



Salmon Wars

Salmon Farms, Wild Fish and the Future of Communities

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SHELDON DIXON: [00:00:39] Cooke's Aquaculture came down, and – they don't ask you, they pretty well tell you, okay, and the government's workin' hand in hand with 'em.

SHANE BORTHWICK: What I try to do in many of the discussions I have with people is try and move the debate from should salmon farming happen to, "It's going to happen, how should it happen?" [00:01:05]

STERLING BELLIVEAU: To me, aquaculture is a natural fit with our coastal communities, and I think there's opportunities.

ANDY MOIR: This has nothing to do with community development; this has to do with developing the profit margin of Cooke Aquaculture, and also the province seems to think it will improve its bottom line as well. [00:01:34]

STEWART LAMONT: [00:01:42] When I got this call saying all our lobsters were dead, I thought it was a joke. It was unimaginable.

SILVER DONALD CAMERON: [SILVER DONALD CAMERON, HOST, THE GREEN INTERVIEW] [00:01:50] Stewart Lamont is managing director of Tangier Lobster, a Nova Scotia company that buys and stores lobsters in New Brunswick. In 1996, his company and three others were holding 200,000 pounds of lobsters in a natural pound in Back Bay, New Brunswick.

LAMONT CONTINUES: [00:02:07] I was assured very, very quickly that this was no joke, the lobsters were dead. So four companies put their employees and trucks on the road, and at 10:00 at night we wound up in Back Bay,

NB, looking down on a natural pound in which two of the three components of the facility had been drained dry, and here were thousands and thousands of pounds of dead lobster on the shore. That part of the whole story is very very fresh in my mind; it's as if I were there last night. Come to find out, to make a very long story short, a salmon-farming operation across the bay had had a lice problem, and the best and most effective way to deal with lice is to treat it with cypermethrin. Cypermethrin was and still is illegal in Canada...but is, at least it was, legal in the United States. [00:03:12]

SDC: The salmon farmers had purchased cypermethrin in the US, brought it to Canada, and doused their fish with it. The currents carried the poison across the bay, where it wiped out the lobsters. The lobster companies sued and won a six-figure settlement. That was in 1996.

SDC: [00:03:31] This is the headquarters of Cooke Aquaculture, in Black's Harbour, New Brunswick.

SDC: In November, 2011, Cooke was fined \$40,000 for the improper use of a pesticide – and later that month the company and three of its executives were charged with 33 counts of illegal use of cypermethrin after a mass lobster kill in Passamaquoddy Bay in 2009. As I speak, in the spring of 2012, the case is still before the courts.

SDC: [00:03:57] Cooke's is unquestionably the major player in aquaculture in eastern Canada. On two occasions we asked them for the opportunity to do an interview with them. And on both occasions, they refused.

SDC: Salmon farms began in Norway, and soon spread to Scotland, Ireland, Chile, British Columbia and elsewhere. But the heaviest concentration in the world is around the New Brunswick islands in the mouth of the Bay of Fundy. Now the industry wants to expand across the Bay, to Nova Scotia.

Their initial proposals affect five communities. Cooke has applied to establish or expand salmon farming in four communities in southwestern Nova Scotia: St. Mary's Bay, Shelburne, Jordan Bay and Port Mouton. The fifth application is for the Sheet Harbour area on the Eastern Shore. The applicant there is Snow Island Salmon, a joint venture between a New Brunswick operator and a Scottish company named Loch Duart. [00:04:50]

These plans are meeting with fierce resistance. Of 135 submissions from St. Mary's Bay, 134 were opposed, and those communities are now suing the provincial minister for authorizing two huge salmon farms without doing a proper consultation and review. The Conservative government in Ottawa and the NDP government in Halifax seem determined to impose net-cage salmon farms on coastal communities. Which is very odd, because the federal NDP is firmly opposed to them – as was the provincial NDP, when it was in opposition. Here's Opposition Leader Darrell Dexter in 2007, speaking against fish farms in Port Mouton.

DARRELL DEXTER: [00:05:32] Last week I was down in southwest Nova with some fishermen talking about what's going on in coastal communities. They're all concerned that the provincial government lacks leadership when it comes to rural communities, when it comes to coastal communities, because they are not listening to the people of these areas. This is a lack of leadership in government. And the first way that they can turn this around is by demonstrating that with respect to this project that they're going to say 'no.'

SDC: [00:06:05] But now he's the Premier, and his government strongly supports a massive expansion of salmon farms in the province's little coves and harbours... including Port Mouton, which still doesn't want them. We call them "salmon farms," but they're not really farms. They're actually feedlots. Essentially, a net-cage feedlot consists of bags of netting hanging from floating platforms. Tens of thousands of small fish are dumped into the nets, fed and held until they reach market size. Then they're pumped out and slaughtered. These farms can be enormous. The two new farms in St Mary's Bay are licensed for 1.4 million fish.

SDC: [00:06:46] But compact monocultures like this are a paradise for parasites and disease. And because net-

cages just hang in the water, all kinds of things can pass in and out through the mesh, from small fish and crustaceans to viruses, bacteria, parasites and pesticides. And so certain problems occur with salmon net cages everywhere, just as naturally as green grass occurs in the spring.

ALEXANDRA MORTON: [ALEXANDRA MORTON, RAINCOAST RESEARCH SOCIETY] [00:07:11] The basic problem with farmed salmon is they break the natural laws. In nature, the wild salmon is always moving, so the waste never collects, and pathogens have a lot of trouble jumping fish to fish because they're constantly moving. And any salmon that's a little bit slow or a little bit wobbly on the edge of the school, there's a predator that takes it out. At every age, class, and size, there are always predators trimming up these schools, and so you don't get epidemics.

SDC: Alexandra Morton was once described by a journalist as the "citizen scientist who overcame intimidation by bureaucrats, indifference from government scientists, and dismissals from industry to force the plight of wild salmon to the top of British Columbia's political agenda."

MORTON: [00:07:54][CONTINUING] ...then you take now a salmon farm. It really doesn't matter what you put in there, whether you put a Pacific salmon or an Atlantic salmon, it's the same dynamic. The wild fish come by and they infect the farm fish. That's definitely part of the dynamic: sea lice, viruses, bacteria. The wild fish go into the rivers; they die. The farm fish, everybody is pressed together, and so the pathogens are having a heyday. They're jumping fish to fish to fish, and now they're competing against each other, so it increases virulence. This has actually been studied. It makes them more virulent because there's no longer any reason for those pathogens to live lightly on their hosts.

SDC: [00:08:32] Take sea-lice, for example -- small crustaceans that lock onto salmon and feed on their mucous, blood and skin, creating deep open wounds that provide an invasion route for bacteria and viruses. A few sea lice can kill an immature salmon, and larger numbers can weaken or kill even a fairly large fish. To combat sea lice, salmon net cage operators lace their food pellets with drugs and pesticides. As the lice become resistant to those chemicals, the operators move to stronger ones. They may also pump the fish into tank boats where the fish are bathed in chemicals like hydrogen peroxide. When that fails, some operators, at least, move to strong but illegal pesticides like cypermethrin -- and that's the story behind the chemical kill that wiped out Stewart Lamont's lobsters in 1996, and wiped out thousands more in 2009.

Drugs aren't the only foreign substance in salmon feed. The flesh of farmed salmon is white, not salmon-coloured. It arrives in the supermarket salmon-coloured because it's had dye in its food. Other fish sometimes pick up salmon feed that's fallen through the cages -- with odd results. Here's Guy Melville, a retired scientist who lives in Freeport:

GUY MELVILLE: [GUY MELVILLE, RETIRED SCIENTIST, FREEPORT] [00:09:52] Yeah, there's a salmon-coloured pollock -- it's in my freezer. [LAUGHS]

SDC: And -- as naturally as bird-song in summer -- masses of salmon produce masses of feces. Wild Atlantic salmon spread their wastes over huge stretches of ocean -- they migrate between eastern Canada and Greenland -- but farm salmon drop their wastes right through the bottoms of their cages.

SHELDON DIXON: [SHELDON DIXON, FISHERMAN, TIVERTON] [00:10:15] 1,800 metric tonne of waste -- that's what these sites in one year are gonna produce, and that's the equivalent of Digby County all going to the bathroom. That's what's being dumped down here on our bottom, every year when they get up into production. They can come shit all over us, and they don't have to look after their waste. That's how they can have 52% profit.

SDC: [00:10:42] 52%? Well, Cooke Aquaculture is a private company, so we don't see their financial statements – but a Department of Fisheries and Oceans study set the average return on investment of net-pen operations at 54%. In 2011 Cooke had revenues of more than 500 million dollars, and a war-chest big enough to try a hostile takeover of Clearwater, the dominant seafood company in eastern Canada. But their profits are high partly because salmon feedlots don't pay for all their costs. Inka Milewski is a marine biologist.

INKA MILEWSKI: [INKA MILEWSKI, MARINE BIOLOGIST, CONSERVATION COUNCIL OF NEW BRUNSWICK] [00:11:18] The industry is not paying for the waste that it's generating. That's being borne by the environment and all the other species that inhabit that environment where fish farms are located. It's out of sight and out of mind to most people. Most people don't get to see what it's like under a fish farm. All they get to see is on the surface, and it looks very nice – leaping salmon being tossed food – but underneath, it's a waste dump, it's a sewage-type environment.

SDC: [00:12:00] What's on the bottom is a toxic sludge up to a meter in depth, composed of feces, putrefying food and dead, disintegrating fish, all spiced with drugs, other chemicals and dyes. Nothing can live there except a specialized worm and carpet of bacteria.

MILEWSKI: [10:12:18] So what you have here, this is my farm site, and you can see these white patches that are quite extensive. These are the bebbiatoa mats, these bacterial mats that are covering the surface. This bottom is toxic, and organisms really are quite sensitive to the sulphur levels that are there, and they would stay away from it.

SDC: [00:12:43] Of the diseases that affect salmon feedlots, the most devastating is ISA, Infectious Salmon Anemia, which arose in Norway and has since spread around the world, often carried by infected eggs. It's incurable, and when it appears, all the hundreds of thousands of salmon in the affected cages have to be slaughtered. ISA almost eradicated the industry in Chile, and there have been several major outbreaks in New Brunswick. (BEAT) Another issue: unlike most farm animals, salmon are carnivores, so their feed is made up of – well, here's Daniel Pauly of the University of British Columbia, one of the most eminent fisheries scientists in the world:

DANIEL PAULY: [00:13:23] Lots of marine fish of the world are predators, and these predators have to be fed with other fish- fishmeal from other fish-and there is no getting around that. About one-third of the fish that are reported caught, about 25 million or 30 million tons of fish is turned into fishmeal. It's reduced to fishmeal and fish oil. Of that amount, half is used for chicken and pigs and stuff, and half for salmon and other fish. So one-sixth of all fish caught is used to grow other fish. If you feed them with other things than fish, they will taste like tofu, they will get sick, and it doesn't work. Basically, aquaculture needs fish to produce fish, this form of aquaculture. The production of carnivores, the more you produce, the less fish you have. This is something that will not get into the heads of most people because they see a salmon, but they don't see the sardine that goes into feeding it, and in Canada at least, they wouldn't eat the sardine. But everywhere else in the world, they would. So this is more than a zero-sum game. We lose when we do aquaculture-we, humanity-when you do aquaculture of carnivores.

SDC: [00:15:05] Perhaps the most serious long-term effect of salmon feedlots is genetic pollution, the result of interbreeding between wild salmon and escaped farm salmon. This issue is acute in British Columbia, where Atlantic salmon are an alien species – but it's also an important issue on the Atlantic coast. Wild salmon are born in the shallow headwaters of rivers, and spend the first part of their lives in fresh water before swimming down to the sea. They live in the ocean for a year, or two, or more, depending on their genetic programming. And then – navigating with incredibly subtle chemical sensing – they force their way back up the same river to the very

spot where they were born. Every population, from every single stream, is unique. But they all make that incredible journey, adapting to two utterly different environments. A farm salmon doesn't have that genetic programming. When escaped farm salmon interbreed with wild fish, they weaken the survival mechanisms of the wild stock. And there are always escapes, just as there are always sea lice. Escapes occur as naturally as snow in winter.

BILL TAYLOR: [BILL TAYLOR, PRESIDENT, ATLANTIC SALMON FEDERATION] [00:16:14] Farming salmon, farming fish for food, certainly makes sense on a lot of different levels, takes pressure off wild stocks. In fact the Atlantic Salmon Federation was very involved with helping the aquaculture industry get started here in this part of New Brunswick, in the Maritimes, back 25 years ago. What the Atlantic Salmon Federation didn't see – or scientists at the time didn't see -- was all the unintended consequences, and that is serious problems with disease, serious problems with sea lice, serious problems with pollution, and maybe the most important, significant problem, the fact that a lot of farm salmon escape.

SDC: [00:16:55] Jonathan Carr is Director of Research and Environment at the Atlantic Salmon Federation. Every fall, he and his assistants intercept the salmon entering the Magaguadavic River as they come up this fish ladder in St. George – a surreal place in midwinter, sheathed in ice. They examine every single fish. They remove the farmed salmon, and send the wild ones on their way.

JONATHAN CARR: [JONATHAN CARR, DIRECTOR RESEARCH AND ENVIRONMENT, ATLANTIC SALMON FEDERATION] [00:17:19] When we first started the monitoring program back in 1992, there were years when we had close to a thousand escapees coming into this one river. And this is only one river we're monitoring. There's several other local rivers nearby, and many other salmon rivers. But as time has gone on, there has been improvements in terms of husbandry practices; we've noticed the scale of escapes have gone down dramatically over the years. But that said, so has the wild returning salmon, so we've had years when over 90% of the fish entering this river intercepted at this fish ladder, over 90% have been aquaculture escapees, versus 10% or less of wild fish.

SDC: [00:17:57] Since 2010, salmon farms have been obliged to report any escapes – but before that, says Carr, the first sign of an escape was typically the sudden appearance of numerous farm salmon in the mouths of the lower Fundy rivers. The industry always claims that their cages won't fail, and their fish won't escape – but just one episode in New Brunswick in 2010 saw the escape of 138,000 farm fish. The aquaculture industry says that such escapes really don't matter, because real wild fish don't exist anyway.

BRUCE HANCOCK: [00:18:30] This idea that we have pure stocks running in these rivers is simply not true. We've been stocking these rivers for over 100 years. You take something like the Margaree River in Cape Breton. There's hatchery-produced salmon from the St. John's River, there's hatchery-produced salmon from the Richibucto River, that's in there, and I believe that there's one or two other river strains that have been actively introduced into that river system to try to enhance the stocks. This is long before aquaculture ever showed up.

SDC: [00:19:08] But it turns out that healthy wild salmon runs can simply shrug off the introduction of juvenile hatchery fish that were bred to survive in the wild – as in the case of the Margaree.

FRED WHORISKEY: [DR. FRED WHORISKEY, DALHOUSIE UNIVERSITY] [00:19:19] In terms of these events, where people have stocked fish from strains that are not native to a particular river, salmonids, into that river system, there've been a number of studies where the geneticists have gone back many years after the original stocking, and they compared the genetics of the donor population to the genetics of the original population that was in that river, and the genetics of the animals that are now there, twenty years after the stocking event – and what

they're finding is that the genes from those donor populations are gone. They're just not present – and instead the population that's now here after 20 years is very similar to what it was 20 years before.

SDC: [00:19:52] So yes, there certainly are intact wild salmon populations – plenty of them. But not in areas of intensive salmon farming. Stocking a river with compatible juveniles is not the same thing as allowing hordes of voracious adult farm salmon to invade rivers where the native stocks have already been weakened and reduced. Through generations of selective breeding, farm salmon have become so different from wild salmon that some biologists consider them a separate species – and if the spawning grounds contain eight or 10 times as many farm fish as wild ones, the wild population can indeed be completely overwhelmed.

JONATHAN CARR: [00:20:28] We took scale samples from wild fish entering the Magaguadavic River pre-industry, so samples taken in the 1970s. And we looked at samples taken in the 1980s, in the 1990s and in the 2000s, and we found that the genetic integrity has been compromised within the Magaguadavic River – and basically what I'm saying is we've proved that interbreeding has occurred in the past between wild and aquaculture fish, and the wild fish have actually lost some of their unique alleles that are critical for survival in the wild, so the population we've been trying to recover, we just found out truly is not a wild population any more because of genetic contamination in the past.

SDC: What happened on the Magaguadavic is the most serious effect of salmon feedlots, because it destroys the sophisticated genetic composition of unique wild salmon populations – and once the genome of a particular salmon tribe is lost, it's gone forever. Compared with this, the question of housekeeping is minor – but it tells you a lot about the attitude of the industry. Both sides of the lower Bay of Fundy are littered with salmon farm debris. New Brunswick lobsterman Greg Thompson has watched Cooke's abandoned cages breaking up and drifting ashore.

GREG THOMPSON: [00:21:42] To me, this is very easy to fix. I take my used gear ashore and dispose of it properly. To me, the aquaculture industry should be able to take their used gear ashore and dispose of it properly.

SDC: On the other side of the Bay, Sheldon Dixon has pulled large pieces of aquaculture debris up into his own field.

SHELDON: [00:22:08] Our shores out here, you know, every half a mile you can pick up salmon pen debris.

SDC: If salmon farmers do this out where we can see them, what do they do down below, where we can't see them?

STERLING BELLIVEAU: [HON. STERLING BELLIVEAU, NOVA SCOTIA MINISTER OF FISHERIES AND AQUACULTURE, AND MINISTER OF ENVIRONMENT] [00:22:21] Well, we monitor this on a regular basis. So I'm confident that these sites are regulatory monitored. We have one of the strongest regulatory systems in Canada, and I have the greatest confidence that ours is second to none.

SDC: The industry says the same thing.

HANCOCK: [00:22:44] I can tell you right now we have some of the strictest regulatory practices in Canada and anywhere else in the world.

SDC: Really? Cooke has said that it's expanding in Nova Scotia partially because Nova Scotia's regulations are weaker than those in Maine. Inka Milewski knows something about salmon farm regulations.

INKA MILEWSKI: [00:23:01] I was an expert witness at the hearings that were held to determine what should

the environmental monitoring program look like in Maine, for fish farms. And I made a series of recommendations about what should be monitored, and as it turned out, a lot of those recommendations were incorporated into the management of salmon farms in Maine, and as a result they have a much more rigorous, more detailed monitoring program than we have in New Brunswick or in Nova Scotia.

SDC: [00:23:44] In Maine, regulators monitor several different indicators – and when those indicators show environmental deterioration, the salmon farm has to take immediate action. In Canada, the only indicator that's monitored is sulphides, which are produced by decomposition under the cages.

MILEWSKI: [00:24:00] The industry says, "we are highly regulated, there's all kinds of monitoring that takes place on our fish farms." But in fact what happens in New Brunswick and in Nova Scotia is when the sulphur levels, the sulphide levels in the sediment, reach or exceed 1500 micromolars of sulphide, the response is, you do more monitoring. And at no point in that process does the government say, "You need to cut back on production, you need to do something to change those sulphur levels from their seeming trajectory into the high values.

SDC: Minister Belliveau also says that his siting and leasing decisions are based on science. In fact the industry produces its own environmental assessments – a cozy arrangement – and those documents are then reviewed by government scientists.

BELLIVEAU: [00:25:00] I really believe in the science, that we have good science, we have some of the best professional veterinarians in the world, and I trust that, I trust that information and I believe in the conditions that we've set out in these approvals, and that information needs to flow and the community needs to be engaged in that, yes.

SDC: When I asked him for the specific science supporting a specific decision, the Minister handed the question to associate deputy minister Greg Roach, who described the application process, and assured me that it was all accessible.

GREG ROACH: [00:25:37] There is indeed a public screening of the information about fish farms.

SDC: I asked him for the website address, and he assured me he'd send it. When I later reminded him of it, he had an assistant send me three successive emails outlining the application process – but never provided a single scientific fact. The truth is, his department doesn't have any science. The real story is buried in another comment by the Minister.

BELLIVEAU: We've made every effort to make our decisions public, and we are involved in a process where, and our federal counterparts are involved in the science and stuff, and they have some good scientists, and they have some good studies that they can relate to.

SDC: [00:26:42] In short, the science comes from the feds. Long time deputy minister Paul LaFleche openly admitted that the province has no scientific capacity of its own, and relies on the federal Department of Fisheries and Oceans. And other sources say that the province doesn't even get to see the actual studies; the feds simply assure provincial officials that the science is fine. So the expansion of the aquaculture industry rests on the private, unsupported assurances of the management at the Department of Fisheries and Oceans -- the same bureaucrats who managed the Atlantic cod fishery into extinction, over the objections of their own scientists. Despite the industry's denials, there's plenty of sound, published, peer-reviewed science on the shortcomings of net-cage aquaculture. Indeed, the Royal Society of Canada – the pre-eminent scientific organization in the country – recently published the report of an expert panel on the relationship between

marine biodiversity and climate change, fisheries and aquaculture. Predictably, it identified the well-known problems with wastes, chemicals, disease, escapes and interbreeding. The chairman of the expert panel was Jeff Hutchings, professor of biology at Dalhousie University. I asked him specifically about the industry's repeated claims that there's no scientific evidence that salmon feedlots adversely affect wild salmon.

JEFFREY HUTCHINGS: [DR. JEFFREY HUTCHINGS, DALHOUSIE UNIVERSITY] [00:27:42] What I would say to those who would say that, in industry, is, show me the data. Show me the reports. Show me the publications. Because for anybody moderately cognizant of the science that's been undertaken in this area cannot speak truthfully and make that statement.

SDC: [00:28:03] Since the communities can't get access to good science from the government, they're finding ways to do their own. In 2009, Cooke applied for a new, large site in Port Mouton Bay, where a smaller fish farm had been operating for 15 years. Convinced that the small farm had damaged the bay, local fishermen strongly opposed the larger one. Ruth Smith grew up in Port Mouton, and still owns the family home there. She and her husband, Dr. Ron Loucks, operate an oceanographic consulting firm in Halifax, and they offered to help. They began by asking the fishermen how the bay worked.

RON LOUCKS : [RUTH SMITH AND RON LOUCKS, OCEANOGRAPHERS] [00:28:41] These people were working on seven generations of familiarity with this bay. And so we tried to marry the local ecological knowledge – on both sides, they and us – with the formal science.

SDC: Together, the scientists and the fishermen negotiated with Cookes to gain access to the existing site, which had been taken out of production. To their credit, Cookes did give them access for three years. Enlisting the aid of Dalhousie University, the team did sediment surveys, took still pictures and video footage, analyzed the chemistry of the water, measured the currents. They raised money to pay for lab work. And they tested the fishermen's theories about the fish farm and its impact on the bay.

CLYDE FISHER: [CLYDE FISHER, RETIRED FISHERMAN] [00:29:27] Everything kept getting worse. Everything expanded from the fish farm. This is the point.

RUTH SMITH: The size of the footprint, from the sediment analysis, extended out at least as far as 400 meters, and to a further extent of 2 kilometers in depositional areas where wastes tend to settle.

BOB SWIM: [BOB SWIM, FISHERMAN] We took Ron out in the boat and he could do his water samples and he had drifters, a weight with little bit of an underwater kite on it and then a buoy up to the surface, and that allowed the tides to have all the effect on this instead of the wind, so when the stuff moved it wasn't the wind that was movin' the stuff, it was the tide, and a lot of questions he had with us about how the tide cycles in this harbour and all that stuff, and then he sampled all of this stuff, and whatever we was tellin' him, he's found to be fact.

GLORIA GILBERT: [GLORIA GILBERT, FRIENDS OF PORT MOUTON BAY] [00:30:33] People got together on that, it brought community people and fishermen and the science team all onto the same page. It's like, we can do this. We can learn and prove what we need to be going to government with.

RON LOUCKS: [00:30:50] So our guys got to be acquainted with the Dalhousie guys, and they listened and learned and communicated and shared. See, a lobster fisherman earns his living by the map that he's got in his head of the bottom.

SDC: [00:31:08] Ron and Ruth say there are three main findings in their work. Just as the fishermen claimed, the fish wastes did drive lobsters completely away from what was once a rich lobster breeding ground. The bay does

not flush very well, and the footprint of the farm is hundreds of times larger than the lease area.

CLYDE FISHER: [00:31:27] The fishermen's been proved right, ever since we started, 'cause the fishermen are the ones that knows the bays.

SDC: But how is it that communities have to hold bake sales to pay for the scientific testing that's needed to show whether their local waters are suitable for aquaculture? Isn't it the job of government to monitor and control the industry? So one would think – but the bureaucrats have become cheerleaders for the industry. Mind you, the bureaucrats can hardly be blamed, because their mandates make them responsible for both regulation and promotion – an impossible task.

BILL TAYLOR: [00:32:04] DFO has an inherent conflict, in our view, in the way it's responsible for the care of our wild Atlantic salmon runs, and at the same time DFO is also responsible for the promotion and development of aquaculture, and we view that as a conflict of interest.

JEFF HUTCHINGS: [00:32:21] Well, indeed, that was one of the key recommendations that came from the Royal Society panel as well, that one of the things that inhibits – and seriously inhibits, in our panel's view – the ability of Canada to fulfill its national and international obligations to conserve and sustain biodiversity lies in this regulatory conflict within Fisheries and Oceans Canada. And it seems pretty clear, based on past experience, that the promotion of industry typically wins out.

CINDY WEBSTER: [00:33:01] Good evening everybody, I'm Cindy Webster, I'm the director of aquaculture management for Fisheries and Oceans Canada. We have not come anywhere near a decision for these sites, we're just starting to look at this, so, as I said we take all those concerns very seriously and consider those when we're doing our advice. I've only been with aquaculture for 10 years, and we have not turned down a salmon farm in the 10 years I've been here.

BILL TAYLOR: [00:33:33] You look at DFO's budget for wild Atlantic salmon conservation, management, research and assessment – in the mid-80s they had a \$25 million budget dedicated to wild Atlantic salmon. Today that budget is less than \$15 million.

SDC: The same internal conflict exists provincially. Remember Inka Milewski's photos of the sea floor? Those photos were taken in Shelburne Harbour, where Sterling Belliveau used to fish. He's now Nova Scotia's Minister of Fisheries and Aquaculture and Environment – so I asked him how he felt about these essentially dead zones in the harbour of his own community.

BELLIVEAU: [00:34:14] You make reference to certain dead zones in certain harbours... **SDC:** Well, it's your harbour...**BELLIVEAU:** ...to me, I have a sensitivity around that, because I go there with my Sunday drive, and I observe a traditional fisheries, and I keep going back to my, my, my occupation, and when I drive there, whether I'm there touring what the local pothole situation is on a road, I'm also observing that I know that there's an active lobster fishery in that harbour. I also know that there's traditional lobster holding facilities in that harbour. So I have some sensitivity about the term about a dead zone in Shelburne Harbour.

SDC: Ah. So I guess it won't matter till the whole harbour is a dead zone. I also asked the Minister, if aquaculture is such a natural fit for coastal communities, how come they're booing you and suing you?

BELLIVEAU: [00:35:10] Well, it's interesting, because I come from Shelburne County where I see other municipalities actually endorse it. So there's a different range of exceptions or how people endorse it, and the local council municipalities in the Shelburne area is on the opposite side of that.

SDC: It's true: in Shelburne, unlike other coastal communities, a lot of people really do support Cooke's

expansion plans even in Shelburne Harbour. Shelburne is a shrinking industrial town that badly needs conventional jobs – and jobs are at the heart of the controversy.

MAYOR DELANEY: [SHELBURNE MAYOR AL DELANEY] [00:35:48] Our population has shrunk, there's out-migration, people are going out west, families are divided, families have moved, and it's created an effect on our community that we'll never get over.

JIM SPENCER: [JIM SPENCER, SHELBURNE CHAMBER OF COMMERCE] [00:35:59] This is a rural area, and all rural areas around North America are having the same problem, there's migration out of the rural areas and into the urban areas. So you sit back and you say we want the jobs – well, it's not the jobs, we don't want the churches closing, we don't want the school population to go down, we want someone to volunteer to do figure skating, we want volunteers for 4H, we want the kids in 4H, we want all those things that you need for a society, we want those to stay. We don't want to lose those things. It's not just about jobs.

SDC: [00:36:28] I understand this completely. Rural communities in rural Nova Scotia are fading away – and with them, a way of life that people rightly treasure. But net-cage aquaculture is not a big source of good jobs. Cooke Aquaculture has promised that when its various leases produce a sufficient supply of fish, about three million fish a year, it will build a processing plant in Shelburne and hire 350 full-time workers. But a South Shore journalist recently noted that, depending on the level of automation, a fish plant worker can process about 26 fish an hour. At that rate, three million fish would only require about 60 workers, not 350.

Cooke's plans received a major setback in the spring of 2012, when an outbreak of Infectious Salmon Anemia required the destruction of all the fish in its existing Shelburne cages. Cooke abandoned one of its applications for new sites; Shelburne's entire harbour is apparently under quarantine, and the outbreak may give a year's breathing space for nearby Jordan Bay, which was slated for two huge sites. But the loss of those salmon won't affect Cooke's bottom line.

STEWART LAMONT: [00:37:37] I'm given to understand that when an open-pen farm has a mass mortality issue with their salmon, that they now have it designated that this is a crop, salmon farmers are raising a crop, and they're compensated for the losses associated with the demise of that crop. That's another thing I couldn't believe. If in our lobster-storage facility we suffer mortality for any one of 50 reasons, nobody says, 'Can we compensate you for that loss?'

SDC: [00:38:15] The compensation isn't cheap -- "the reasonable market value that an owner could expect to receive for the fish up to the maximum of C\$30." The "reasonable market value" presumably includes the anticipated profit. In Shelburne, about 700,000 fish were destroyed. That means compensation of up to \$21 million, including perhaps \$5 million in profit. In New Brunswick, the provincial and federal governments have forked over more than \$75 million in compensation to aquaculture companies for losses due to ISA. Fish farms eat up taxpayers' money as naturally as salmon eat sardines. And every new farm that the government approves increases the taxpayer's risk. All of which raises the question, what's in this for us – for the taxpayers, for the government? The lease payments for salmon-pen sites are absurd – less than \$350 a year for a site that can earn \$22 million every two years. There are no property taxes on sites in the ocean, and as Inka Milewski notes, you and I were major investors in the companies in the first place.

MILEWSKI: [00:39:25] When we did our first report, we dug into ACOA files, we made right-to-information requests to the Atlantic Canada Opportunities Agency, and found that the industry had been given millions and millions of dollars in loans, forgivable loans, free money, to get established. The industry got established because federal money made it happen.

SDC: [00:39:56] And then, when things do go wrong – like an outbreak of ISA – the governments compensate the industry for its losses. Nova Scotia can't afford school librarians. It's cutting \$30 million from its educational budget – and it's welcoming an industry that can soak up \$21 million for a single outbreak of disease. How can we afford an industry like this? And although I can easily understand Shelburne's thirst for industrial jobs, what accounts for the government's insistence on foisting salmon feedlots on the Eastern Shore? The application down there comes from Snow Island Salmon, the Canadian affiliate of the Scottish company Loch Duart, which calls itself "the sustainable salmon company." Shane Borthwick, Snow Island's vice-president operations, grew up in a family aquaculture business in New Brunswick. He's been operating a single farm in Nova Scotia for a decade, and he says he's had no escapes, no diseases, no sea lice and no pesticides. Snow Island Salmon has applied to start what Shane Borthwick calls a "model" that involves stocking and fallowing four widely-separated farms in rotation near Sheet Harbour.

SHANE BORTHWICK: [SHANE BORTHWICK, VICE PRESIDENT OPERATIONS, SNOW ISLAND SALMON] [00:41:04] Our model, maybe just to touch on the model overall, is a four year model, whereby we stock any farm once every 4 years. So what that does is, it takes a year and a half roughly to get them up to size, a year to harvest them – a 12-month harvest cycle – and then an 18 month fallow period. Our model also calls for up to 500,000 fish per farm, which is far less than what you'll see in many of the larger models. We have 3km minimum distance between production classes, so that we don't have influence from one generation of fish to the next generation of fish. Often it will be far more than 3 km. We want to crawl before we walk, walk before we run; if we can prove what we believe will work, then we hope more and more people will embrace this model.

SDC: [00:41:51] Snow Island's people seem respectful and reasonable – and their whole approach stands as an implicit criticism of standard industry practice; Snow Island is actually trying to address problems that other operators don't even acknowledge. In Scotland, however, Loch Duart has faced the usual issues with sea lice, pesticides and escapes – and although fallowing the farms reduces the problems with waste, it doesn't eliminate them. So is Snow Island's model good enough? The community – and its businesses – don't think so. Stewart Lamont's business on the Eastern Shore does \$21 million worth of business shipping lobster to 16 countries – and it's on the cusp of a remarkable expansion.

STEWART LAMONT: [00:42:30] In the last 18 days, we've had three separate visits from three significant buyers from China making their way from China to Pleasant Harbour, Tangier, Nova Scotia, to come see our facility, talk to us about business opportunity, see if they can build the relationship.

SDC: The Chinese will pay \$40 or \$50 a pound for lobster – but they demand seafood that comes from a pristine environment.

LAMONT: [00:42:57] Pristine is our middle name, we like to think. The Eastern Shore is untainted territory, we have no industrial tarnish east or west. Food safety issues in China are considerable. Those Chinese with financial resources increasingly want products produced outside the country, which they have no fear of any kind of food safety damage. So our Canadian brand, which is pristine at its real core, I believe it's an ideal time not for just a terrific product, but a safe food traceable product to go on their market. They see that in our product, they see that in our environment. That's what they want.

SDC: [00:43:46] The Chinese know all about aquaculture – they lead the world in aquaculture – and exposure to aquaculture is exactly what their high-end consumer seeks to avoid. So the fishing community on the eastern shore sees the advent of salmon cages as a huge threat to a business that's far more important than salmon farming could ever be.

LAMONT: [00:44:06] This open-pen fish farming concept, with three specific applications and, we're told, many more to follow, it's caused a lot of anxiety. It's caused an association to be developed that's an ad-hoc community group, the Association for the Preservation of the Eastern Shore, It draws support from everywhere in the community, and people have been contacting the association and saying, what can we do to make our concerns expressed? In the seafood sector in particular, we have nine companies and we have two associations, which have for the first time in the history of the commercial fishery, spoken with one voice on this topic. We represent one thousand jobs, and we represent \$175 million dollar sales on an annual basis. By Nova Scotia standards, that isn't small potatoes, it's significant. And that isn't potential jobs or possible jobs down the road, or possible sales or possible value – that's reality today.

BILL WILLIAMS: [BILL WILLIAMS, RETIRED FIREMAN, SHEET HARBOUR] [00:45:14] I talked to some of the people that I've dealt with on the environmental assessments – we put in a lot of complaints about the environmental assessments – the material and the data that was used, and outdated, missing data -- and some of the people I dealt with on the federal level said that they've never seen anything like this, like the operation that's goin' on here, like the resistance against these salmon farms here. They've never seen this much paperwork, they said, generated for anything. There's nobody in favour of this. You wouldn't get 10 people on this piece of shore here that want anything to do with this stuff.

SDC: [00:45:53] And on the Eastern Shore, unlike the South Shore and St. Mary's Bay, wild salmon are an important factor. On the whole Atlantic coast of Nova Scotia, acid rain has hammered salmon populations – but when the acidity is reversed, so is the decline of the salmon. Conservation groups like the Atlantic Salmon Federation and the Nova Scotia Salmon Association have spent more than 18,000 volunteer hours -- and nearly a million dollars in cash -- on a "lime doser" to spread lime into the West River, Sheet Harbour. The experiment has shown a remarkable increase in the number of juvenile salmon, or "smolts."

GEORGE FERGUSON: [GEORGE FERGUSON, NOVA SCOTIA SALMON ASSOCIATION VOLUNTEER] [00:46:29] We're seven years since we started liming – this is a ten year pilot project – we do monitoring, we monitor invertebrates and we monitor pH, of course, and we monitor juvenile salmon densities. We've seen a 400% increase in smolt production in seven years, since liming.

SDC: [00:46:53] Salmon were considered "extirpated" from the West River in 2000. In 2011, the river produced 11,500 smolts. But these salmon – and this run – are fragile. They too need a pristine environment.

EDDIE HALFYARD: [EDMUND HALFYARD, OCEAN TRACKING NETWORK, DALHOUSIE UNIVERSITY] [00:47:08] I work for a group called the Ocean Tracking Network, and what we do is we implant sort of state of the art tracking technology, small little tags, into the juvenile fish, and we follow them as they migrate out through the river, through the estuary into the ocean as part of their life cycle.

SDC: It turns out that while most smolts move fairly smartly off towards the sea-pastures of Greenland, smolts from this river and a couple of others hang around along the coast for a month or more, which gives them a much higher chance of encountering any salmon pens.

HALFYARD: [00:47:38] Add to that some recent science out of Scandinavia that shows that stressed fish from acid-rain rivers are actually more prone to being affected by sea lice, so if there's an issue with sea lice from the aquaculture facilities, which may very well occur, that our fish are actually more prone to being affected.

SDC: Snow Island points out that its nearest sites are about 10km from the estuary of the West River.

HALFYARD: [00:48:04] Well, the question of distance is all relative. From the fish perspective, the salmon smolt

perspective, we know that they go out and they gradually move offshore, but they're moving around quite a bit. So a 10 km distance, for example, up the shore, is actually not that far.

SDC: Here's a heartbreaking story from the Bear River First Nation, which was always reliant on fish from its own river. The east branch of the river is blocked by a power dam, and the west branch, Franklin Creek, had been abused, degraded and emptied of fish. The community decided to restore the creek.

FRANK MEUSE: [CHIEF FRANK MEUSE, BEAR RIVER FIRST NATION] [00:48:15] We finally was able to convince a few salmon to come back up in the streams and started using some of our spawning beds, which we really got excited, saying 'Wow, we've done it! This is beautiful!' And here they were, right in front of us, using the spawning beds. And then the next spring we went back and we saw little juvenile fish, and we were just so happy, and we said, 'We've done it!' And so at some point in time we might be able to use some of those fish for our food. And then one day we went down to the brook to do a little work on it, and we realized that the river had way more fish in it than we had ever seen before. It really got us excited at first – 'Oh, look at this! There must be a big run just came in.' We just got so excited, and then someone said, 'There's something strange about that fish. It doesn't look like a salmon,' and somebody said, 'Well, I don't know, but what are they doing out there in the bay there, in the basin, aren't they doing some aquaculture fishin' or something like that, open pen fishin' out there?' And I said 'Oh, maybe that's where they come from.'

SDC: The net pen off Digby was indeed where they came from. The Bear River people ate them until a DFO officer found out and warned them against it; the fish had recently been inoculated.

FRANK MEUSE: [00:50:13] And then we found out later, as we talked, that these fish were pretty aggressive. They have to put on a lot of weight in a short period of time, they're designed to eat-eat-eat, and we realized they were having quite an impact on our brood stock.

SDC: [00:50:31] The steelhead ate all the juvenile salmon, erasing in a few days the patient work of a whole community. Net-cage salmon aquaculture is also a suspect in one of the great, unheralded fisheries collapses of recent years – the virtual disappearance of the salmon runs in the inner Bay of Fundy rivers. Fifty years ago, more than 40,000 salmon returned to those rivers. Today that number is about 200 – and the issue is not acid rain.

JIM GOURLAY: [JIM GOURLAY, PUBLISHER, RESTAURANT OWNER AND ANGLER] [00:50:58] In the Bay of Fundy, in Nova Scotia, we have 23 rivers, the wild stocks of which have simply disappeared. And the rivers are still in perfectly good shape, so whatever has happened there has happened in salt water. Credible scientific sources are beginning to point fingers of suspicion at the aquaculture industry in the Bay of Fundy because the timing was the same – as we experienced in Norway, in Scotland, in Ireland, and in British Columbia. So we believe that the open pen salmon aquaculture industry on the coast of New Brunswick in the outer Bay of Fundy has been very much a part of the collapse of the salmon in the Bay of Fundy.

SDC: The industry would point at other factors – temperatures, urbanization, power dams, farm run-off, and so on. Fair enough – but those factors also affect other regions, like the Gulf of St. Lawrence rivers, where there aren't any salmon pens, and where salmon runs are robust and growing. Science hasn't found a smoking gun. But this is a study of wild salmon populations in the vicinity of salmon feedlots around the world, by the late, legendary Dr. Ransom Myers. It shows that wild salmon survival near net pens is much lower than in other similar areas, everywhere in the world. And that clearly includes the Bay of Fundy.

SDC: [00:52:32] Not long ago, Nova Scotia promoted itself as a three-season salmon-fishing destination. Today it doesn't promote salmon fishing at all. Yet a recent study by Gardner Pinfold Economic Consultants set the

economic value of Atlantic salmon to Atlantic Canada at \$255 million.

MICHAEL GARDNER: [MICHAEL GARDNER, GARDNER PINFOLD ECONOMIC CONSULTANTS] [00:52:55] Well, if we think about the components of value, there's the angling of course, which is worth upwards of \$100 million, and the value that the public places on wild salmon as well, which would add another \$30-odd million. We look at government expenditures, we look at NGOs, we look at a range of people who are spending on wild salmon, whether to conserve it, to consume it, or simply to enjoy the recreation of salmon. So that fishery, we estimated, would be valued at upwards of \$150 million. That number has been as high as \$200 million just based on angling in the mid 1990s.

SDC: Wild salmon – even now – account for nearly 4,000 jobs in Atlantic Canada. And people would be willing to pay more in taxes for salmon restoration and enhancement.

GARDNER: [00:53:58] They collectively agreed that salmon, to this group, was worth in the order of \$25-30 million. In other words, we value salmon simply because of its existence, and we would be prepared to increase our taxes say, in the order of \$10 or \$12 a year in order to see more resources flow to conservation efforts to improving salmon habitat.

SDC: [00:54:29] This is fascinating, because of what it says about our values. The great environmentalist Paul Hawken recently observed that people all over the world are showing the enormous personal dedication to the natural world that we see on the West River Sheet Harbour – and that this huge global effort makes the environmental movement the largest social movement in the history of the world. That's a phenomenon that governments and corporations ignore at their peril. And so, if I were involved with Snow Island and trying to establish a net-cage operation on the Eastern Shore, I would be pushing for a moratorium myself. If it's possible for Snow Island to do net-cage aquaculture sustainably – a huge "if" – nobody is going to believe that until that claim has been independently verified by qualified experts. In the meantime, they'll be seen as just another participant in a net-cage salmon-farming industry, which is – to put it kindly – grasping, reckless, sly and sometimes criminal. And everyone senses that the present plans for expansion are only the beginning. If the industry has its way, every little cove and inlet from Cape Sable to Cape Canso will be clogged with salmon farms. And that's not to mention a similar vast expansion apparently being planned for the south coast of Newfoundland.

How has this salmon aquaculture expansion gone so incredibly wrong? The underlying failure – as with so many environmental issues – is a failure of accounting and critical thinking. Governments now assume that any increase in Gross Domestic Product is "growing the economy," and is a good thing – and that government is responsible for making that happen. But GDP is a bankrupt indicator. What isn't counted doesn't count -- and what isn't counted is most of what makes life worthwhile, like clean air and water, a healthy population in a healthy natural environment: none of that shows up in GDP.

Furthermore, the GDP calculation only counts the jobs and dollars that may be gained by something like aquaculture, disregarding the existing jobs and dollars that may be lost. Meanwhile the public pays the cash cost of corporate failure, while the environment pays the long-term non-cash costs. The other bewildering feature is the immovability of the Nova Scotia government. All that people are asking for is a moratorium, a pause for second thoughts, an opportunity to answer some very troubling questions.

KAREN CROCKER: [KAREN CROCKER, TOUR BOAT OPERATOR, FREEPORT] [00:57:17] We went and took all of the concerns that were brought forth by fishermen, landowners, moms, dads, doctors, ministers, right – and I don't mean ministers in the political sense [LAUGHS]– and we wrote them down, and we asked for them to give us

letters on their own, we asked for them to write letters in to government, and over the course of about 10 months we were able to really have an enormous amount of documents sent in both to our federal and provincial government, asking the strong questions. And what was so mind boggling to us was the fact that – nobody replied.

SDC: [00:58:03] We are accustomed to arrogance and paternalism from the federal Department of Fisheries and Oceans – several fishermen told us quite frankly that they believe DFO intends to eliminate independent fishermen altogether in favour of a corporate industry that would be much easier to administer. But what accounts for the lofty intransigence of the provincial government? Over and over again, people told us they couldn't believe that an NDP government – a social-democratic government -- could be so environmentally insensitive, so enslaved to corporate priorities, so dismissive of the wishes of the communities they were elected to serve. What's going on behind the scenes?

BILL WILLIAMS: [00:58:42] If they're in some sort of deal, which it looks like they are, they've made a deal with the devil somewhere, and can't get out of it.

CLYDE FISHER: [00:58:50] This is the trouble, I think, in the Department of Fisheries and Aquaculture. We've had the same deputy ministers, we have the same people workin' there year after year after year, with their own point of view. And when a Minister comes in, these people are tellin' him how great this all is, and tellin' the government how great this is all, how it's good for everything, because they don't believe in nothin' else. That's all they believe in.

KAREN CROCKER: [00:59:17] At our public consultation, one of the things that resonated most with me was Sherry Pictou, of the Bear River First Nations, she spoke up at the end and said, Where are we at today when democracy has been hijacked by big business?

SDC: Whatever accounts for the mystery of the province's behaviour, this situation is becoming mean and ugly. One fisherman told us that the cages proposed for his community would never go in the water; the local fishermen, fighting back in the only effective way left to them, would destroy the cages first. "That's where this is gonna end," he told me. "It's gonna make criminals out of honest people."

ANDY MOIR: [ANDY MOIR, CHAIR, FREEPORT COMMUNITY DEVELOPMENT ASSOCIATION] [00:59:57] It makes people so angry here that we know what the science says, they know what the science says, DFO knows goddam well, and so does Sterling Belliveau, the Minister of Aquaculture, he knows damn well, and so does his deputy minister, and all of those high-paid bureaucrats who are in that department, know full well what these things are doing to the environment, because they have seen the science and they have ignored it intentionally to line the pockets of a company that's not even from here, and also to try to grab some tax dollars for themselves. And it's shameful. It's shocking.

SDC: And if your wishes mean nothing, if your community is powerless, if government can simply erase your citizenship on an issue this important to your livelihood and your family...

KAREN CROCKER: [01:00:50] The strongest emotion you feel when you're a mom is, you want to protect your kid. And you want to know they're safe. And I don't feel safe.

SDC: [01:01:05] The bizarre thing is that we need aquaculture, and it would be easy to devise an aquaculture policy that almost everyone could support. Alanna Mitchell has been called the best environmental journalist in the world. She's the author of *SeaSick: The Global Ocean in Crisis*.

ALANNA MITCHELL: [01:01:21] So in our lifetime, fish has gone from being mainly wild to mainly farmed as a

global phenomenon, which is stunning. But it is the next logical step, and there are lots of biologists who will argue that it's the only logical step, that it's the natural progression and that we ought to be spending much more time farming fish than catching it in the wild. The problem is in the detail, and in most parts of the world, we're not doing fish farming in a very smart way. In most parts of the world, what we're doing is still catching little fish from the ocean to feed to these bigger fish that we're trying to grow in cages.

SDC: Almost everyone who takes a hard look at this industry comes up with two questions. The first one is, wouldn't it be better to raise fish in closed tanks, either in the water or on land? Minister Belliveau says the government isn't opposed to closed containment, but the industry tells him it's not viable.

SHANE BORTHWICK: [01:02:19] The other end of the spectrum is closed containment land-based commercial salmon farming. That just simply is not viable, contrary to the belief of many people. I've visited many of those facilities in Norway, and they're simply not viable at this stage.

SDC: [01:02:37] The industry says the fish would have to be packed too tightly, the cost of power to pump the water would be prohibitive, and so forth. All of which would be much more convincing if people weren't already doing closed containment, all over the world, with all kinds of different species, in all kinds of places. People are raising fish in disused warehouses in Chicago, on the waterfront in Baltimore, in their backyards. There's a guy in the Bronx raising tilapia for the table in his bathtub.

In Quebec, an outfit called Cultures Aquaponiques uses the same water to raise rainbow trout and Boston lettuce. In that system, waste equals food, just as it does in nature. The truth is that closed containment would be viable in a wink if we stopped subsidizing aquaculture companies for doing the wrong thing. The other big issue is, why salmon?

JEFF HUTCHINGS: [01:03:31] We tend to be very focussed on Atlantic salmon, but 30 years ago people weren't eating Atlantic salmon except those who lived near rivers and caught the fish themselves. So the fish farming industry has created a market for farmed Atlantic salmon; it could do so again for other species.

SDC: Hutchings mentions bass, pickerel, sturgeon, Arctic charr and various others. And in fact we can also grow salmon sustainably. This tank is made of fiberglass and styrofoam, and it's full of salmon. It's floating in an inlet near Campbell River, BC, and its operating costs are not much greater than net-cage systems. All its wastes are collected in a sump and composted into fertilizer. Agrimarine Holdings also exports these tanks to China, and sees good market prospects in Norway, the original home of the salmon-farming industry, which has now banned net-cage feedlots in certain districts. And this facility, near Seattle, raises coho salmon entirely in fresh water, far from the sea and surrounded by farmland. More than 95% of its water is re-circulated. It has no escapes, no lice, no pesticides, no disease, no untreated wastes. SweetSpring Salmon's fish have achieved SuperGreen status from the Monterey Bay Aquarium's Seafood Watch Program – and they're now being grown in similar facilities in Montana within sight of the Rocky Mountains. And just recently the Atlantic Salmon Federation has begun harvesting Atlantic salmon from Saint John River stock raised in a demonstration project at a closed-containment facility owned by The Conservation Fund Freshwater Institute in Shepherdstown, West Virginia. The fish were grown without sea lice, disease, antibiotics or vaccines in water that was 99.8 % re-circulated.

BILL TAYLOR: [01:05:21] We are demonstrating to the industry and to DFO that the technology exists, one, to raise the salmon, and two, we are crunching the numbers to prove that it's cost competitive or cost effective to do so, and the view is, as we continue down this track, to hopefully work with the industry and engage the industry and engage the federal and provincial governments so that we can take this knowledge and this new

technology and maybe transition the current industry in the Bay of Fundy and in other areas throughout eastern Canada more towards this land-based salmon farming.

SDC: [01:05:56] I can tell you, the quality is excellent. And when I asked Minister Belliveau about closed containment, I don't know why he didn't point out the leading-edge closed containment fish farm that's already in operation in Nova Scotia, within an hour's drive of his office.

We've been told time and time again that land-based, closed-containment finfish aquaculture just won't work. It's not viable, it's not profitable, it's not sustainable, the technology just doesn't exist. Well, let's go see.

Sustainable Blue began as a water filtration and recirculation company serving large aquarium operators around the world. It now raises European sea bass and sea bream in a closed-containment fish farm in Centre Burlington, on the Bay of Fundy. The company also manages a closed-containment facility owned by the Millbrook First Nation, near Truro, which produces Arctic charr. Sustainable Blue's filtration systems allow the company to pump up murky Fundy water and have it crystal-clear in a few hours – and 99.95% of the water is re-circulated. All the fish wastes are captured and treated, there are no problems with parasites or disease, and the farm produces a kilo of farmed fish from just 2/3 of a kilo of wild fish; the rest of the feed comes from other sources.

KIRK HAVERCROFT: [KIRK HAVERCROFT, CEO, SUSTAINABLE BLUE] [01:07:17] I consider this technology on this site to be world-leading; it's proprietary, developed by one individual who's been working at this for 20 years – and the most important point is that it works. If you canvass opinion, and probably even informed opinion, on the merits of closed-containment aquaculture for marine systems, I think most people who are informed on the subject would even say, 'It's a great concept but the technology just doesn't work to make it commercially viable.' So I know that what we've developed here, I can say with conviction that our technology is at a level where it is most certainly commercially viable.

SDC: Could they raise salmon?

HAVERCROFT: [01:08:06] We could certainly raise salmon here. There's absolutely no reason why not.

SDC: No reason except economics. Salmon was once a rarity, a high-priced delicacy, but today there's much more salmon growing in captivity than ever swam wild in the ocean – so salmon is now a commodity, like chicken. In the North American market, sea bass and bream are worth 50% to 70% more. But that raises another question: if your market is in, say, Toronto, and you're not raising your fish in the sea, why build your farm in Nova Scotia? Why not in a warehouse in Toronto?

HAVERCROFT: [01:08:42] If you approach general consumers and ask them for their opinion on farmed aquaculture product, they view the east coast of Canada as a nice and a very natural place to produce farmed aquaculture product. What that says to us, basically, is that there is some marketing advantage to us in selling fish in Toronto that was raised in Nova Scotia. It carries a nice connotation with it.

SDC: [01:09:13] Once again, Nova Scotia's brand is a major asset, and it's all about purity – cold, clean water, a pristine environment – just as it is for the lobster industry. Sustainable Blue's fish have received the approval of the OceanWise sustainable seafood program of the Vancouver Aquarium. And the fish is getting rave reviews from master chefs in Nova Scotia, Ontario and Quebec. It's delicious.

I'm impressed – and apparently I'm not the only one that's impressed. Recently, this facility was visited by an executive from a major Canadian food chain, who came out and said, I have seen the future.

All these leading-edge producers say that they're responding to a substantial and growing market that's willing

to pay more for safe, sustainably-produced seafood. So the most powerful player in this whole debate may be the informed consumer. Jim Gourlay is a publisher, an ardent sports fisherman and a restaurant operator. His restaurant serves only what he regards as wholesome food, locally-sourced. He won't offer farmed salmon because it won't be accepted by the kind of customer he's aiming to attract.

GOURLAY: [01:10:26] The public is increasingly demanding to know what they're eating. There are demands for more clarity in labelling, there are demands to know source of food, people want to know what they're consuming, with particular concern about chemicals – pesticides, insecticides, and so forth. The general public has been quite ignorant of the realities of salmon – salmon is salmon, salmon's good for you, Omega 3 and so forth. Fatty fish is good for you. But only if it's not laced with toxins.

SDC: [01:11:11] It's true: not many people would knowingly eat food that's been dyed and drugged, and bathed in poisons to rid it of parasites. Pretty clearly, net-cage salmon aquaculture is a primitive method of food production – the marine equivalent of slash-and-burn agriculture. In the end, though, this story is not so much about fish and food as it is about values and power. When governments have been captured by corporations, your vote at the ballot box doesn't seem to matter very much. But you also get to vote with this [\$\$ bill]. You can cast your ballot, yea or nay, here [SOBEYS] and here [SUPERSTORE] and here [FARMERS MARKET, SUSTAINABLE BLUE] and here [SALTSCAPES RESTAURANT]. And, as more consumers refuse to buy this stuff, more and more grocery chains will stop selling it. Important chain stores in western Canada and the US, like Safeway, Overwaitea and Target have already banished net-pen salmon from their shelves.

As we were wrapping up this program, the government released this new Aquaculture Strategy, which is big on generalities and short on specifics. It talks about monitoring – but not enforcement. It says that government and industry must engage in outreach and respond to local concerns. Fine words. But this document was produced without any community consultation at all – though the government did consult with the industry, in the form of Bruce Hancock and his Aquaculture Association of Nova Scotia.

And so the opposition just keeps growing. More than 100 organizations – community groups, conservation groups, representatives of tourism, recreation and the traditional fishery – have now come together in a broad and growing coalition to oppose the granting of further net-pen licenses, and, ultimately, to call for the removal of existing net pens from Nova Scotia's coast. They've learned that simply marking a ballot every few years doesn't cut it any more. If we want a better future, a renewed democracy, we'll have to forge it ourselves – in our communities, at public events, in the streets. That's actually what the people in all these community organizations are doing. This is what democracy looks like.

I'm Silver Donald Cameron. Thanks for watching. [01:13:39]