look like salmon anymore. They look like –

PM: No, no. This is it. They take those genetically engineered eggs. They insert those other genes at a certain point, right? And then they take that egg. Once it's a viable egg, and they pressurize it. That makes it a sterile fish. The genetically engineered fish is theoretically sterile.

JM: Yeah. Theoretically. That's a good word.

PM: It's a triploid. It's theoretically sterile.

JM: Because it's triploid. That process you described is a process that essentially sterilizes it?

PM: Yes.

JM: Okay.

PM: They take that genetically engineered eggs, sterilize it to triploid, and then you need to grow it on land at present. But at the same time, we have heard this thing about no escapes forever. And then we'll say, "They'll escape, but they won't live. Well, they're living. First, they won't escape. Maybe they've escaped, but they'll live. They'll live, well, maybe that's a good thing." It's a typical pattern of denial and excuses from the industry. I think the same with the genetically engineered fish, it's going to be the same with genetically engineered corn that's escaping now into the wild into other farms, right?

JM: It gets even worse because Monsanto has the audacity and the financial leverage to influence the judicial system to actually sue farmers for infringing on their intellectual property, because their land is growing their patented seeds and they're the ones that caused it. They win these lawsuits. It's just complete perversion of the judicial system.

PM: Right. With the land-based system, your odds of escape go down tremendously, of course, because you're not exposed to the vagaries of nature. But here's the thing. You have shrimp that are raised in ponds essentially on land. A fellow named Steven Travis did a study. When hurricane Mitch came through Honduras, it flushed those ponds into the wild. Those domesticated Litopenaeus vannamei shrimp then spawned with the wild, reducing the viability of the wild shrimp. He did a paper on that but couldn't get it published, because the people at the peer-review team included people from the aquaculture industry. The same thing.

You've got pen-raised salmon. Great. They're not going to escape. But, again, what if there is a flood or a tsunami or what have you and these are close to the ocean? Then they're going to be out there. As I say in the book, it's an ecological genie that you can't get back into the lamp.

JM: Yeah. It's pretty similar to genetic engineering of our food supply too.

PM: Yeah. Exactly.

JM: The parallels are really astonishing.

PM: Yeah.

JM: When you veer from the natural and traditional approaches, you've got to be wary of this and actually expect this to happen. No matter how many safeguards you put in place, they're usually not enough.

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PM: Yeah. What I would say to the consumers is, "If you want to eat healthy, expect to pay more, unless you want to eat sardines." You can either pay a lot more, or unless you want to change your diet –

JM: Let's talk about how much more should they pay. Actually in the book, you talk about how in 1988 the Marine Stewardship Council certified the Alaskan salmon sustainably caught. That really wasn't a very good strategy, because people weren't willing to pay for the difference. How much is the difference typically then? That was 20 years ago. Now, do you think there's an increasing acceptance by the public to accept the additional cost for sustainably raised fish?

PM: Well, they're probably going to eat less of it, of course, right? You're better off to pay 15 dollars a pound for a Bristol Bay sockeye than 7 dollars a pound for a Chilean farmed salmon.

JM: Yeah.

PM: Right? Better off to eat one meal of sockeye than two meals of farmed fish.

JM: And then of course that works out really well because fish, of course, is protein. It's a pretty darn healthy protein if it's raised properly. But like any protein, most of us eat too much. The average person doesn't only need maybe 3 or 4 ounces of protein as meat or fish. That'll supply your protein needs fabulously. You don't need to eat half a pound of fish or a pound of fish.

PM: Three ounces what? Daily, weekly or what?

JM: No. At a meal.

PM: Oh, yeah. Okay. Yeah. That's great.

JM: Three or 4 ounces a meal. That's about all you need. You don't need a lot more. Yes, you can eat a pound of trout, but you know. I love trout, but isn't most of it farm-raised?

PM: Yeah. Of course. Because otherwise it's wild, and there's no way to commercially catch wild trout. A lot of that comes from Chile too. A lot of those farms are in the lakes. We get a lot of fish. I remember there was a group that was briefly formed.

Forgive me if I can't remember exactly the name of it, like the Maine Aquaculture Association. Sebastian Belle, who is referred to quite frequently in the book, they got together and ran a full-page ad in the New York Times of a pregnant woman saying her doctor told her to eat more omega-3 acids, eat farmed fish. I talked to Sebastian about that. I didn't put this in the book, but he said, "They're putting chemicals in those fish that they can't even test for." I said, "And you had the audacity to sign off on that ad? Are you joking me?" Right? A pregnant woman. Anyway.

JM: It's not even the omega-3s. The omega-3s aren't even in there for the most part. I mean they're radically reduced compared to wild-caught fish. I mean they probably may have more omega-6s than omega-3s.

PM: Well, Sebastian has been actually touring the Midwest in recent years, encouraging farmers to grow omega-3 genetically engineered soybeans to turn into fish food. That's rather interesting. But I'm wondering –

JM: It's still the wrong omega-3.

PM: Yeah.

JM: The reason that the fish are so healthy is because they eat low on the food chain. Most of it is food that's been consuming the algae. The algae has docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), so it's not like the fish is making this. They're just concentrating the fatty acids that they're eating in the food supply.

PM: Sure.

JM: If you give them omega-3 that's alpha-Linoleic acid (ALA), they're not going to convert that to EPA and DHA. That's just not going to happen. It's just going to be like flax oil fish or flax oil hens. It's the same thing. You see omega-3 eggs, it's the same damn strategy. They're feeding them flax seeds and all the things that are healthy foods, but that's not the omega-3 that you want. You want the higher order ones that are normally in fish that are eating their natural foods.

PM: Right. Those larval salmon are going to be eating the diatoms. They're eating primary production.

JM: Those are the real omega-3s. They're not getting them from the algae.

PM: Exactly. In the fresh water of streams that are still healthy.

JM: Right.

PM: It's such a complex thing, Doctor. For example, out in Bristol Bay, where you have those tremendous sockeye runs at 40 million fish a year. They're trying to put a gold mine or a pebble mine that will pollute those streams and damage those fundamental systems. The next thing you know, you're doing hatchery-raised fish, which is a form of aquaculture. You're feeding those fish pelleted food from the moment they hatch. It's a difficult thing.

One of the things that you talked about with the land-based farming, which I think is a great idea, is to utilize that water. I just got back from Uganda in April. We were over there teaching aquaponics, home- or backyard-scale aquaponics, not only in the rural areas, but also in Kampala, in the ghettos of Kampala. Anybody can actually produce at least some of their own food in almost any situation.

JM: Yeah. People, obviously as a hobby, raise fish and tropical fish just for the beauty of the fish. They have systems that are designed to filter the water. Imagine that.

PM: Right. Yeah.

JM: You can just scale that up into commercial operations.

PM: Exactly. No, no, no. You take that water directly and run it through a – Those people who are growing the tropical fish could attach a little indoor garden to their fish tank and grow a salad's worth of lettuce.

JM: To me, at scale, it wouldn't work as well, because the limited resource and the bottleneck in the fresh water. Yes, that would be great if you had unlimited fresh water, but that's not the case. It's a diminishing resource that we have. If you could filter it and then take the waste and put that out, then you can just recycle that initial investment of a quarter million gallons or whatever.

PM: We actually did two systems. Actually, Dr. Emma Naluyima in Entebbe, Uganda. She grows catfish in a tank, a larger tank, much like me, and just pumps the water directly onto her crops.

JM: Yeah, yeah. That works. There's no question. But you've got to [inaudible 47:32] the water. That's the problem.

PM: Yeah. The ground was, so she draws from her well. The groundwater –

JM: Okay. That would work. That's the filter.

PM: Yeah. The earth is her filter system.

JM: Yeah. That would work. I don't know. I'm not a geologist. I certainly have no training. I don't know how that would work to fill up the water tables in other communities. But if it works there, that's great. Because you've got to complete the cycle.

To me, one of the biggest tragedies of urbanization – I mean we consider the toilet such a magnificent development. But if you think about it, the waste, where does it go? Into the water. It was never, never designed to be in the water. It was supposed to be in the land. Unfortunately people are eating crap and they're taking all these drugs, so there's a danger putting it back in the land. I mean the microbes will eventually detoxify, but it's still less than ideal.

PM: Right.

JM: That's why human sludge that they use for fertilizer is not a good strategy, because of the contamination issue.

PM: Yeah. Kozo Mayumi, Ph.D., says that we should be trucking human waste out of the cities back to the farms, right?

JM: Yeah. But if you could separate it. I know human sludge. There's a term for that, but it escapes me.

PM: Humanure.

JM: No. That's one of that, but it's actually a more generic term that's actually used in a lot of organic fertilizers. They fail to disclose that it's actually contaminated. I think that's because they actually have industrial waste in there too that are combined with the human waste.

PM: Yeah.

JM: Human waste, by itself, probably isn't that toxic. Of course there are the infectious illnesses that you have to be concerned about. But the toxins are mostly industrial waste, not so much in the human manure.

PM: Do you encourage people to sort of look at the big picture of their health? In terms of our society, even how our society is constructed. For instance, when you go to a restaurant, why isn't whitefish and walleye on the menu? Right? Because the Great Lakes used to be a tremendous commercial fishery there. But then you've got all this industry and all this pollution going into the lake, right?

JM: Just so you know, I used to live in Chicago. I've been living in Florida now for the last five years or so.

PM: Oh, yeah, yeah.

JM: I'm actually right next to the ocean.

[-----50:00-----]

PM: Right. Where are you?

JM: Just north of Daytona.

PM: Yeah.

JM: East coast.

PM: Right. In 2007, I went to Guggenheim and did a world tour looking for sustainable systems. One of the beautiful things about being a journalist is that I meet some of the most impressive thinkers on this subject, you know? By and large, they said that the ability for us to have healthy sustainable food production systems in the current economic regime and the current sort of global system of values is going to be impossible. It really would require a value shift, a massive population value shift.

JM: Yeah.

PM: Of how we value our streams in our local environment to produce seafood. If our ecosystems, for example the estuaries of Florida are impaired. No one did a study. They're all impaired. They're not providing the ecosystem services required for many wild species at some point in their development need to be in those estuaries. If those estuaries can't provide those services, then those species, they're going to diminish too with or without fishing. When do we start cleaning up these estuaries and cleaning up these systems, so that our wild fisheries rebound?

JM: What is your recommendation of what the average consumer can do? We have a lot of people watching. We've previously been highly successful at educating individuals about these types of choices and it really changed a lot of industries, like increased awareness about genetically modified food. When we first started in this space, hardly anyone knew what genetically modified organisms (GMOs) were. I mean if you asked the average person, you'd have to interview 100 people before anyone even heard of it. Now it's common knowledge and people are making wiser choices and voting with their pocketbooks. It's a very powerful political statement.

PM: Right. Yeah. The first thing I would say is if you can put a face to the fish, that's the best thing you can do. I would say go online and search for a community-supported fisheries near you, if you're near the coast. Secondly, you can also go online and buy this. Lots of fishermen now are starting to sell their products directly online.

JM: How would one find those?

PM: I would go to Google and I think–

JM: We don't recommend Google. Duck Duck Go would be better as your search engine.

PM: Where can I see Duck Duck Go?

JM: Google has a large monopoly in the world.

PM: Yeah. I've got an idea. But I would go online and search for – Let's see. Well, I guess we're going to have to do something. We're going to have to get a clearing house for this. But I would say –

JM: If you could send us the information, we could easily put it –

PM: Yeah, yeah.

JM: They can identify, find and source this healthier form of fish.

PM: Yeah. I would say that the search term I would use would be, "Buy Direct Seafood Online."

JM: Oh, okay.

PM: The other thing that I would say is to eat mindfully.

JM: That's good in any case.

PM: I think that anybody – there's a tendency I would think, I would guess that someone would feel better if they buy that 15-dollar sockeye instead of the 7-dollar farmed fish. They take it home and they steam it lightly and they put it on the plate with some brown rice and some escarole or some –

JM: Actually, white rice is healthier than brown contrary to popular opinion.

PM: Okay.

JM: It has less lectins.

PM: When you're eating that quality of fish, it's like eating in a white tablecloth restaurant.

JM: Yeah.

PM: Make it an aesthetic experience. Light some candles and really just enjoy that. Enjoy that smaller portion that you paid more for, knowing that you're part of a movement to –

JM: What's your favorite way to prepare a fish?

PM: Raw.

JM: You don't cook it?

PM: Yeah. I mostly eat mackerel that I catch myself.

JM: Okay.

PM: Or I eat cod that my –

JM: And mackerel is a code word for sardines.

PM: Yeah. Well, it's also a great fish. Mackerel is a great fish. There's another thing that I was thinking about that I'm working on here. I have too many ideas. I can't work on them all, but I would really like to see people eating fresh, frozen herring, not sardines in a can. If you've ever eaten fresh herring, there is not a more – it is such a delicate –

JM: Where would one obtain such a creature?

PM: Online.

JM: How do you buy fresh frozen herring online?

PM: Well, they do. They do. They do butterfly fillets in Europe. There's a story I tell in a book that I have that isn't published yet of watching a friend of mine when I lived in Belgium as a young man. I was watching a friend of mine eat a herring that he just got from a boat that brought a load in and was selling them as food. I've gotten them as food from the weirs, which are herring traps along the coast here. You get them out of the trap. You take them home and you put them in the frying pan. There is absolutely nothing like it.

JM: You do fry your fish.

PM: Yeah, yeah. I do fry the herring.

JM: Okay.

PM: Sauté in butter. If I have a cod, I'll sauté that in butter with onions and garlic and a little Cajun seasoning on that.

JM: Are there other cooking tips? How long do you sauté it for? What's the thickness of the fish? What are the parameters that you use to optimize its cooking?

PM: Okay. A good fresh fish – Let's start from the beginning. The only place you can get a fish is at the counter of the fish market. You're looking around. You're seeing tilapia. Just say no to tilapia that came from China, right? Or any of these industrially caught fish. Anything that's frozen at sea, just leave that be. Look, when you see some pollock or –

JM: Why the frozen at sea? What's the concern there?

PM: It's just part of this industrial food production system.

JM: But I mean theoretically, if it was caught the right way, it would seem to be – what was frozen at sea would be preserved and the nutrients wouldn't be as damaged biologically.

PM: If those are your parameters, then yeah. I have eaten it. But my parameters are, "Is this part of the industrial food system or is this something that I really want to eat?" Plus, not to mention that the frozen-at-sea is not going to give you the same cooking qualities that a fresh fish has.

A fresh fish, when you're looking – This is important. When you look in the seafood case, you look for a wild-caught fish. If it's a whitefish, like a cod, a haddock or a pollock, the flesh has almost a silicone quality to it. It's almost translucent. When you touch it, it bounces back. Your fingerprint doesn't stay there. The meat is tight. It holds together. If you see that in store, buy it. Buy it immediately. But a few pounds and put some in the freezer for yourself.

JM: Right. But is the butcher – I don't know what they call a butcher equivalent to fishery or the fish market.

PM: Fish cutter.

JM: Fish cutter. They're going to let you touch the fish to see if it would spring back?

PM: No. But I think he can do it for you.

JM: He can touch it?

PM: Yeah. When you see him touch it, or you could ask him, "Could you put your finger on that?" to see and see how that bounces back. You'll see after a while. For me, having been a quality control person who run processing plants, I walk into the supermarket. If I see out of the corner of my eye a good quality fish, I'll buy it.

[-----1:00:00-----]

I'll bring that home and cook it that night. I don't wait. I don't put it in the fridge and say, "I'll buy it on Friday and I'll have that Sunday." If I buy it on Friday, I'm going to eat it on Friday. I'll take my cast-iron frying pan. I'll put a little butter in there and sauté some onions slow. And then I'll put that fish in there. And then I'm watching that fish. I'm watching it. I'm letting it cook. When it gets a little white around the edges, I flip it.

JM: Okay.

PM: I'm waiting. It flakes, right? If it's good fresh fish, it'll flake. I'll pry that open there. As soon as that translucency of the flesh is just about to disappear, take that off.

JM: Okay. It's kind of like cooking an egg too, because it becomes translucent, at least the white, and then turns opaque. It's the same process. Just when you see it turn, just at that moment, it's when you take it off.

PM: Right.

JM: That's great.

PM: Yes. If I remember, I learned to cook fish actually in Alaska, really. I remember my mother and I had a rare phone call. I was fishing up there. She said, "How are you doing up there?" I said, "Mom, we are so broke. All we have to eat is halibut, salmon, crabs and shrimp."

JM: Oh, boy. That was good. I did one modification for your fish cooking instructions. I would swap out the pan from a cast-iron skillet to a more contemporary one. Especially as a male, the general observation is that we tend to increase our iron storage as we grow older, because unlike women, we don't lose them every month through their menstrual cycle. High iron levels tend to premature disease, like heart disease and cancer.

PM: Really?

JM: Yeah. You have to be careful. We encourage everyone to have their iron tested regularly through a test called ferritin. I would say almost 90 to 95 percent of people have elevated iron levels that need to be optimized. You certainly don't want to exacerbate that by using iron cookware. If you were cooking for a child or a menstruating woman, then that's no problem. Usually the iron would be beneficial. Although in that form it's probably biologically available.

PM: When I buy sockeye, I steam it.

JM: Yeah. Perfect. Just don't steam it in an iron pot.

PM: No. I mean I steam it on a stainless steel steaming tray.

JM: Perfect, perfect.

PM: I do the same thing. I cook that even less.

JM: Yeah. The same issue with the sockeye, which is orange from the astaxanthin. Just the moment the color changes is when you take it out?

PM: Yeah. Even so with cod, I'll let the color change just right to the last minute. Whereas with salmon, I'll just let the outer edge get cooked.

JM: Oh, okay. Alright. Perfect.

PM: Yeah. It's basically raw in the middle

JM: Okay.

PM: Yeah.

JM: Great suggestions. Any last ones before we sign off?

PM: Well, I think that eating healthy seafood, if you really want to make a difference, I think it's to see yourself as part of a movement, a part of a global effort that includes a lot of beautiful people, a lot of small-scale producers, people with faces that put faces to their fish. If you can connect with them, that's even better.

JM: Yeah.

PM: And then you're not eating fish that you bought. You're eating fish from a friend.

JM: Yeah. Hopefully, obviously that's a bit of a challenge for most people who live in urban environments. But with your assistance, we'll help seek to identify some online resources that people can essentially –

PM: I have been working on that, and other people have too. Hopefully we can get that together, like sort of an internet clearing house of fish, where you can find somebody local.

JM: Yeah. We have been using Vital Choice for a long time out of Alaska. They only sell sustainably raised fish. I'm sure you're aware of them.

PM: Yeah. I buy from my neighbor, [Chris Mullein inaudible 1:04:24]. He brings back [inaudible 1:04:34].

JM: Yeah. But most of us don't live or grow up near fishermen.

PM: My son's a commercial fisherman now. He brings home the cods, so not to worry.

JM: That's good. Alright. Thanks again. Your book, *Swimming in Circles: Aquaculture and the End of Wild Oceans*. It's a great book.

PM: Yeah. I have another book, *The Doryman's Reflection: A Fisherman's Life* that talks about policy changes that have impacted small-scale fisheries over the years. The second revised edition came out this summer. You've got a great write-up in the New York Times review of books. That's been selling well too. If I can sell these two books, maybe somebody will publish my third one that's been on the shelf for a while, which talks about positive initiatives.

JM: I hope so. Yeah. Good stuff. Alright. Thanks for all your work. Thank you for sharing your insights with us, I'm sure it helped a lot of people. We'll take it from there.

[END]