



HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

Standing Committee on Fisheries and Oceans

FOPO • NUMBER 021 • 1st SESSION • 41st PARLIAMENT

EVIDENCE

Thursday, December 8, 2011

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Chair

Mr. Rodney Weston

Standing Committee on Fisheries and Oceans

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• (1535)

[English]

The Chair (Mr. Rodney Weston (Saint John, CPC)): I call this meeting to order.

I'd like to take this opportunity to thank Professor Brauner for taking the time out of his busy schedule to join us today. Thank you very much, professor.

I'm not sure if the clerk has advised you on some of the procedures here with our committee, but generally we allow about 10 minutes for presentations by our guests. We have some time constraints for questions and answers in the interest of fairness, to try to make sure we get as many questions in as we possibly can.

Having said that, please don't be offended if I interrupt you at some time, or one of the members tries to make sure we're proceeding along as planned.

At this point in time, I would ask you to proceed with any opening comments you may have.

Dr. Colin Brauner (Professor, Department of Zoology, University of British Columbia, As an Individual): Great. First of all, can you hear me?

The Chair: Yes, we can hear you very well. I should have asked you that to begin with, I guess.

Dr. Colin Brauner: It's a pleasure to be here today.

As a bit of background, I am a professor in the Department of Zoology at the University of British Columbia. I am a biologist, specifically a physiologist, who studies how animals adapt to different environments and, in essence, how animals work. I study fish, which as species represent half of all vertebrates on the planet and live in almost every aquatic habitat. So they are a marvellous group to investigate environmental adaptations. Salmon of course are very impressive in their migratory ability and in their ability to transfer between fresh water and sea water, which is a great challenge that only about 3% of all fish are capable of doing. While much of my research program is focused upon basic research, I also conduct research related to aquaculture, particularly geared toward making it more sustainable, as is the case for many of my colleagues in zoology at UBC. Research into the biological requirements of cultured fish is really applied physiology, my main interest, and the biological requirements of fish are of course very important in intensive culture of any species.

Land-based closed containment aquaculture is technically possible, but it's economic feasibility is a topic of debate. What is clear is

that profitability is dependent on optimizing water quality and the biological conditions for growth of salmon at high densities. Recirculating aquaculture systems, abbreviated RAS, are unique in aquaculture in that they provide an opportunity to completely control the environmental rearing conditions, such as salinity, temperature, ammonia, carbon dioxide, and density, all of which can greatly influence growth. Complete control over these conditions allows salmon to be reared under optimal conditions, promoting fish welfare and product quality, maximizing growth and economy of production. While the conditions that result in adequate growth in some salmon species, such as Atlantic salmon, are reasonably well described, conditions for optimal growth for any salmon species, especially at high stocking densities, are largely unknown. Defining the truly optimal conditions that maximize growth and increase food conversion ratios in closed containment aquaculture is crucial for the long-term success of the industry.

There are currently two facilities that conduct this sort of research, the Freshwater Institute in West Virginia and Nofima in Norway, both of which conduct world class research on Atlantic salmon requirements. To provide this sort of information catered to the specific needs of British Columbia and Canada, Western Economic Diversification has partnered with UBC, with an application pending to Tides, to develop an initiative for the study of the environment and its aquatic systems, abbreviated InSEAS. InSEAS is a world-class aquatic research facility currently being built and consisting of a team of internationally recognized fish biologists and physiologists. The overall goal of InSEAS is to define water quality parameters, like salinity and temperature in particular, but also ammonia, carbon dioxide, oxygen, pH, and other conditions like density and alternate diets, all of which result in optimal growth performance and the welfare of salmon at all life stages of development, from juvenile to smolt to adult, and all of which may have different requirements for a given species or strain of choice for land-based closed containment aquaculture. This information can then be used in economic forecasting of the costs and benefits of using these optimal, or maybe sub-optimal, conditions in land-based closed containment aquaculture.

• (1540)

For example, relatively little is known regarding the optimal salinity for rearing salmon in closed containment aquaculture. Salmon regulate their blood electrolyte levels at approximately one-third seawater, a process that requires energy. Here, it has been proposed that if electrolyte regulation is expensive energywise, with some estimates as high as 20% of resting metabolism, optimal growth may occur at an intermediate salinity between fresh water and seawater values. There is interest in rearing salmon at intermediate salinities in closed containment aquaculture in B.C. However, there have been no systematic studies designed to determine what salinity would be best, which has an influence on site selection, system design, and profitability. If a chosen salinity improved growth and/or feed conversion by 20%, this would have great significance for fish production, which would have to be balanced by the cost—or possibly the savings—of rearing fish at that salinity.

InSEAS is designed to derive the relationship between salinity, growth, and other indicators of performance in any salmon species through the use of seven independent RAS systems, each with replicated tanks. A similar approach can be taken for temperature, where we know that different species, and even strains of that species, have quite different optimal temperatures, which remain largely unresolved.

All research performed at InSEAS will be conducted in partnership with industry and government agencies. Through membership of the InSEAS Scientific Facilitation Board, the aquaculture industry will assist InSEAS researchers in identifying knowledge gaps that potentially limit profitability of land-based closed containment salmon farming. We will partner with industry through applications to research partnership programs, such as the Natural Sciences and Engineering Research Council, NSERC. However, these do not currently have programs specifically directed toward aquaculture and, more specifically, closed containment aquaculture. They also require industrial support, which is difficult in the current climate.

A source of funding specifically geared to closed containment aquaculture would greatly enhance the rate at which information can be generated and disseminated to industry to increase Canada's competitiveness in the marketplace for the emerging technology of land-based closed containment aquaculture.

Thanks very much.

The Chair: Thank you very much, Professor.

I'm going to start off with our line of questioning.

We're going to go to Mr. Sopuck first.

Mr. Robert Sopuck (Dauphin—Swan River—Marquette, CPC): Great.

Thank you very much, Dr. Brauner. I really appreciated your presentation.

I noticed that you appear to have done some work on the effects of open aquaculture on wild salmon stocks. Am I correct?

Dr. Colin Brauner: The two areas we've mostly focused on are the effect of alternate diets—that is, increasing plant-based food

sources in diets for rearing salmon—and looking at the effect of sea lice on juvenile pink salmon, which has been an area of concern in British Columbia in particular. So through our work on sea lice, I guess there are implications for ocean stocks.

• (1545)

Mr. Robert Sopuck: Do you feel that you're qualified to speculate on the effect of net pen aquaculture as it's practised off the coast of British Columbia and its effects on wild salmon stocks?

Dr. Colin Brauner: I think the real challenge is that we need a lot of information to make inferences on how wild stocks are being affected. In order to study the impact of something like aquaculture or any anthropogenic activity on the environment, we must first have a thorough understanding of the baseline conditions. This can only be achieved with continuity in research funding to appropriately monitor the environment in space and time. Of course, there are a lot of things that need to be thought about in that regard, but once we know what the baseline conditions are, we can start looking at how any industry impacts the environment.

I think one of the biggest challenges in assessing the impact of current aquaculture practices is not really having sufficient information on which to draw solid conclusions. There's always a danger in looking at correlations of inferring cause and effect without fully understanding the system you're looking at. What we need to get at that is funding to maintain the capacity to monitor, but also to quickly deploy scientific expertise to address critical issues as they arise, because they do vary depending on the system.

Mr. Robert Sopuck: I couldn't agree more with your caution that we shouldn't mistake correlation with cause and effect. What we've heard from many of our witnesses, from what we loosely call environmental activist groups, was their immediate and positive assertion of the negative effects of aquaculture, as if the question had been completely settled and now it's time to move on and deal with it. So your caution as a scientist is greatly appreciated.

As for your research on food sources for aquaculture, I see you've done some work on replacing fish oil with canola oil for growth. What percentage of the feed can be canola oil, or some other plant-derived protein?

Dr. Colin Brauner: That's great.

Our research has focused solely on the oils. Other people have been looking at proteins, so both of them are important. In terms of our work on oils, we were interested in chinook salmon early in development, and we found that we were able to replace up to 75% of the anchovy oil in the diet with canola oil, and there was no negative effect on growth, no negative effect on swimming performance and their ability to transfer from fresh water to sea water, and their ability to tolerate low oxygen tensions. We looked at a whole list of performance indicators and we were really quite surprised that we were able to change that much of the lipid. Of course, that has large implications for aquaculture, because much of the feed comes from wild fish ground up into pellets. If we can make those pellets go three or four times further, in terms of lipids at least, that will feed quite nicely into the sustainability of aquaculture.

Mr. Robert Sopuck: To me, that's a remarkable achievement. I represent a rural prairie constituency that has thousands and thousands of acres of canola grown every year, so it's nice to hear of another use for it.

In your view, how limiting is the supply of wild fish protein as feed for aquaculture? Is there a ceiling beyond which the industry can't grow, in terms of accessing wild fish protein as feed?

• (1550)

Dr. Colin Brauner: I think that's a great question. If we think of the wild stocks that currently exist, many of them are being fished close to maximal capacity. Some are in decline, others are doing reasonably well. But I think we are approaching a point at which we are limited in the amount of fish that we can draw from the ocean to, in this case, convert into fish pellets. Anything that can be done to make that fish protein and lipid go further through alternate lipids, or improved growth efficiency, is what I think the industry is very interested in for this exact reason. The cost of fish proteins is going up as well.

Mr. Robert Sopuck: Is there something inherent in salt water fish protein that makes it uniquely suited as food for aquaculture? As you know, there are thousands of kilograms of what we call rough fish in fresh water Canada, the carp and the white suckers and, of course, the Asian carp and so on. Is there any potential to turn those species into fish protein as part of the feed stock for aquaculture?

Dr. Colin Brauner: I would imagine there would be. One of the bigger challenges of eating an animal that lives in a very different environment is that its composition could be very different. But fresh water fish have a fairly similar composition to sea water fish in terms of their ion content, for example, which is something we're quite interested in. The specific fatty acids, for example, that are building blocks for things like omega-3 fatty acids that we know a lot about, and omega-6 fatty acids, may differ, but it seems to me that it would be a completely reasonable line of research to at least pursue. If we can feed them plant-based protein, I would think a fish-based protein would only be better.

Mr. Robert Sopuck: My time is up, but I would be very interested in following up with you on that at a later date.

Thank you very much.

Mr. Chair.

The Chair: Thank you, Mr. Sopuck.

Mr. Donnelly.

Mr. Fin Donnelly (New Westminster—Coquitlam, NDP): Thank you, Mr. Chair, and I'd like to thank you, Dr. Brauner, for being here at committee and providing your testimony today.

I was wondering if you could tell us why the university is interested in examining closed containment.

Dr. Colin Brauner: That's a great question. There are a number of reasons.

The researchers more than the university per se are interested. Several of us are really interested in what limits the performance of fish. We do a lot of work studying how animals adapt to different environments, and the possibilities are quite amazing.

Something like closed containment is interesting because here you have a system where you can manipulate the environment a fish lives in and look at the effect of that environmental manipulation on the animal, and why certain things limit performance. For example, in the case of salinity, we're very much interested in the evolution of salinity tolerance and how fish move from fresh water to sea water, and that kind of thing. We're also interested in why performance is ultimately limited at some salinity in different species.

There's a basic research component that we're interested in, but the other thing is that it's a way of applying our knowledge to something that's of direct relevance to the public. So I think that most of us believe that sustainable aquaculture, or any way we can increase the sustainability of aquaculture, is a good thing.

The role of aquaculture—sorry did you...?

Mr. Fin Donnelly: I was just going to jump in. I have a number of questions I could fit in my seven minutes, if I could.

Dr. Colin Brauner: Yes, absolutely.

Mr. Fin Donnelly: Talking about sustainability, I don't know if you can answer this, but if you can make a guess or offer a position or an opinion, what in your opinion is the most sustainable fisheries method if you had to choose from three: the wild caught; the current open net pen method of aquaculture; or closed containment aquaculture, let's say using the RAS system?

• (1555)

Dr. Colin Brauner: Sure, and that's a great question.

Part of what we've been thinking a lot about is that with increased populations, we need more protein, and fish is a valuable source of protein. If we want to provide that protein source through fish, then you have the wild fisheries or you have aquaculture. I think most people feel that the wild fisheries are currently being fished to their maximum capacity and, in some cases, beyond.

The ability to draw more protein from that source is not an option. In well-managed systems, I think that's a nice, sustainable form of fish production, to get to your question. If we want to increase protein production beyond what the wild fishery can supply, then it has to be aquaculture, and then the question is what is the more sustainable way to go?

Industry responds a lot to public perception and, clearly, something like aquaculture is a hotly debated topic. Often people choose a side: It's either good or bad. I'm a firm believer that there's a huge middle ground that that needs to be discussed. I'm always a bit disappointed in how the media focuses on whether it's good or bad. Closed containment, in this form today, is moving into that grey area to get at more sustainable aquaculture.

In open net pen culture, a lot of practices are changing to improve its sustainability, which is a great thing. Certainly looking into and working with closed containment is a great way to go. There are pros and cons in both. Closed containment has a much higher energy requirement than open net pen farming, but again you have the ability to regulate environmental conditions very tightly, and that can promote fish welfare.

To answer your question on which is more sustainable, I think it's difficult to say. It's early days with closed containment, and what's happening with it is exciting. It has a lot of potential, and I think we'll learn a lot as we go. That's one of the things that has us interested in closed containment. A lot of the public perceptions of the negative aspects of net pen aquaculture can be satisfied, and we'll have to see what sort of challenges appear as closed containment aquaculture moves forward.

Mr. Fin Donnelly: Okay. Thank you.

This committee is hoping to get down to the Freshwater Institute and take a look at what they have. What would you recommend the committee look for or ask about when seeing what their facility has to offer?

Dr. Colin Brauner: First, the facility is quite an impressive one. I think that one of the biggest challenges, as you've heard from many people, is probably the cost of closed containment. Many of the people at the Freshwater Institute are engineers and are very well versed on the proper technology or the cutting edge technology on cost. So I think the cost of designing a system would be an important question to ask.

They're very interested in using fresh water. Their system is only set up for fresh water rearing, but they've been able to rear Atlantic salmon in fresh water. So getting some feedback on what the pros and cons are of rearing Atlantic salmon in fresh water, I think, would be a very useful line of questioning, as well as asking about density. They've been doing some great work on density and are able to rear fish at much higher densities than other people thought possible, largely because they have such nice control over their water quality.

Mr. Fin Donnelly: Great. Thank you very much.

Perhaps I might squeak in one last question. Specifically looking at aquaculture systems, if you were to look at the open and closed systems, which one would you say better deals with pathogens and disease?

Dr. Colin Brauner: Certainly, one of the debated topics within closed containment is that you have tight control over disease, and if you're treating the effluent that leaves that facility, you have the potential for no disease entering the environment, which is really quite good.

In terms of animals that come into the facility, they're generally hoped to be disease-free. So I would imagine closed containment would have a better capacity for regulating release of disease—and, certainly, that is something that a lot of people are excited about with closed containment.

•(1600)

Mr. Fin Donnelly: Thank you very much.

The Chair: Thank you, Mr. Donnelly.

Mr. Leef.

Mr. Ryan Leef (Yukon, CPC): Thank you, Mr. Chair, and through you, thank you to the witness for attending today.

You mentioned a bit about the balance and grey area and the unfortunate public perception of constantly focusing on negative aspects of one thing or another. When you talked about working in partnership in some of the forward studies on this, you were

including industry as an involved partner in the information you're getting.

I'm wondering how industry is chosen. I'll lay out what I've heard, at least in testimony at committee, so it doesn't seem like I'm biased or trying to slide in a backhanded question on this. I'll be honest that I've heard very polarized testimony at times and we have heard industry say some very different things from other groups. Does the industry involved include open net farming as well as closed containment? I guess I'm asking if industry, which has a polar view to some of the things we've heard, is included in those kinds of forums?

Dr. Colin Brauner: That's a great question.

As a university, we're interested in all sides of the equation. Our focus has mostly been in British Columbia, because that's where we're based, and we interact with basically all aspects. So we include industries that are predominately open net pen, which are generally receptive to at least the concept but wary about the economics of it, through to other groups that are very interested in closed containment as a sole source for aquaculture. We're quite broad about whom we would like to interact with, because we're approaching this very objectively. So that's our view on this.

Mr. Ryan Leef: Thank you for clarifying that and, certainly, your testimony today has highlighted objectivity, which we greatly appreciate.

I'm going to ask if you have an answer to the following. What volume or density of fish in a closed containment, or even an open net environment, would start to have an impact on the performance of fish?

Dr. Colin Brauner: That's a great question and, obviously, people are very interested in the answer. From the people I've talked to who are doing research on density effects on fish performance, it seems the biggest determiner of density effects is actually indirect, through water quality. So it seems that as long as you can keep the water quality good, you can have quite high densities. Open net pen systems, because you don't have control over the incoming water, tend to be at lower densities. In closed containment the number that seems to recur at a lot of the workshops that we go to is around 40 kilograms per cubic metre. But at the Freshwater Institute, for example, they've been rearing fish at even 80 kilograms per cubic metre and finding really quite good performance.

So it seems that as long as you have good control over the water quality, density per se may not be an issue at those sorts of densities.

Mr. Ryan Leef: Obviously that leads to some profitability considerations. I'm just wondering if those densities, from your experience, create any sort of social consideration for this. That's partly what's influencing a lot of decisions made by the market.

Do we start to reach densities that are causing social concern, with the technological advances of a closed containment set-up?

•(1605)

Dr. Colin Brauner: When you say “social”, do you mean in terms of the public or in terms of the fish in those systems?

Mr. Ryan Leef: In terms of the public. Are people concerned about mass farming densities of fish?

Dr. Colin Brauner: Right, yes. It's a very interesting question and I think it depends on the species you're working with.

For example, species of Arctic char actually grow best at really high densities of up to 200 kilograms per cubic metre, which is absolutely incredible. That's 200 kilograms per 1,000 litres. That's one part in five fish, and they actually get stressed at lower densities. So I think it depends a lot on the species. Salmon are schooling animals. They're used to fairly high densities. We don't know enough about density effects on social hierarchies and things like that. That's an area of current interest and something that will probably be investigated in the not too distant future.

Mr. Ryan Leef: Great. I think I have time for a final question here.

Do you know if there are any genetic limits to fishing? We talk about protein enhancements. We're getting much better at what we do, across the board, controlling the environmental conditions, controlling the water quality. Is there any genetic limitation to what a salmon can grow to, and if there is, do we understand any of ramifications of that? We start getting into the world of basically injecting steroids into our salmon. I don't mean that's what we're doing, but that kind of analogy. Do we know of any limits?

Dr. Colin Brauner: Yes, probably the world expert on that is Bob Devlin at the Department of Fisheries and Oceans in West Vancouver. He has been very interested in growth hormone transgenic fish. By introducing a growth hormone into an animal, you can greatly accelerate the rate of development. But one of the really interesting things he has found is that rainbow trout have been domestically reared for over a century, and that just through animal husbandry there has been selection for the highest growers. So domesticated rainbow trout grow much more rapidly than wild rainbow trout, and through that husbandry, it seems that we've come more or less to a limit of how fast rainbow trout can grow. If you introduce transgene into wild rainbow trout, they don't get any bigger than those selected for fast growth through husbandry.

So I think there is an upper limit to growth that is just a physiological limit, and there is some understanding of that—although there's always a lot more to be learned.

The Chair: Thank you very much, Mr. Leef.

Mr. MacAulay.

Hon. Lawrence MacAulay (Cardigan, Lib.): Thank you very much, Mr. Chair.

Welcome, Doctor. It's a pleasure to have you at the committee. I certainly appreciate your middle-ground view. We have had witnesses, certainly, who were either on one side of the issue or the other.

First of all, having canola oil replace fish oil is interesting. Does that have any effect on the taste of the fish? Is anybody producing

this on a commercial scale for fish farms, whether closed containment or open net?

Dr. Colin Brauner: That's a great question.

Most fish feeds now have some vegetable proteins and vegetable lipids in them, so it's common practice, to some degree. One of the concerns is whether you are changing the nutrient composition of the animal and how does it taste? What the industry generally does is this. A few months before an animal will be harvested for market, it is put on finishing feed, and that feed then influences both the flavour as well as the fatty acid composition of the animal. Within a few months you can convert an animal back to what it would have been had it been reared on that diet all its life. So it's quite an interesting practice.

Hon. Lawrence MacAulay: So the food is being manufactured on a commercial basis. Also, you have likely tried the fish without removing them from the canola oil and it would definitely affect the taste. Is that right?

Dr. Colin Brauner: To be honest, I don't know. We haven't eaten the fish. The fatty acid profiles were different. They weren't as different on canola as we expected them to be, so it appears that they do have some ability to compensate for that non-native diet, but we never did eat them, so we actually don't know.

•(1610)

Hon. Lawrence MacAulay: So you have never produced the fish using canola oil only and then had them tasted. It would be interesting to see how that would affect their taste.

Dr. Colin Brauner: Absolutely.

Hon. Lawrence MacAulay: Anyhow, I would like to ask you this, being that you're a middle-of-the-road presenter. We've had lots of presentations on sea lice. As you and the committee are fully aware, the open net concept means a lot of jobs, and we've also heard some pretty heavy views against the open net concept. But I'd just like you to comment on the resistance of Slice for sea lice and how do you think that will affect open net fish farming? And how do you think it affects the environment?

Dr. Colin Brauner: Yes, that is a great question and a complicated one.

The whole issue of sea lice is an interesting one, in that you are dealing with an extremely complex system.

Hon. Lawrence MacAulay: We've heard a lot of discussion on just how bad it is. I'd just like to hear your view.

Dr. Colin Brauner: Okay.

One of the things that we were really interested in with regard to sea lice is this. A lot of the studies on the impact of sea lice are correlative studies, and we wanted to know what the specific effect of sea lice was on these juvenile, out-migrating pink salmon, which are of concern. What we did was to rear pink salmon, both wild-caught pink salmon and pink salmon leaving the river system, exposing them to different sea lice densities, from one to four lice per fish. We found something interesting. When the juvenile pink salmon were very small, less than about 0.5 grams, they were more sensitive than when they were larger than 0.5 grams. So we adopted a no-effect threshold, where we started to see effects of even one louse on the swimming performance of a juvenile pink salmon of less than 0.5 grams. But in our studies where we had fish exposed for up to a month, with one to four sea lice, we only experienced about 6% mortality. Mortality was not nearly as high as we expected, and once fish were greater than about 0.5 grams or 0.7 grams and started to develop scales, they seemed to be much more able to defend themselves against sea lice.

There is a lot of work that needs to be done to get at that exact question of how much of an impact sea lice have on the juvenile pink salmon, because we did different studies that found very different things. And the more studies that are done, the greater the body of evidence we can put together to really make an informed decision on what the impacts are.

Hon. Lawrence MacAulay: Thank you very much, Doctor. You would be indicating that we need more research money in this area, and I would certainly agree with you.

•(1615)

Dr. Colin Brauner: Absolutely.

Hon. Lawrence MacAulay: I've stirred up the government a bit here.

Voices: Oh, oh!

Hon. Lawrence MacAulay: On the open net concept, do there need to be more regulations in place? It seems to me that the open net concept is going to be here for quite a while. Do you think there need to be more rules, more regulations? We've heard all kinds of stories that it's not all that bad. What do you think needs to be done? This is a big industry involving a lot of money, creating a lot of work. Do you feel something should be done in order to give it a better face?

Dr. Colin Brauner: Yes, that's a great question.

With any industry there is always going to be some impact. The question is what level of impact is acceptable to society. How we come to a decision on what is and what isn't acceptable is a challenge.

I've worked in conjunction with a number of different industries and I've always been impressed with how responsive they are to public perception issues, for obvious reasons. Very often, they are willing to get involved to find out what the nature of the problem is so they can be part of the solution.

What is the best way to move forward? Industries develop with time, as markets change and technology changes. I think we need to be careful not to completely stifle things, but at the same time be reasonable in terms of the environmental impact. I think the main

thing is that if we don't know what the impact is, then it's very difficult to decide what should be regulated. First of all, I think a lot more has to be learned about the baseline conditions. So often there is so little data and if you don't know what the baseline is, it's very difficult to try to infer what the effect of any industry is.

Hon. Lawrence MacAulay: Thank you very much, Doctor.

Of course, you're indicating again that we need more research dollars. With some of the perceived difficulties with the open net concept, do you see certification as playing a role. We hear about eco-certification and we hear that the large food chains are going to decide what will and will not be certified. Do you see that playing a role?

Dr. Colin Brauner: I think for sure that will play a big role in public perception. People are interested in buying a product that satisfies their philosophy. So whatever the certification is, and as long as it's an objective certification by a body not directly linked to the industry that's producing it, I think it will go a long way, in that the market sets the demand and industry responds to that.

But more and more, Ocean Wise is a very common certification that a lot of people feel strongly about. So this sort of certification will play a greater role and, hopefully, self-correct many of the challenges we're faced with.

The Chair: Thank you very much, Professor.

On behalf of the committee, I want to take this opportunity to thank you for taking the time to appear before us and to answer our many questions and to make a presentation. It certainly was greatly appreciated. Thank you, once again.

Dr. Colin Brauner: Great. It was my pleasure. Thank you.

The Chair: We'll take a short break while we get ready for our next presentation.

•(1615)

(Pause)

•(1630)

The Chair: I call the meeting back to order while our witnesses are getting situated.

A notice of motion has been filed by Ms. Davidson. I will ask Ms. Davidson if she wants to read her motion at this point.

Mrs. Patricia Davidson (Sarnia—Lambton, CPC): Okay.

It reads as follows:

That the Standing Committee on Fisheries and Oceans conduct a study on invasive species that pose a threat to the Great Lakes system, in order to better understand the overall management of the Great lakes fisheries, with emphasis on: Asian Carp and the potential impact on commercial and sport fishing industries across the Great lakes;

To review current and future strategies to deal with the on-going risk from Asian Carp and other invasive species like the Northern Snakehead fish and lamprey Eel;

An overview of the dispute resolution mechanisms in place for bilateral issues related to invasive species risk management practices for the Great Lakes system (Canada/US.)

The Chair: Thank you, Ms. Davidson. The clerk has informed me that the motion is in order. I've asked the clerk to set aside some time on Tuesday at our committee business to discuss the motion. Thank you.

I'd like to welcome our guests here this afternoon.

Ms. Stewart, thank you for joining us. I assume the clerk has made you aware that we have certain time constraints that we operate under. We generally allow about 10 minutes for opening comments and presentations. The members are constrained by certain time-frames for questions and answers as well. Please don't be offended if I interrupt at some point in time. It's all in the interests of fairness and ensuring that all members have the opportunity to ask their questions and have their questions answered.

Having said that, I would like to ask you at this point in time if you would like to proceed with any opening comments you might have.

•(1635)

Ms. Catherine Stewart (Campaign Manager, Salmon Farming, Living Oceans Society): I would, thank you very much. As you said, my name is Catherine Stewart. I work with the Living Oceans Society. I'd like to thank the committee for this opportunity to speak with you about this really important issue and thank you for your efforts in studying it.

We also work with a coalition for aquaculture reform. I know you've spoken to a couple of my colleagues, including Kelly Roebuck the other day, who works at the Living Oceans Society; and David Lane from the T. Buck Suzuki Environmental Foundation, whose group is also a member of the coalition. I just wanted to start by emphasizing the name of our coalition, the Coastal Alliance for Aquaculture Reform. All of the member groups of CAAR, which started in the year 2000, came to the table with the firm belief that aquaculture can make a valuable contribution to society, that there is a need for fish protein in the world, and that aquaculture is an ancient practice in many regions and can be done in a more sustainable fashion.

Our concern is with how we're performing aquaculture—in British Columbia particularly—and where. With regard to how the fish are raised, we believe that open net cages are a problem, and with regard to where they are raised, we believe that open net cages on wild salmon migration routes are an issue of serious concern.

I know the issue of scientific proof has come up frequently. I'm not a scientist; I studied English at the University of Winnipeg, but I've had the privilege over the years of working with many scientists. If there's one thing I have learned from all of them, whether they work for industry, government, or academia, it's that scientific proof is extremely hard to come by and very rare. Generally what scientists are looking at in making decisions and recommendations is the weight of scientific evidence. There will always be two sides to the equation. You may have 2,500 climatologists saying that human-caused climate change is an issue, but you'll always have others who will question whether that is the case.

We believe that in the case of open net cage salmon aquaculture, the weight of evidence is abundant that it is having negative impacts on ecosystems and wild salmon stocks. I'm sure you're familiar with the study that was done by Ransom Myers and Jennifer Ford at Dalhousie University that looked at aquaculture operations around the world and found declines in wild salmon everywhere that net cages were operating.

I think it's also important to stress that DFO does acknowledge the risk. If we look at DFO's wild salmon policy, on page 31, it states,

It is recognized that aquaculture operations, as with other human activities, pose risks to the natural environment. These potential impacts to wild salmon include: the chance of disease and parasite transfer, competition and genetic effects of escapes, and physical disturbances in near-shore environments.

It also states, on page 34,

If specific Conservation Units of wild salmon are threatened by development proposals or other human activities, corrective actions will be taken under Section 35 (fish habitat) of the *Fisheries Act*, or longer-term solutions will be pursued....

We heartily applaud the committee's efforts to study those longer-term solutions. I think it's also really important to recognize that DFO openly acknowledges the problems associated with aquaculture in international fora. For example, in the department's report to the North Atlantic Salmon Conservation Organization in January 2010, it states, and I quote,

Aquaculture information is mainly provided as it relates to marine-based activity, as it is widely accepted that this component of salmon farming comprises the primary risks to wild salmon.

That's DFO's own language. So it's widely accepted. It would be hard for it to pretend otherwise, particularly in meetings with governments like the Government of Norway, which not only openly acknowledges the risks associated with net cage aquaculture and their impacts on wild salmon but has also designated two river and fjord systems as national salmon rivers and prohibited aquaculture activity in those areas.

What we're doing in Canada right now is trying to manage the risks associated with net cage salmon farming. We're spending millions of dollars to do that. Risk management is an extremely tricky business. One of the things we do know is how little we know, how much there is about the natural world and functioning ecosystems that we don't truly understand. Nonetheless, the Government of Canada and the provinces have incurred, and are incurring, substantial costs in trying to manage the risks of net cage aquaculture, in conservation and protection and enforcement activities, fish health monitoring and analysis, on-site inspections, data collection, reporting, and all the costs associated with the investigation of periodic offences.

•(1640)

Then there are the invisible subsidies. I think it's important to acknowledge those as well when we're trying to look at the balance of costs between closed containment and open net cages. For example, for the last 20 years or more, DFO has been funding research into transgenic salmon by Bob Devlin at the West Vancouver laboratory. Growing a bigger fish faster is not in the interests of the conservation and protection of wild salmon, but rather a benefit to the aquaculture industry.

Another hidden subsidy to the net cage industry is externalized costs, and I know Ms. Murray has addressed this to some degree previously. The deposition of waste into our marine ecosystems is basically a cost that the current net cage industry does not have to address. It's absorbed by our ecosystem; it's absorbed by the citizens of Canada. There are no end-of-pipe fees or fines for smothering the benthic environment or for wastes that can be carried by tides away from the farm but deposited on clam beaches that were harvested by first nations for generations in the past.

These externalized costs are borne by us, and they include the deposition of chemicals, and antibiotics in waste feed, and copper-based antifoulants to prevent fouling of the nets. They may very well be having a profound effect on species and ecosystems, and we're learning more and more about what those impacts are. A recent study published by the Government of British Columbia found elevated levels of copper and zinc in the benthic environment adjacent to a farm on the west coast of Vancouver Island that had not been in operation for 15 years. So these effects can be long lasting as well.

Also, when we look at the relative merits of closed containment and open net cages, we need to look at the way the Canadian government and provinces have been supporting the aquaculture industry through taxpayer-funded granting programs and government run initiatives, including \$9.4 million for the Atlantic Canada Opportunities Agency for the development of aquaculture on the south coast of Newfoundland; \$600,000 a year for the aquaculture partnership program; \$14.4 million over four years for Aquanet, which has now expired; and recently more than a million dollars for CAIA, the Canadian Aquaculture Industry Alliance, to generate awareness and new sales of aquaculture products.

Even our government officials are spending taxpayer dollars to assist industry marketing efforts. I totally agree with Canadian government support for Canadian business. What I struggle with is that when businesses are having a negative environmental impact and citizens groups like CAAR make an effort to inform buyers of the non-sustainability of the product, and then the director of the aquaculture program for DFO flies to California to meet with Safeway to tell them that our information is inaccurate and that the aquaculture industry in Canada is entirely sustainable. We don't think that's necessarily the case, and we don't think it's the best use of taxpayer dollars.

Another example was the granting of \$250,000 to a major B.C. aquaculture company for research on kudoa. Kudoa is not a problem for the ecosystem; kudoa is a problem for the industry, and we feel those costs should be borne by the industry.

In weighing the relative merits and costs of the two systems of aquaculture, we would strongly encourage the committee to assess the overall costs to the federal and provincial governments of management, oversight, enforcement, grants, subsidies, marketing support, and the externalized costs as well.

Closed containment operators are by and large internalizing those costs. If we switch to closed containment, DFO is not going to have to deal with escapes, with sea lice and disease transfer to wild salmon, predator deaths, waste deposition in the marine environment, and toxic residues. The moneys currently allocated for that, with the kind of enforcement and monitoring and public relations

that are required, could be transferred to supporting the development of a new and innovative industry, particularly the development of a product that the marketplace is increasingly demanding.

• (1645)

I know there has been a lot of discussion about the value of jobs in coastal communities. I've spent a lot of time on the B.C. coast in small communities, and I know how difficult it is to find employment and industries that can function in those communities. But I would also encourage the committee to look very closely at the claims of the number of jobs aquaculture currently supports in British Columbia. The provincial committee on sustainable aquaculture hired an outside consultant to do an assessment of employment, and concluded that there were approximately 2,900 direct, indirect, and induced jobs in the salmon aquaculture industry in B.C. The B.C. Salmon Farmers Association and the industry have been promoting a PriceWaterhouseCoopers study that claims there are 6,000 jobs. But that study is not public. Unlike the SCSA study, which people can scrutinize to see how the conclusions were reached, the PriceWaterhouseCoopers study keeps repeating the figure of 6,000 jobs—double the SCSA's—without revealing how that figure was arrived at.

We're curious about how they reached that number. Marine Harvest is the largest aquaculture company in the world and the biggest one operating in British Columbia. It employed approximately 540 people, but they've just announced that about 60 of them will be laid off, including management, administration, finance, and executive staff. So when you boil it down, there are not that many jobs on the farm-site itself. This is not to undermine the value of those jobs, whether they're farm-site jobs or office jobs. But we want to strongly encourage the committee to implore the aquaculture industry to release the PWC report and let us all have an accurate assessment of what the job benefits are. You've heard from other witnesses that there are job benefits in closed containment.

The Chair: Ms. Stewart, I have to interrupt you there. Possibly we can cover more of your points through the questioning. At this point, I'd like to move to questions with members, if you don't mind.

Ms. Catherine Stewart: Not at all.

The Chair: We'll begin with Ms. Davidson.

Mrs. Patricia Davidson: Ms. Stewart, thank you for being with us this afternoon.

We have heard a lot of conflicting evidence as we've been doing this study. It's been extremely interesting. We've heard a lot of comments vehemently expressed by one side or the other, without a whole lot of middle ground. I have to say, though, that we had a good presenter before you who covered a good deal of middle ground, which I think the committee will be able to use.

It's interesting to hear the different views from different groups. I was interested in what you were saying about employment. One of the things that we've heard loud and clear on both sides is that open nets are mainly located in small coastal communities, where they are often the only source of employment. We've also heard loud and clear that if we go with closed containment, there's a high probability that these operations will be moved farther inland. They'll be moved closer to the population points, away from the small communities. The coastal communities will lose that employment, which in many cases is the only employment they have.

Could you elaborate on what your group feels about this?

•(1650)

Ms. Catherine Stewart: Certainly, we acknowledge that there are risks. There's no telling with any new and innovative industry where it will end up going. None of us, I think, can really predict the future, so there are going to be differing opinions about how that future will unfold, for sure.

I think we need to look at the current closed containment proposals. The 'Namgis, for example, are on the north coast of Vancouver Island in a small coastal community. My group, CAAR, has been working closely with Marine Harvest on their pilot project proposal, and they have identified sites on the north end of Vancouver Island as well. So what we see in the examples that we have are some operations in the lower mainland area, such as Pitt Meadows and the Fraser Valley, and some that are still looking at the more rural communities on the coast. I think a mix of both is entirely possible.

I think there are opportunities for marketing, not only in potentially fetching a premium for closed-containment-reared salmon but also with branding opportunities for first nations. I know there are first nations on the central coast who have voiced an interest in closed containment opportunities in their communities, and they're looking at it being a unique product that can carry a first nations brand. That would be another way of marketing it, with innovation supporting employment in coastal first nation communities in the Great Bear Rainforest, which is a marketing brand in and of itself.

I think we'll see both paths develop, but I would hope that it wouldn't be to the exclusion of one or the other.

Mrs. Patricia Davidson: One of the themes that we've heard over and over again is the fact that, whatever the operation is going forward, it needs to be sustainable. Does your group subscribe to that as well?

Ms. Catherine Stewart: Absolutely. I first got involved—

Mrs. Patricia Davidson: Could you define “sustainable” as your group sees it?

Ms. Catherine Stewart: I don't know if there's an acceptable definition of sustainable in anybody's world. But I think that increasing responsibility for the impacts of your operation, and, as much as possible, internalizing those impacts, would put us on the path to more sustainable operations, for sure. Rather than discharging waste into the ocean, deal with the waste, and possibly profit from the waste. All of those component pieces would add up to making the industry more sustainable.

I think it's fair to acknowledge there's a fundamental issue of sustainability around raising carnivores. Carnivorous fish need to consume species such as salmon and a certain percentage of wild fish meal and oil. The industry is working hard to bring that feed-conversion ratio down to one kilo of input to one kilo of output of protein, but they're not there yet.

Mrs. Patricia Davidson: Could an open net operation do things that would make it more sustainable? Could it reach what you would consider sustainability?

Ms. Catherine Stewart: At current levels of production, I personally don't think that's possible. I think part of the impact that we have to address is not just the technology itself, but also the cumulative impacts of multiple farms in given areas and the location of those farms on wild salmon migration routes. All of those factors contribute to having an impact that puts it into the unsustainable column.

While acknowledging that the industry is certainly on more responsible footing than it was 20 years ago, I don't think you can ever really overcome some of the hurdles or inherent flaws in the technology itself.

Mrs. Patricia Davidson: Do I have more time? Okay.

Just very quickly, then, if you go to a full closed containment system, all located on land, and you've got these containers, what would their lifespan be? What is left when that lifespan is done? What kind of environmental impact would you have from that?

•(1655)

Ms. Catherine Stewart: I honestly can't answer that question. I think that would be well addressed to some of the folks who are actually operational experts. My understanding, from what I've heard, is that it would be 20 to 25 years, possibly quite a bit longer. Perhaps a way of answering that would be to look to some of the hatcheries that have been in operation for an extended period of time, because closed containment technology is really a bigger hatchery.

The Chair: Thank you very much.

Mr. Donnelly, I believe you're going to share your time with Mr. Cleary.

Mr. Fin Donnelly: Thank you, Mr. Chair. Indeed, I'll share my seven minutes with Mr. Cleary.

Ms. Stewart, welcome, and thank you for providing your input and testimony to the committee.

Picking up on Ms. Davidson's questions, in your opinion what form of fisheries method is the most sustainable? If I were to give you three options, wild caught, the open net pen as it's currently done, or the closed containment systems, which would you say is the most sustainable form?

Ms. Catherine Stewart: That's a tough question to answer, Fin, because I think we have to look...

When you say wild caught, are you talking about bottom draggers or about selective terminal fisheries with hook and line? Are you talking about endangered Cultus Lake sockeye fisheries or are you talking about abundant Nass-Skeena sockeye? It totally depends on the gear type, the health of the population—

Mr. Fin Donnelly: Yes, I was talking about the current commercial form and all that it includes. Obviously, there could be improvements to the open net pen, and I guess you could make that argument that there could be improvements in closed containment, which is largely theoretical, with some pilot projects in place. Obviously, it's a really hypothetical question, but I've been asking other witnesses what their opinion was on that.

Ms. Catherine Stewart: Okay.

If I envision a future for my grandchildren, I would like to see a combination of closed containment aquaculture with responsible wild fisheries. The wild fishery, obviously, needs to be selective. It needs to be controlled. It needs to be appropriately targeted at the right stocks, using the best possible gear type—and on and on goes the list.

I think we place a tremendous value on our wild salmon and wild caught fish, and I certainly hope there's a future for the wild fishery. That's one of the reasons why I hope our government will address the whole host of threats posed to the viability of our wild salmon stocks, including the impacts of open net cage aquaculture.

Mr. Fin Donnelly: Great. Thank you.

I have one more question before I turn it over to Mr. Cleary.

If the aquaculture industry continues in its current form or even expands its operations—I'm thinking mostly on the west coast, but of course this includes the east coast as well—in your opinion how will that be received by the public five years, as well as ten years, into the future?

Also, could you comment further about the role of market campaigns by your organization and others that are a part of CAAR. We've heard of other organizations that are also involved in market campaigns, so could you comment on the impact that market campaigns have on industry and other businesses?

Thank you.

Ms. Catherine Stewart: Sure.

To start with public perception, as you all are very aware, I think the issue is extremely polarized in British Columbia. I think the polling that has been done over the years has shown us that the vast majority of British Columbians who are aware of the issue are very concerned about the impacts of open net cages. The Cohen inquiry has enhanced that concern and increased the level of awareness.

A poll that CAAR conducted about three years ago, asking whether citizens in British Columbia would favour government investment in fostering the development of a closed containment aquaculture industry, showed that 81% in total strongly supported and supported that happening. That was the total, and the level of strong support was high, with well over 50% expressing strong support. I think there's very, very strong support for maintaining an aquaculture industry, but transforming it into a more responsible industry, such as land-based closed containment.

The impact of market campaigns is similar to the impact of any campaign. It's about creating awareness. What I spent many years doing with CAAR was meeting with grocery retailers and chefs and restaurateurs, informing them of the available scientific information

about the impact of the net cages and encouraging them to adopt responsible purchasing policies. That has spread. It has certainly not been isolated to farmed salmon.

There have been campaigns around tuna, particularly blue fin tuna, and a constant raising of awareness in the retail grocery sector and the restaurant industry. As you heard from my colleague, Ms. Roebuck, the other day, most of the major retailers in North America and in Europe are adopting sustainable seafood purchasing policies and phasing those in over the next few years. Increasingly, there is going to be demand for responsibly produced farmed products and responsibly harvested wild fish.

• (1700)

The Chair: Mr. Cleary.

Mr. Ryan Cleary (St. John's South—Mount Pearl, NDP): Thank you, Mr. Chair.

Thank you, Ms. Stewart, for appearing before the committee.

I have two quick questions.

You spoke in your opening remarks about managing the risks of open net aquaculture. So my first question is very straightforward. Are you concerned about recent cuts, maybe even impending cuts, to Environment Canada and the federal Department of Fisheries and Oceans and the ability of both departments to regulate open net aquaculture?

Ms. Catherine Stewart: I am profoundly concerned about that. I think it's going to have a major impact on the industry.

I think you need to look to the testimony offered by conservation and protection staff to the Cohen inquiry, who stated that they didn't have the capacity to adequately enforce and monitor the industry—and that was prior to the most recent round of cuts.

Yes, I think it's a big problem.

Mr. Ryan Cleary: Thank you for that.

My next question expands on one that Mr. Donnelly asked a little earlier. You mentioned how eventually you would like to see a combination of closed containment aquaculture and wild fishery. But in terms of a timeline for closed containment, what do you think would be a reasonable period of time to actually embrace closed containment and be there in terms of that technology?

Ms. Catherine Stewart: Well, I think that ten years ago we said that it would be five years, so honestly, I would have to say as quickly as we can.

I think there's an economic factor that needs to be taken into consideration here. You've heard from Overwaitea Food, which is purchasing closed containment farmed coho from the United States. You've heard about the Hutterite colony in Montana that is investing in closed containment. In West Virginia, there's the Freshwater Institute. These are all supported and are growing, and they are going to continue to grow to meet the rising market demand for responsibly produced salmon.

I think the train is leaving the station, and I'm very concerned. Canada has an incredibly good reputation for our fisheries and the provision of goods to the marketplace, but we're going to miss the train if we continue to debate the merits and pros and cons of the issue, and if we don't start investing now in what's going to be the technology of the future, and what the marketplace is increasingly demanding.

I don't know about a timeline for a complete transition, but I would say that the timeline to begin that investment and transition is now.

The Chair: Thank you very much.

Mr. Kamp.

Mr. Randy Kamp (Pitt Meadows—Maple Ridge—Mission, CPC): Thank you, Mr. Chair.

Thank you, Catherine, for appearing. It's good to see you again.

Your title I think is “salmon farming campaign manager”. Can you tell me what this campaign is that you're engaged in? What are the components of it and its goals and so on?

Ms. Catherine Stewart: Sure. I work with the Living Oceans Society. We currently have three members on our campaign team—we had four, but a woman just went on maternity leave.

One part of it was to reach out to the restaurant industry and chefs. My colleague Kelly is working on sustainable seafood policies with the retail grocery sector. I'm a jack of all trades. I was a witness at the Cohen inquiry, where I was subpoenaed to testify for two days. I've worked on government relations, closed containment, markets, and concerns around enforcement and regulation. My colleague Will, who is based in our Sointula office, is primarily focused on incidents and practices in the industry—because he's based adjacent to the Broughton Archipelago—and also on new farm applications.

Then, as part of the CAAR coalition as a whole, I was also on our negotiating team for our relationship with Marine Harvest. We are also party to the Broughton area monitoring program, which we developed in conjunction with Marine Harvest, and we brought on board the Department of Fisheries and Oceans and the other two major aquaculture companies.

As well, we have a closed containment team. Also, we are represented in the Salmon Aquaculture Dialogue on the certification issues by our colleague at the David Suzuki Foundation. Living Oceans also published a report recently on the variety of certification labels and eco-labels that are out there.

So we cover a lot of ground, a host of issues.

• (1705)

Mr. Randy Kamp: Can you tell me where you get the funding to be able to do all of those things?

Ms. Catherine Stewart: Sure. Some of it is through individual donations from Canadians, supporters, and sometimes from outside Canada. And some of it is foundation funding.

Mr. Randy Kamp: Is it true that the vast majority of the funding is from foundations, and American-based foundations, particularly?

Ms. Catherine Stewart: The bulk of it is at the present time, yes. Like all groups, we're working to build our membership and supporter base.

Mr. Randy Kamp: In the campaigns you run—and here I think I probably know the answer—do you believe you're providing an objective set of information to people you're contacting, for example, chefs, and so on? It's clear that you're pretty negative, pretty pessimistic, about the current state of aquaculture that we see in British Columbia, primarily.

Ms. Catherine Stewart: We pride ourselves on providing factual information. And yes, I bring a bias to this. I believe the weight of evidence is clear: net cages are having a profoundly negative impact on our ocean ecosystems and on wild salmon. I believe the scientific studies indicating that are abundant.

But like any party to this debate, we'll present the information in a way that is going to best inform our argument. We don't misrepresent the facts. We present accurate, factual information. The individuals we are speaking to are going to get information from the Department of Fisheries and Oceans and from the aquaculture industry, which is going to present the facts in the best light possible for the open net cages.

Mr. Randy Kamp: Would you agree, Catherine, that there are reputable scientists who disagree with some of the conclusions in the studies and information you are providing to the people you come in touch with? Do you disagree that there are different positions?

Ms. Catherine Stewart: Sure. And there are very reputable scientists who disagree with them. Individuals like Simon Jones and Dick Beamish from DFO have conducted studies that have been criticized in scientific journals. It's not just by folks who work with environmental groups and non-profit organizations, but by academics and other scientists from other government departments.

Mr. Randy Kamp: Well, I've read those.

Ms. Catherine Stewart: There's always going to be a scientific debate.

Mr. Randy Kamp: Sure, I know.

Let me follow up and ask this in a slightly different way from that of my colleague, Mrs. Davidson. Is it your opinion, then, that there are no sustainable or environmentally responsible Atlantic salmon farming operations anywhere in the world?

Ms. Catherine Stewart: I believe the technology is inherently risky. And I believe that if production were very limited, if the numbers of farms in a given area were severely restricted, if there were no proximity to wild stocks that could be impacted by disease and parasite transfer from the farms, if there were no chemical use on the farms being dispersed into the marine environment, then perhaps you could raise fish in net cages in the ocean. But I don't see that happening anywhere.

In order for the industry to be profitable, they have to rely on density. In order for them to be efficient, they rely on the concentration of farms in a given area so that their feed boats and their crew boats do not have to travel vast distances from one farm to the next. When you create a situation like that, you begin to have cumulative impacts. And I don't believe we can reach a point where those impacts can be completely negated.

●(1710)

Mr. Randy Kamp: Yes, fair enough. That's true. There would be negative impacts, I think, from closed containment aquaculture projects as well, maybe in a different area and in a different way.

Well, let me ask this in a different way. We all hope these projects, such as the Namgis project and others, including AgriMarine, and the one in Pitt Meadows, in my riding, for example, are successful. But, hypothetically, if those projects that are beginning to test the feasibility of RAS closed containment models, or other forms of closed containment, turn out not to be feasible, for whatever reason, what do you then suggest about the future of salmon farming? Is it your position and that of your organization that the current aquaculture operations should then be closed down?

Ms. Catherine Stewart: My organization doesn't actually have a position on that issue per se, because we have been striving for solutions to the problem. Rather than saying it's a yes-no equation, we've been working with the industry to try to find a way to put them on a more responsible footing.

Of course, there may be impacts from closed containment operations, but our objective is to try to minimize the impacts of the industry while retaining the benefits and the jobs. I think closed containment is going to significantly reduce the impacts of raising farmed salmon.

If we ever get to the point where our wild stocks continue to decline and the closed containment systems are not working, then we're all going to have to sit down and ask the hard questions of all Canadians. Do we want to do everything within our power to sustain the wild salmon, which are the backbone of the coastal ecosystem and all of the functioning of that ecosystem, or are we going to let them crash and die because we are invested so heavily in open net cages?

I hope we don't get to that point and I sincerely hope that the closed containment technology will provide the solution that we've been working for, for many years.

Mr. Randy Kamp: Thank you, Catherine.

I think my time is up.

The Chair: Thank you very much, Mr. Kamp.

Mr. MacAulay.

Hon. Lawrence MacAulay: Thank you very much, Mr. Chair.

Welcome, Ms. Stewart.

In your opening statement you indicated that you are involved in aquaculture reform. Do you do much work with the open net concept? We hear from a lot of differing presenters. Some indicate that the lice are the problem. Some indicate that the farms are in the wrong place.

Is there any way that some of this can be adjusted, in your opinion, to save the open net concept?

Ms. Catherine Stewart: Well actually, yes....

CAAR initiated a dialogue in 2005 or 2006—I can't quite remember the date—with Marine Harvest, the largest aquaculture company in B.C. One of the key issues in our dialogue with the

industry was to look at interim measures that could minimize or mitigate the impacts of the farms in the Broughton Archipelago, specifically on wild out-migrating juvenile salmon. On that, we arrived at an agreement with Marine Harvest.

There are two primary migratory routes through the Broughton Archipelago. The fish come out of Knight Inlet and either go straight out Knight Inlet to the ocean or they go north and around through Tribune Channel and Fife Sound. The company has farms along both Knight Inlet and on the northern route as well.

We reached an agreement that they would alternate fallowing of those farms during the juvenile wild salmon out-migration period, that they would coordinate the Slice treatments, and that they would proactively treat for lice numbers. Right now the trigger threshold is such that when the farms reach three motile lice, they call in a veterinarian and apply the medicated feed. Marine Harvest agreed that when their farms were trending towards three motile lice—when they could see that rise was happening in the juvenile out-migration period—they would proactively treat to reduce the lice numbers. On the non-fallow route, they would only stock juvenile or sub-adult fish during the out-migration period, because there have been studies done in Norway showing they are less prone to lice infestation.

That was an active engagement with the company, trying to find mitigation and interim measures that would help reduce the pressure. It's proven to be fairly successful, and it led to the formation of the Broughton area monitoring program. The preliminary science—and I have to emphasize that it's preliminary science coming out of that program—indicates that the fallowing and coordinated treatment have reduced the lice levels on farms.

Oftentimes the industry will cite a study that was published by Dr. Krkosec, who has said that if we didn't do something we could lose the pink salmon within four generations, that they could be extirpated from Broughton. The industry could say, "Well see, he was wrong and it didn't happen". But what his study actually indicated was that if nothing changed, this is what could happen. Things did change as a result of our work with Marine Harvest and their willingness to implement changes. Things did change and the results seem to show that the pressure was reduced somewhat.

That doesn't deal with the host of other factors affecting the ecosystem. It doesn't deal with escapes, the predators, the chemical use, or the use of Slice itself, which can probably be harmful to prawns. We need more study on that.

I'm sorry for this long-winded answer, but I do want to emphasize the fact that we have been making efforts to work in a constructive fashion with the open net cage industry. But I still am of the opinion that, ultimately, we need to transition out of the water.

●(1715)

Hon. Lawrence MacAulay: You stated that DFO acknowledges there's a problem with the open net concept, particularly in discussions with Norway and other countries. You also mentioned that the government has spent dollars promoting the open net concept. I'd like you to elaborate on that.

If you have a minute too, do you see certification being a problem for the open net concept as things develop? Whether justified or not, there's a lot of criticism of the open net concept. Do you see certification coming into play here with the product in the end?

Ms. Catherine Stewart: There are three things.

Yes, in a lot of its published material and particularly in international scientific forums, I think DFO, to maintain its credibility with scientists from other countries, has to acknowledge and does acknowledge that there are problems associated with net cages. It's pretty hard to deny when you look at the effects the lice have had in Norway, the problems they're increasingly having with resistance to chemical treatments.

Trevor Swerdfager, a former director general at DFO, told me in a face-to-face meeting one time when we were discussing this that on the east coast he had been seeing lice infestation levels per fish of 200 to 300 lice per fish. Those numbers are staggering and indicate why it's possible that one of the companies may have broken the law and, in a desperate attempt to control the lice, used cypermethrin, which is a banned chemical in Canada.

I think the department is very aware of the problems. They don't acknowledge that a lot publicly and domestically, but internationally they will acknowledge it, even in writing in their reports, for example, the one I cited from NASCO.

Yes, DFO is actively engaged in promotion of the open net cage aquaculture industry. Again, I have to stress that I don't criticize our government supporting industry and business in Canada, but I think the government has a responsibility to support those industries that are making an effort to be responsible and trending toward more sustainable practices. It's disheartening for me to see DFO chasing us around when we talk to retailers, showing up afterwards to try to undermine what we have said and to promote the open net cage industry with claims of sustainability. I don't mind our department giving the facts, but I think they do an awful lot of work and give an

awful lot of money to the aquaculture industry for promotion and marketing. That should be the industry's own responsibility. Our department's responsibility should be the health and protection and sustainability of ocean ecosystems and of our wild stocks. I think they have a fundamentally conflicted mandate, acting as both the regulator and PR agency for the aquaculture industry.

Certification is going to be an increasingly prominent issue. A host of certification schemes are in development. The Canadian government is working with the CGSB and DFO in developing organic standards for open net cage aquaculture in Canada. I believe those standards are going to undermine the credibility of Canadian organic certification as a whole, if they continue to be as weak, as they currently are. Certification and labelling initiatives are being developed by the industry in isolation, by multi-stakeholder groups like the Salmon Aquaculture Dialogue. I think they're going to take increasing prominence and importance.

We'll see similar trends to what we've seen with the Marine Stewardship Council, whereby more retailers and more consumers are going to be seeking a certification label they feel they can trust. That's going to be the key issue. There will be a proliferation of branding and labels and eco-labels, but at the end of the day, there will be a hierarchy of which ones are credible and which are just a rubber stamp.

● (1720)

Hon. Lawrence MacAulay: Thank you.

The Chair: Thank you very much, Mr. MacAulay.

Ms. Stewart, on behalf of the committee, I'd like to thank you once again for taking the time from your busy schedule to appear before us and answer our many questions. We really do appreciate the information you've provided to this committee today. Once again, on behalf of the committee, thank you very much.

There being no further business, this meeting is adjourned.

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