HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

Standing Committee on Fisheries and Oceans

FOPO • NUMBER 011 • 1st SESSION • 41st PARLIAMENT

EVIDENCE

Thursday, October 27, 2011

Chair

Mr. Rodney Weston

Standing Committee on Fisheries and Oceans

Thursday, October 27, 2011

● (1535)

[*English*]

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

To the witnesses, thank you for meeting with us today and taking time out of your busy schedules to appear before this committee. You're pretty well all familiar, I believe, with the workings of the committee. We have certain timeframes that we try to stay as close to as possible in order to allow everyone to get both questions and answers in. We generally allow 10 minutes for an opening presentation.

I see that you have a slide deck. I assume all members have copies.

Mr. Stringer, perhaps you could start by introducing your delegation. Please proceed.

Mr. Kevin Stringer (Assistant Deputy Minister, Program Policy, Department of Fisheries and Oceans): Thank you very much.

The slide deck was actually presented on Tuesday by my colleagues. We have it today by way of background. I thought I would say a few words so that we don't start just by asking for your comments and questions. I will introduce my colleagues and say a couple of words to follow up from that slide deck. But we can certainly work from it today. We' be happy to do that.

I do want to say thank you very much for the invitation to be here today to further discuss the topic of closed containment. My name is Kevin Stringer. I'm the assistant deputy minister for program policy at the Department of Fisheries and Oceans. I have general responsibility for operational policy for the department's major programs, including aquaculture.

I have with me three colleagues. Dr. Jay Parsons is director of the aquaculture science branch within the ecosystems and oceans science sector in the department. He is also the immediate past president of the World Aquaculture Society.

Mr. Stephen Stephen is director of the biotechnology and aquatic animal health science branch within the same science sector at DFO.

As well, Mr. Alistair Struthers is the team leader for sector strategies within our aquaculture management directorate. He's one of three authors of the feasibility study on closed containment.

[*Translation*]

I gather from my colleagues that you had a useful and informative introductory session on Tuesday. I am told that you asked some interesting questions, and hopefully you were able to gain a greater understanding of closed containment, DFO's involvement thus far, and an insight into the challenges of potentially applying these technologies.

[*English*]

As you know—just for a bit of context—aquaculture is important in Canada. It generates a landed value now of $400 million and nearly 6,000 jobs in British Columbia, and another $350 million and nearly 5,000 jobs on the east coast. There are important developments in central and inland Canada as well.

In total, aquaculture has an economic impact of $2.1 billion for the Canadian economy. We're committed to ensure that this growing industry is managed and regulated in an environmentally responsible way.

[*Translation*]

DFO recognizes the importance of continuous innovation that can provide further improvements to current practices, sustainability, economics and social acceptability of all elements of aquaculture. In this light, closed containment may be one such production approach.

[*English*]

As my colleagues would have said on Tuesday, closed containment represents a broad spectrum of technologies or practices, starting with water-based pens and culminating with land-based, recirculating systems. As we move along this spectrum, the systems offer perhaps greater control over the growing environment, but seemingly, at this time, at the cost of greater complexity, technical challenges, and financial investment. Many, including our department, are seeking to better understand these challenges and to address them.

As I believe my colleagues touched upon, closed-containment systems are not currently being used anywhere in the world for the commercial production of Atlantic salmon. But these systems are being used for the production of Atlantic salmon juveniles or for high-value species in niche markets.

There are a number of barriers we can speak to during the Q and A session and discussion.

We note that there are a number of crucial assumptions in our studies and other studies. They're very sensitive to changing conditions, and we can speak to them later on, as well.

There's also interest in assessment. We have an interest in assessing the relative environmental impacts of the different types of containment systems, and we are continuing to work on that.

In conclusion, like you, we are engaged in this, if further work does need to be pursued. The work of your committee in examining closed containment for salmon aquaculture is well timed, in our view, and is important in that regard. We'll follow your work with great interest and look forward to your conclusions.

That said, we're happy to share our experiences and knowledge with the committee at this time.

● (1540)

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

We'll go to Mr. Hayes.

Mr. Bryan Hayes (Sault Ste. Marie, CPC): Thank you, Mr. Chair, and welcome to our guests.

Your colleagues last week gave a great presentation. They were very informative. I knew absolutely nothing about aquaculture before that time. I know significantly more now, but still not nearly enough. I know a little bit about sea lamprey control, because in Sault Ste. Marie last week, during my constituency week, I visited the Department of Fisheries and Oceans and had a very good tour. I'll have some nice pictures for you folks down the road very soon.

It's my understanding that in terms of return on equity, there are only two types that have shown a positive return. One is the net pen and the other is a recirculating aquaculture system, as it's referred to.

It's my understanding that there are different types of RAS systems. I wonder if you could elaborate on the difference between the AquaOptima RAS technology and the RAS system evaluated in the feasibility study of closed containment options for B.C. I'm trying to get an understanding of the differences between RAS systems, most specifically in terms of capital costs, and in terms of the different returns on investment, or returns on equity. What differences would have an impact?

Mr. Kevin Stringer: Let me start, while giving my colleague Alistair fair warning that I'm going to ask him to talk on some of the specifics.

I'll start with some sensitivities and assumptions. You talked about what could affect economic viability. We made a number of assumptions. We pointed this out in the executive summary, and the conclusion, and the body of the paper. There are a number of inputs to this that would have a significant effect on bottom-line economic viability. I point to three of them. These affect both closed containment and non-closed containment. I'll start with the price of salmon.

If the price of salmon when we did the study had been what it is today, we likely would have found, even by back-of-the envelope calculations, that the RAS system was not economically viable. When the study was done, the price of salmon was in the range of $2.60. It's now in the range of $2.30. It's gone down significantly. Whether that's because the Chileans have come back into the system because the U.S. market is in tougher shape, or because of the exchange rate, is uncertain. There are a number of factors. But the price of salmon is enormously important. We found in our study that the systems currently being used are economically viable. The RAS system was marginally viable.

Rearing densities are important, those being the number of fish in the pen. We don't have demonstration projects to know how many fish you can stock. So we made some assumptions about how many fish you can put into a pen. We assumed that it would be significantly more than what's in an open-net pen, because otherwise the economics wouldn't be there.

Capital costs are enormous, and a slight change makes a significant difference. You're right to suggest there are serious sensitivities—the price of salmon, rearing densities, capital costs, and exchange rates. As for the specific technical differences between the different RAS-type systems, Alistair can fill you in.

● (1545)

Mr. Alistair Struthers (Team Leader, Sector Strategies, Aquaculture Policy, Department of Fisheries and Oceans): Essentially they're different brands, AquaOptima and the system we used in our financial feasibility study. We had to start somewhere, so we chose the system based on the recommendations of a design consultant we had. There are various types and brands. AquaOptima is one, and there's another company in B.C. that produces large-scale research systems and components. As to the differences in capital costs, though, I think they would be negligible.

Mr. Bryan Hayes: Are there any more systems currently being developed? Is this an emerging technology?

Mr. Alistair Struthers: It is emerging. There are probably four or five companies around the world that are developing recirculating technology. A number of them are based in Europe.

Mr. Bryan Hayes: I understand there are negative environmental impacts associated with the aquaculture industry. In closed containment, I expect one of those is the fecal waste that is generated. Can you describe the different technologies that exist for dealing with waste from closed containment systems? Do we need to do more work in this area to improve the technology? Is that the only environmental concern with closed containment systems, or are there others?

Mr. Kevin Stringer: Again, I'll start.

An area of work that's been identified as useful to do is to have a life-cycle analysis of environmental impacts of open-net pen and closed containment systems. It may be a bit like comparing apples and oranges, but when you're talking about a land-based system, the issue of waste management is a challenge. There are opportunities and there are experiments, or demonstration projects, that are seeking to use the waste as compost in fertilizer and for those types of things. I'm not sure how feasible that is, but that is one possibility that people are looking at.

You're right: waste management is a challenge. It is a challenge in open-net pens as well, but it's a new challenge and a particular challenge for closed containment.

Power use is another issue. One challenge, both in terms of costs and environmental impacts, is that these systems need an enormous amount of power. Challenge number one is that you have to be close to and able to gain access to a power grid, but challenge number two is with GHG emissions and the amount of power you are drawing down for these systems.

That said, we know that the open-net pen processes are not without challenges as well. But power use, greenhouse gases, waste management, resource depletion for concrete structures and the like are all issues. Work is being done, and we're trying to seek some of that information, on a life-cycle analysis. You're right that we need to better understand the environmental impacts of closed containment, in particular. We already have a sense of the challenges around open-net systems.

Mr. Bryan Hayes: That's good for me.

Thank you.

The Chair: Thank you, Mr. Hayes.

Mr. Donnelly.

Mr. Fin Donnelly (New Westminster—Coquitlam, NDP): Thank you, Mr. Chair.

Again, welcome to our guests. Thank you for appearing as a delegation in front of us. We appreciate the information.

Before I ask my main question—and I have a colleague who will also ask a question—I just want to clarify something.

Mr. Stringer, you mentioned that a life-cycle analysis is being done. Is the department leading that study?

● (1550)

Mr. Kevin Stringer: Part of what we do is to see what research is being done elsewhere. In fact, if you look at our CSA session a couple of years ago, which Jay can speak to, it was largely a review of research that's being done elsewhere. But it is something that we're interested in. We do have a study that's looking at different types of environmental analyses, including this type, but we have not sponsored something on a life-cycle approach with respect to closed containment.

Mr. Fin Donnelly: Okay.

Perhaps you could keep this committee informed of the information you find out.

My question is regarding ISAV, the infectious salmon anemia virus. It's been an issue on the east coast and we're now concerned about it on the west coast, potentially.

With these closed containment systems, could you describe the differences involved? For instance, a re-circulating system has to address the issue of salmon disease, or disease versus, for example, parasites, sea lice, and other issues like feces, etc.

Mr. Kevin Stringer: I'll say a couple of things on this. You've seen the minister's letter announcing that we are doing further testing —and we can speak to that if you wish.

In terms of the potential effect of closed containment, I would say two things. First, it obviously has an effect on distancing the aquaculture-based fish from the broader environment. That's not 100% in the system, as I believe you know. But we also believe that we have a safe environment now, with proper protocols in place. For instance, under our B.C. regulatory system, we require all facilities to have health management plans, to have reporting to CFIA and to ourselves on disease outbreaks, and to have biosecurity protocols in place. While the closed containment technology does not currently exist in a way that can be operated, in our view, we believe that we have an adequate system in place. That said, we take the findings very seriously, and we are doing further testing to see what bears out from them.

Mr. Fin Donnelly: I'll let my colleague ask his question.

The Chair: Mr. Cleary.

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

Mr. Chair, my question is probably a follow-on to the question that Mr. Hayes asked. Mr. Hayes asked about the potential impacts on the environment of a closed containment facility. What I'm looking for is a list of potential impacts on wild fish from the fish raised in closed containment.

This is a two-part question. The second part is this. I'm from Newfoundland and Labrador and part of the Atlantic caucus of the New Democrats. We had a presentation the other day from the Atlantic Salmon Federation, coincidentally. One of the stats they mentioned in their presentation was that wherever there's an aquaculture industry, there's a decline in the wild salmon population by 50%. This is the number that the Atlantic Salmon Federation gave us. Would that be the case with a closed containment facility?

So the first part of my first question is about the potential negative impacts on wild salmon populations, and the second part is whether the stat I mentioned would also hold true for a closed containment facility's impact on wild populations?

Mr. Kevin Stringer: I've heard that stat but haven't seen it, so I can't comment on whether it would be accurate or not. But we can took a look at it and I'll be happy to get back to you on our views with respect to that.

Regarding closed containment, intuitively you would think that if there's not the interactions with the wild fish in the outside environment, then there's less likely to be that effect on wild fish. But that's why you want to look at it from a life-cycle perspective, because there are other environmental impacts. That's what I'd say on that.

With respect to the specific number, we'd have to take a look at that number to see what the impact is. We do think it is manageable to have wild fish and aquaculture fish in the same area. It takes appropriate management. It takes a management plan for the area, which involves fallowing, fish health plans, strategies around escapes, and strategies around fish coming into the pen. The regulatory regime needs to speak to those things, but closed containment may address some of those things as well.

● (1555)

Mr. Ryan Cleary: Thank you.

The Chair: Thank you, Mr. Cleary.

Mr. Sopuck.

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

In terms of closed containment aquaculture, it looks like the economic and technical issues are very daunting. What are the conceivable technologies out there? I'm asking you to peer into the future, the dim future. What conceivable technologies are out there might make closed containment aquaculture systems feasible and that compare roughly with net-pen aquaculture? I'm just asking you to speculate on what might be coming.

Mr. Kevin Stringer: Okay.

Generally, when these things are developed, there are three phases. When I refer to new technologies for commercial use, there are three phases.

The first phase is getting the idea and doing the research to understand what the possibilities are, and coming up with ideas about what might work. We've largely gone through that, I think. There's more work to do, but in terms of closed containment....

The next phase is demonstration projects. I think that's the phase we're at, the phase that we're entering into, namely to demonstrate these things on a commercial scale. What generally has happened, and not just with this technology but with others—though we'll see if that's the case—is that as they get introduced, you do demonstrations projects. And there are often public funds that go into this, because it's not commercially viable yet. So demonstration projects go into it. We see which technologies work, by trying a number of different ones. At this point that we're at, we make our best scientific-inspired guess about what's going to work effectively. And generally what has happened—and we've seen it in things like carbon capture and storage and other technologies—is that the price or cost starts high and gets driven down with practice. And as it becomes more accepted in industry, there's an economy of scale to be able to use it. We don't know if that will happen in this case.

In terms of new bright ideas coming out, I'm going to throw it to Jay—or anybody—to suggest the next generation of things that we're hearing about. I think at this point we're at this generation, and still testing out some of the ideas.

Dr. Jay Parsons (Director, Aquaculture Science Branch, Department of Fisheries and Oceans): I agree with Mr. Stringer's comments on the different phases.

The only further thing I would say in terms of the demonstration scale is that it's not only testing the technology around closed containment, but it's also looking at some of the biological factors related to growing the fish in these systems, such as the growth rates, the food conversion ratios, how the fish respond to higher densities, and what some of the challenges might be in growing the fish in these closed containment systems with respect to health management of the fish. Certainly, I think that's where the added work needs to be done in the future in looking at the overall viability of these systems, not only from an economic or an environmental perspective but also from a biological perspective.

Mr. Robert Sopuck: Thank you very much.

Let's just say that there was enough public controversy raised about net-pen aquaculture and Canada's precipitous move to mandate closed containment only, I would presume that the price of salmon would have to be fairly high to make that economical.

Given that other countries would probably continue with net-pen aquaculture and given that we're part of the World Trade Organization, is it conceivable that those countries would flood our markets with much lower-priced salmon and put closed containment aquaculture out of business?

Mr. Kevin Stringer: My view is that's not unreasonable as something that you might foresee.

Let's again use the example of carbon capture and storage, which is one of those things where the number of countries involved had to be large enough for somebody to start going in that direction, because if one went in that direction, the others would face a disadvantage.

We do work with other countries. Other countries are looking at closed containment. We think it is important to go in tandem as much as possible with the other leaders. The other leaders by the way are Norway, Scotland, and Chile. I'm not sure about all of them, but I know that some of them certainly are looking at this sort of thing, although I think it is more prevalent here than it is elsewhere at the moment in terms of the views.

I'll use this opportunity to say that one of the advantages of bringing scientists with you is that they get to prove you wrong in the first 15 minutes. I have a study on life cycle assessment of alternative aquaculture technologies, so one study has been done that we know of. It was done by Dalhousie University, and we would be happy to provide it to you.

● (1600)

The Chair: You still have a couple of minutes left.

Mr. Robert Sopuck: Okay, good.

Can closed containment aquaculture be done anywhere. Is that fair enough to say? Just a quick yes or no.

Mr. Kevin Stringer: It can be done anywhere. It does require—

Mr. Robert Sopuck: It doesn't have to be done on the coast, though.

Mr. Kevin Stringer: You want to be near a water source.

Mr. Robert Sopuck: I understand.

Mr. Kevin Stringer: You want to be near a power grid.

Mr. Robert Sopuck: Right, understood.

Mr. Kevin Stringer: So when you're talking about Manitoba versus B.C., yes.

Mr. Robert Sopuck: Okay.

Let's say that if closed containment aquaculture or the prevalent form of aquaculture came to be mandated in Canada, we could conceivably see a tremendous loss of rural jobs. I look at your report here, which says there are 6,000 direct, full-time jobs currently in aquaculture. Those, I would suspect, are largely rural jobs in remote communities and areas where employment is difficult to find to begin with. So a move toward closed containment aquaculture, where those systems would potentially be moved closer to where the markets are, could cause a really significant hit for maritime, rural economies. Is that a fair assumption?

Mr. Kevin Stringer: Right now, the aquaculture industry is a rural industry in Canada on both coasts and inland areas. It's providing significant jobs in rural communities. I gave the statistics earlier: there are 6,000 jobs in B.C., and 5,000 on the east coast. As you know, they're not easy to replace. It is currently a rural industry and is supporting rural Canada.

Mr. Robert Sopuck: That's good.

The Chair: Thank you, Mr. Sopuck.

Mr. MacAulay.

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

I'm supposed to ask the questions, but I'll give you my opinion first. If you destroy the fishery in the rural areas, in the Atlantic region in particular, we'll have no rural areas. I'll just tell you that for sure. The inshore fishery and the aquaculture industry have done an awful lot for the economy where I live. In fact, while it's not the main part, the fishery is certainly a big part.

What portion of DFO's budget would you say is allocated to aquaculture?

And I welcome you here, if I didn't already. It's good to have you here again. I've been here a few times with you, and I hope to be here a few more.

Voices: Oh, oh!

Mr. Kevin Stringer: As do I.

Hon. Lawrence MacAulay: The alternative is poor.

Voice: Oh, oh!

Mr. Kevin Stringer: Yes.

I don't know what portion is the percentage of the department....

I'll say two things. One is that the new B.C. program that we established is $8.3 million and 55 FTEs. That was what was new, and I'd say that this doubled what we had going on in the department. We have more responsibility now in British Columbia, with the court decision and our taking responsibility. That's one thing I'd say.

The second thing I'd say, having been around this department for a while, is that when I first came to the department in the late nineties, there were maybe 10 people in the department dealing with aquaculture. I've seen it grow over the years to become a major file in the department. It's really grown to take its place. In my view it's at a point now of consolidating, ensuring that we have good, solid environmentally responsible regulations and systems in place.

But I've given you an order of magnitude. We can give you specific numbers of the budget. I'd be happy to provide those.

● (1605)

Hon. Lawrence MacAulay: I just wondered....

Mr. Kevin Stringer: Okay, so that's the order of magnitude. It has become a significant file in the department.

Hon. Lawrence MacAulay: As you have indicated, it's grown from the time you arrived, and I expect it will continue to grow. If you could just get governments to properly fund the departments, then you would be okay.

I imagine you'd like to respond to that.

Voices: Oh, oh!

Mr. Kevin Stringer: I wouldn't presume to do so.

What I can say is that aquaculture worldwide now produces approximately 50% of the world's fish resources. So in terms of where the world's protein is going to come from in the future, we do want to see the wild fishery grow and intend to continue to work to see stocks rebuild and such, but the growth in the world is in aquaculture. The challenge is to ensure that it's developed in an environmentally responsible way so that you can have a vibrant wild fishery and a vibrant aquaculture fishery as well.

Hon. Lawrence MacAulay: I'd like you to comment on Canadian technology versus that of the other countries we will be competing with.

When you're talking about closed containment, I expect that eco-certification is going to come into play. We cannot blame the Government of Canada any more, if I understand this correctly, but the world community. This eco-certification is just bigger than us.

How do you see that playing out in aquaculture, when you're talking about there being so many fish, perhaps too many fish, in the pen and this type of thing?

Mr. Kevin Stringer: That's a very good question, and I'm going to answer the last part, which is on eco-certification. I'll ask Alistair to answer the first part on Canadian technology versus others'.

Eco-certification has been a significant issue with us for 10 years in the wild fishery. In Canada we have, I think, 22 fisheries that are certified. As you pointed out, it is not government saying that it's certified, but it's done by third-party certification. For the most part the gold standard has been the Marine Stewardship Council, MSC certification—but it's not the only one.

Aquaculture has been not as quick to establish those standards, but there are processes to establish them. The World Wildlife Fund and others have been working at establishing standards, and we've contributed to those discussions. We haven't seen the requirement as much from the retailers saying that they're going to expect certification. But we're watching that very carefully, and I think it will be an emerging issue. It will speak to issues like sea lice and fish health and densities and those types of things, which our industry is watching very closely as well.

Hon. Lawrence MacAulay: But if I'm correct, I can see this as deciding what's going to take place in fisheries.

In fact, not to get off the topic, I can also see this eco-certification probably deciding where you can and cannot fish, and that type of thing. And if you don't abide by what they say, you're not certified. There are certain large businesses that require that in the retail industry.

Mr. Kevin Stringer: It is in a challenge, both in the wild fishery and in aquaculture.

What I can say, though, is that these certification systems are based on FAO standards. The idea is that there's a world standard, which governments work on. And we're one out of the 170 governments, or whatever the number is. The certification bodies take those standards and say, okay, here's how we're going to test different fisheries and aquaculture, in our case, to see if they meet the mark.

So the standards are based on something we have a role in. But you're not wrong in terms of their having a significant effect on the market.

● (1610)

Hon. Lawrence MacAulay: They could decide, and I expect this will come into play in the aquaculture industry, there's too much density. And if they do, you do not get the certification. And if Sobeys or some large retail department decides it is not going to be certified, that puts us in quite a mess as far as the fishery is concerned—or at least takes the say away from government. We cannot even blame the government, then.

Mr. Kevin Stringer: It's certainly something we're watching carefully. The issue of certification of aquaculture is definitely an emerging issue we are *Inaudible—Editor*] on.

I'll ask Alistair to make any comment he wishes to on Canadian technology versus others'.

Mr. Alistair Struthers: I think that Canadian companies actually play quite well on the global market. It's a question of brands more than anything. There's a company on the west coast, PR Aqua, that has exported its technology to the U.S. and Chile for hatchery production and for recirculating aquaculture systems.

I think it's largely a matter of preference. Some people view the European technology as perhaps being slightly better. It's a question of whether you want to compare, say, a Ford to a Toyota. From a technological perspective, Canada plays quite well on a global scale.

The Chair: Thank you very much.

Your time's up, Mr. MacAulay.

Hon. Lawrence MacAulay: I've been segregated to the corner.

The Chair: I have a question before we move on. You spoke earlier about the modelling you did for recirculation aquaculture, and you talked about the population density being higher in closed containment as opposed to a net pen aquaculture. Can you explain the basis for that assumption you made?

Also, can you tell us what the footprint of a closed containment system would be compared to a net-pen site with respect to the higher population density in closed containment?

Mr. Kevin Stringer: Thank you.

I'll start, though Alistair knows the answer to this question.

On the issue of density, if you look at the size of the open-net pen facilities currently in operation, it's really not feasible, certainly from an economic perspective, but even from the perspective of covering a football field, to have those types of facilities on land. So I think it's largely about what's actually feasible. But I'll ask Alistair.

Mr. Alistair Struthers: The densities for an open net-pen system are about 15 kilos per cubic metre. For land-based and recirculating aquaculture systems, you're looking at a minimum of about 50 kilos per cubic metre. The primary reason for that is to take advantage of the capital costs, because the difference in capital costs between the two systems is enormous. So you need to be able to maximize your footprint.

The Chair: Okay.

Mr. Kevin Stringer: Jay was going to add something to this.

Dr. Jay Parsons: I could add just a further point on this. It's partly related to the biological parameters that the fish need to grow. In closed containment systems, you have much more control over the parameters in which you raise your fish. To be able to stock fish at 50 kilograms per cubic metre, you need to have much more control over your system in terms of being able to remove the solids and the dissolved wastes. You also need to have systems to introduce oxygen into the water to maintain fish at those densities.

Alistair is right. From an economic perspective, you need to have that density for it to be economically viable. But to have those densities, you need to have the technology to support growing fish at those densities. In the wild, the natural tides and currents flush the water in and out of the cage and provide oxygen to the fish—and that is the density they're able to maintain at in a wild environment.

The Chair: So the footprint ratio is about 3:1? Is that about right?

Dr. Jay Parsons: In terms of the difference in densities, yes, that's correct.

The Chair: Thank you. I appreciate that.

Mr. Donnelly.

Mr. Fin Donnelly: Thanks, Mr. Chair.

Taking Mr. Sopuck's scenario or forecast of the future, let's say we were to come up with an agreed closed containment system, the perfect system, the system that is determined to be the most feasible. How soon could we then expect industry to make a reasonable transition, from what it currently is now to a closed system that's widely accepted or agreed on? Is there a particular number of years that would make sense?

● (1615)

Mr. Kevin Stringer: I'm going to start this, and I'm going to ask my colleagues to think about the full answer to the question of how long it takes to get a demonstration project in place.

The idea, as I said, is that the initial research is done, and then there are the demonstration projects. As I understand it, with the Namgis demonstration, for example, it would take a number of years before you actually proved it out.

I think as well there's the physical and economic challenge—I'm not sure if you were suggesting this—of taking the current net pens and moving them on land or putting structures around them. That's a whole other question, but it's basically saying that all future growth will be....

As to when you would have those things in place, and when the percentage of industry would be there, I think it's a significant period of time you're talking about. I'll ask my colleagues to speak about that; it's a hypothetical thing, but we can make our best inspired guess.

Dr. Jay Parsons: Mr. Stringer is right that this is a very difficult question to answer explicitly. One way to answer it might be from more of a general perspective.

Mr. Stringer has already alluded to the three phases, to the research, development, and commercialization continuum, if you will. Certainly if we look generally at aquaculture development—let's say the development of salmon aquaculture in Canada from the late 1970s, or the development of some other new species, such as cod aquaculture—it's not unusual to see a time cycle of 10 to 20 years in the research to development to commercialization continuum.

So from the perspective of closed containment-type systems, as Mr. Stringer said, we're probably into the development or pre-commercialization phase right now. It will certainly be a number of years before we're able to get to a stage where we're able to undertake the studies required to demonstrate the technology and show it's biologically feasible, and also to be able collectively to demonstrate that the level of risk, from an economic and environmental and biological perspective, is low enough to warrant the type of investment required for industry to take this to the commercialization phase.

Mr. Fin Donnelly: Thank you for that.

Do I have time for a quick follow-up, Mr. Chair? Thank you.

If, for instance, there were government investment, would that speed up that transition period at all?

Dr. Jay Parsons: As I think we've already alluded to, there's already a significant level of government funding in this development, pilot-scale project. I think government funding is very important at this stage of development, where the indications are that it's marginally financially feasible and that public investment of funds will certainly help facilitate the development of this technology.

Mr. Kevin Stringer: I would just add that we have invested in these demonstration projects. Industry has done the same kind of analysis that we've done, and it's not economically viable at the moment. They're not going to invest in it because they're going to do better with the open-net pen.

The only way you're going to be able to test these things.... Actually, it's not the only way, because government is not the only funder. But generally, when you're at the demonstration project level, these are usually public-private partnerships. There are a number of funding sources that contribute to these things. That is what is happening now.

● (1620)

The Chair: Thank you very much.

Mr. Kamp.

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

Thank you, gentlemen, for your good information.

I wanted to follow up on something initially raised by Mr. MacAulay, the issues of density and the whole aspect of animal welfare, because one of the issues that we all realize the industry deals with is the whole notion of social licence, that it needs to be perceived to be an industry that respects social values and so on.

Bear with me here, but if you're going to raise chickens for eggs or for meat, you can have free-range chickens that run inside and outside pretty much where they like. You have free-run chickens that are kept inside but have some ability to run around, and then you have the caged chickens. I think there's a decreasing social licence for the notion that we cram these chickens into cages and not let them run around, and then either take their eggs or take them and slaughter them after a certain number of days.

Would you expect this could be an issue, if it were raised? If you go up to, say, 80 kilograms density, or even 50 for these fish that are now already crammed together, swimming around in their own little pool, do you think that could become less socially acceptable?

If we consider the free-range to be the wild fishery and the net pens to be the free-run, and then we put them in these smaller pools—tubs, whatever—for whatever reason, do you think that could be an issue in the future?

Mr. Kevin Stringer: I have two responses.

I'll start and say that it's one of the issues. If you look at the literature on the challenges around closed containment and, specifically, the issue of density, one of the issues identified is what they call fish performance. What that really means is that these things are bumping into each other, and affects the quality of the fish and their skin. That's called fin...

Mr. Alistair Struthers: Erosion.

Mr. Kevin Stringer: That's called fin erosion. These are genuine issues in terms of animal welfare and the quality of the fish—not to say anything about the issue you've raised, which would obviously be the concomitant one, the social licence issue.

The literature speaks to really broad sets of issues, two of which we've talked about already. One is the financial or economic viability issue, and the second is the issue of the technology that's not been proven. But the third is fish performance and the potential effect of density on what's going to happen with respect to the quality of the fish, and there's the social licence issue that is already on top of that, I would say.

I don't know if you have anything to add....

Mr. Randy Kamp: Let me just follow up then.

Animal welfare requires that we have systems that are reliable. So I guess my question would be this. If you go to a closed containment system, particularly one that's on land, do you think it will be more reliable or less reliable, that is, likely to break down and to stop pumping, with the recirculation thing not doing its job? Or if there's a pathogen that occurs, will it spread more quickly because of the density?

What do you think about this issue of reliability?

Mr. Kevin Stringer: First of all, I'd add the caveat that this is why we need the demonstration projects to be able to test some of those things.

In terms of the issue of reliability, I think the challenge with closed containment systems is that it only takes one thing to go wrong, because everything is artificial. For example, the power could go off for a day and a half. There are a number of technology pieces that you're not relying on in the net pens, but which you are relying on in closed containment.

Again, once you've got some practice, it's possible that those technological challenges can be overcome. But in terms of reliability, there's more that you're going to have to make sure works right in a closed containment system.

As has been pointed out, you have the benefits of sequestering the fish from the wild fish, but you have all of these other challenges, which are not just economic but also technological—and fish performance and viability are based there as well.

Is there anything else on that?

● (1625)

Mr. Alistair Struthers: I would just add that in addition to any types of mechanical problems that may be encountered, there's the human element as well. In virtually every kind of closed containment system that I've seen, they've always had some type of loss because the operator has failed to do something. That's something that's very hard to measure, or very hard to account for.

Mr. Randy Kamp: That's interesting.

The Chair: Thank you very much.

Mr. Cleary.

Mr. Ryan Cleary: Thank you, Mr. Chair.

From what I can gather and from I have heard today, in Canada we're years away from the technology really being there to make closed containment commercially viable. But from the background material that's been circulated to us, I see there's a company in Denmark, Langsandlaks, I believe, which is close to the construction of a 1,000 metric tonne facility.

Does Denmark have more of an advantage over Canada right now in terms of closed containment? Are they closer to making this work than we are?

Mr. Kevin Stringer: I don't know if they're closer to making it work than we are. You're talking about the Atlantic Sapphire project, which is currently developing a facility in Denmark capable of farming 1,000 metric tonnes of salmon on land at commercial scales, so we're told. We don't know that much about it. It's one that we've been following and will follow carefully. The project started in 2010, so it has not got a long production history. It hasn't proved itself out yet.

I will just make another point. There is private funding in that one. It is a commercial operation, but there is a significant amount of government grants, because I think there's again a sense that it's not economically viable. There is $2.2 million, I think, from governments.

We will correct this information, if we're wrong, but we understand that the cost of production is $4.90 a pound, which is significantly higher than the current market price of salmon—certainly in Canada, and I believe over there as well.

So it is one of those demonstration projects that we're watching, but one that they're trying to make an actual commercial operation. You're absolutely right on that, and we'll watch carefully to see if it's going to provide breakthroughs.

One of these things can well provide a breakthrough, which is what often happens, where they can say, folks, this works and you can do it economically.

Mr. Ryan Cleary: You mentioned a figure of $2.2. million. That's the government injection into that project. What's the private funding injection into that project?

Mr. Kevin Stringer: As I understand it, I believe it's $7 million. We'll correct it if we're wrong.

Mr. Ryan Cleary: And just to change gears completely, in terms of aquaculture science within the Department of Fisheries and Oceans, can you give me a breakdown of exactly what your science department consists of, the number of scientists, and that sort of thing?

Mr. Kevin Stringer: I'll ask Dr. Parsons to answer.

Dr. Jay Parsons: I don't have the exact figure for the number of people we have in the department. At Fisheries and Oceans, we have a number of regions: Pacific, central, Arctic, Quebec, gulf, Maritimes, and Newfoundland. We have a number of research facilities in those regions across the country. We do have aquaculture researchers at all DFO facilities. On the total complement for aquaculture, I would put it at roughly in the 30 to 40 range in terms of the number of scientists, biologists, technicians we have. But I can certainly come back with a more accurate number for you. That figure would be of the people who are working on research funded by our main aquaculture programs in the department.

Mr. Ryan Cleary: I have one quick follow-up question. How would that number compare to your science for the wild fishery?

Dr. Jay Parsons: Again, I don't have those figures right at the tips of my fingers, but we can provide them to you.

Mr. Kevin Stringer: It's smaller.

Dr. Jay Parsons: It would be a smaller complement than what we have on the fisheries science side; but again, I think that reflects the history of the department. The department has been around for many years, and we've had a mandate in fisheries science ever since the beginning of the department, whereas, as Mr. Stringer alluded to earlier, the more immediate role of aquaculture in the department has been more recent in the last 20-plus years. And certainly our science complement that Mr. Stringer alluded to, in general, has followed that same pattern, in that we have received more resources over the last number of years and have been able to increase our complement of scientists over that period as well.

● (1630)

Mr. Ryan Cleary: Would it be fair to say that the science for aquaculture is growing, while the science for wild fishery is not?

Dr. Jay Parsons: In terms of the number of fishery scientists in the—

Mr. Ryan Cleary: Overall.

Dr. Jay Parsons: I would say that it's been fairly stable for the last number of years in terms of fishery scientists. But certainly for aquaculture, the department received some funding in 2000-01 that allowed us to increase our complement. As well, we received some funding in 2008, which again allowed us to increase our science complement for aquaculture.

Mr. Ryan Cleary: Thank you, sir.

Thank you, Mr. Chair.

The Chair: Thank you very much.

We now have Ms. Davidson.

Mrs. Patricia Davidson (Sarnia—Lambton, CPC): Thanks very much, Mr. Chair, and thanks very much to our presenters here this afternoon.

It's been extremely interesting, and I'm trying to get a grasp on the whole subject here. I just want to ask a couple of questions for clarification.

First, Mr. Stringer, you talked about world leaders in aquaculture. You said Norway, Scotland, and...?

Mr. Kevin Stringer: Chile for salmon.

Mrs. Patricia Davidson: And Chile for salmon, okay.

Do you collaborate regularly with them in developing and comparing processes as they go along?

Mr. Kevin Stringer: We do. Salmon aquaculture is fairly new, whereas on the fisheries side, we have formal arrangements through NAFO that have been going on for many, many years. The aquaculture arrangements with different countries are just developing. We now have tripartite arrangements with Norway and Scotland, and we meet fairly regularly with them. We talk about fish health management and about the issues of managing salmon aquaculture. So it's not as formalized on the aquaculture side as it is on the fisheries side. But we do actually have an MOU with Chile, which I think is actually focused on science, but it's on aquaculture management generally.

So we do have arrangements with the other three major players, but it's more opportunistic than anything else. We get together when we meet at big international meetings.

Mrs. Patricia Davidson: You also said, I believe, that 50% of the world's fish sources are supplied through all aquaculture.

Mr. Kevin Stringer: That's not salmon; it's aquaculture.

Mrs. Patricia Davidson: Yes, okay.

You were talking about closed containment and some of the sensitivities, including the price of salmon, the densities, capital costs, and those types of things. Then you went on to talk about environmental assessments and power use. You said that the amount of power used was quite extensive. Do you have any idea what the difference is between the amount of power used by closed containment, land-based aquaculture, and the other systems?

Mr. Kevin Stringer: I'll ask Alistair to give you the specifics, but what I can say is that in terms of our economic analysis or feasibility study on closed containment, we found the two big costs that really make it quite different. One was that the original capital cost was enormous for the closed containment, and the other is that you have to be close to a power grid to keep the water temperature at a certain level for these gigantic tanks—and this takes an enormous amount of power.

I'll ask Alistair, who is currently leafing through the study to find the answer to the question—

Some hon. members: Oh, oh!

Mr. Alistair Struthers: I've run out of time, and I can't find the specific numbers, but they are considerably higher for the closed containment. I would hazard a guess of 10 to 15 times higher.

Mrs. Patricia Davidson: Wow.

Mr. Alistair Struthers: They're considerably higher.

Mr. Kevin Stringer: Jay thinks he knows.

Dr. Jay Parsons: I don't have the specific number, but maybe another way to describe the scenario is to compare the difference between net-pen and land-based systems. In net pen, the industry is operating in water. They've got cages in there, and they rely on the natural flow of the currents and tides to move water through the systems. They will often have a barge there with a generator to support the requirements of people living and working on-site. Other than that, there are very limited power requirements for net-pen culture.

If you contrast that with a land-based system, you've got buildings with tanks. You need to be pumping water, depending on the system you're looking at, from the ocean into or around the system. As well, you have the costs for light and heating the water, etc.

So the big difference between a net-pen system and a closed system is in the physical infrastructure, and in maintaining that infrastructure in order to maintain the living conditions for your fish. A closed system requires much, much more power than a net-pen situation.

● (1635)

Mr. Kevin Stringer: So Alistair found it. It's seven times as much, not 10 times as much.

Mrs. Patricia Davidson: Thank you.

Are there other challenges relating to land use that you find with the land-based ones?

Mr. Kevin Stringer: With land use, you have to be close to a power grid, which is easier said than done. This is a rural industry. Finding a power base to hook up to an appropriate water source can be a real challenge. It may be that the land was not planned for that use.

So a whole lot of things have to come together, unless you're going to move this to the suburbs or closer to the city. That's not to say it can't be done. There are places where those opportunities exist, but it does make it more of a challenge.

Mrs. Patricia Davidson: Thank you.

The Chair: Thank you.

Mr. MacAulay.

Hon. Lawrence MacAulay: On this land-based system in Denmark, you said that $7 million was from the private sector and $2 million from the public purse. Salmon is approximately $2.30 a pound. What price would it have to be, in your opinion, to be profitable?

Mr. Kevin Stringer: First, let me correct you. If I said it that way, I—

Hon. Lawrence MacAulay: You might not have.

Mr. Kevin Stringer: Well, I may have.

Our understanding is that it's a $7-million initiative altogether, of which $2.2 million came from government.

Hon. Lawrence MacAulay: Okay.

Mr. Kevin Stringer: Our understanding is that their cost of production is significantly higher than the cost of salmon at the moment. It's $4.90, whereas the price for salmon is $2.30—at least it's $2.30 in North America. I don't know what it is in Denmark, but presumably it's not that different.

They're going to be challenged. This is information that we're picking out of the stuff they're releasing. So we'd have to get more detail than that. We don't know enough to be able to say how viable it will be. The figures we've seen show that it will be a challenge. But it's part of the effort, similar to what we're doing in trying to find ways to prove these things out.

Hon. Lawrence MacAulay: They're using a lot of private money.

Mr. Kevin Stringer: Yes, it would seem so.

Hon. Lawrence MacAulay: In the study, their RAS system showed a marginal profit. Is that correct?

Mr. Kevin Stringer: Yes.

Hon. Lawrence MacAulay: And that, if I understood you correctly, was for salmon at $2.60, and not at $2.30.

Mr. Kevin Stringer: That was the assumption we used for the study. It was $2.60. That's correct. It made a bunch of assumptions. It assumed an exchange rate, because the vast majority of this resource is exported to the U.S. It assumed power costs. It assumed a number of things. And one of the things it assumed was a price for salmon, which turned out to be accurate for the time, but not for today.

Hon. Lawrence MacAulay: Would you invest in a closed containment system?

Mr. Kevin Stringer: Would I?

Hon. Lawrence MacAulay: I know we have to study this, but I believe it's mostly the responsibility of the public purse to come up with new technology is this area. And it's good to have the private sector involved, but we're a long piece away. If I understand it correctly, with the open-net concept you can have a decent profit; but with closed containment you're most likely going to lose money.

● (1640)

Mr. Kevin Stringer: They have been profitable. They've been particularly profitable in recent years, because the Chilean production went down significantly. But we understand that the Chileans are coming back with their production. So we'll see what happens with the future economic viability. But right now, it has been and looks like it will continue to be economically viable.

I'd make two points, but I won't say whether I would invest in it. In our view, what's appropriate at this time are investments in the demonstration projects, with private funding—and not government doing it on its own. In our experience and our view, we've wanted to see private partnerships. There is a benefit to industry in doing this, to whomever takes this on. And the benefit is that they get the intellectual property if the thing works.

But what we've seen so far is that most of industry is not willing to take it on, on their own, because there's not a sufficient economic margin to make it viable. We've even seen one instance in Canada where a company was saying that it was going to do it and that it was applying for government funding to support it, but then recently they said they didn't want to proceed because of the market conditions. They're not saying they won't do it; they're saying they don't want to do it right now.

Hon. Lawrence MacAulay: Regarding this Middle Bay institute, you say that you're involved heavily in it and that there's another partner in China involved in basically the same thing? If I understand it correctly, the Chinese technology is more advanced.

Mr. Kevin Stringer: As I understand it, the group that's running the Middle Bay facility—and we have worked with them—also has arrangements in China, which I think involve different technologies.

I'll ask Alistair to jump in on this one.

Mr. Alistair Struthers: Actually, I think they're using the same type of technology in China. It's just that the regulatory hurdles in China are less than they are here.

Hon. Lawrence MacAulay: Thank you very much.

The Chair: Mr. Donnelly.

Mr. Fin Donnelly: Thank you, Mr. Chair.

I have more of a comment before my question. With the open-net pens, I'm assuming that in looking at the energy costs, you're also considering the fallowing and moving of those pens, because that's obviously a factor in those operations.

My question is this. If we just look at the west coast and are considering the feasibility of closed-containment systems there, profit is certainly one factor, but also, I would assume, another is whether the industry can expand, whether the industry is going to relocate, or come to, or continue to invest in that location. But there have been no new licences granted on the west coast for fish farms, that I'm aware of, for the last eight plus years—though I'm not sure of the exact number. So it seems that we're at a standoff.

I wonder if the department could comment on the fact that there seems to be no incentive for new licences. However, at the same time, the kind of closed containment technology that could offer a way forward may be years away.

So is there some kind of a strategy to move us forward?

Mr. Kevin Stringer: I'm not going to comment on whether there is significant interest from industry. I understand that Industry will be here, and you may want to ask them about their views on that.

What I can tell you, and we've told Industry, is that in terms of applications for new facilities and expansion of current facilities, while the Cohen commission is ongoing and until we've had an opportunity to see what they say and to consider their views and advice on aquaculture in their report, we're not going to be looking at significant expansions and new facilities.

There are some requests out there to do it, but we are taking the opportunity to think through very carefully about how we should position ourselves in the future. I don't think you will see any statement from us on that until we see what the Cohen commission is going to say. That's what we think is most appropriate at this time.

● (1645)

Mr. Fin Donnelly: Switching coasts to the east coast then, how are the other fisheries, the wild fisheries or commercial fisheries, faring in terms of any real impacts from aquaculture on that coast? I'm thinking of the lobster and shrimp fisheries. Are they thriving? Are they noticing any impacts? Are they raising any issues related to impacts they feel are associated with aquaculture in the east?

Mr. Kevin Stringer: There are impacts. They're raising issues. It's been an emerging issue, no question about it, from traditional fishers, particularly in southwest New Brunswick and in Nova Scotia. As new facilities are being established in Nova Scotia, issues and concerns are coming forward from local fishers.

The jurisdictional arrangements are different there right now. We have New Brunswick and Nova Scotia, but we do work closely with those jurisdictions. In New Brunswick, we have an integrated sea lice initiative, a management initiative that we're trying to bring to the table...the aquaculture industry, the traditional fishers in the two jurisdictions.... But New Brunswick at this point has the lead on that.

In terms of impacts, whenever a new facility is established, as was the case in Nova Scotia—there were more than two recently—we do an impact analysis. We provide that to the lead responsible agency, which in this case was Transport. We concluded that we didn't believe there would be significant adverse environmental effects from this; and, partly on the basis of that and other things, it proceeded. The interaction is quite interesting.

I would also point out that this is not the case everywhere in Atlantic Canada. My sense is that in Newfoundland and Labrador, in particular in the south of Newfoundland, there are pretty good relations between traditional fishers and the aquaculture industry.

It is something we're mindful of and working on in terms of bringing people together. Our belief is that it is possible for the two to co-exist effectively. Our job is to try to make it so.

The Chair: Thank you.

Mr. Allen.

Mr. Mike Allen (Tobique—Mactaquac, CPC): Thank you, Mr. Chair.

Thank you to our witnesses for being here.

I just have a couple of clarification questions on the deck, in particular on slide 11 and slide 12. Can you clarify what you mean when you talk about flow-though with no aeration, supplemental aeration, and liquid oxygen injection for the floating rigid-wall tank system, as opposed to the floating flexible tank system where there are cross marks? It's not in any other system. You've highlighted it for these two. I'd just like to understand what the difference is.

Mr. Alistair Struthers: The two red Xs that appear on slide 12, in particular, just mean that those two factors weren't analyzed in that case, because with flow-through and no aeration, the amount of water required for the stocking densities for the flow-through was unfeasible. I can't remember the numbers offhand, but they were unattainable. It was not possible to pump that volume of water through that size.

Mr. Mike Allen: Going back to the testimony of the other day, my understanding of the closed containment and land-based systems is that it's more the warm water species of fish this is used for. Tilapia and things like them seem to be the more prominent species, and there was discussion of 50 kilograms per square metre of those. In this case, if I understand correctly, based on a 10-pound market size Atlantic salmon, which is typically what we go for, we'd be talking somewhere in the area of an open net of three fish per cubic metre, as opposed to ten fish per cubic metre based on that financial model. Is that true?

● (1650)

Mr. Alistair Struthers: No. For the net pens, you'd be looking at probably 15 kilos per cubic metre.

Mr. Mike Allen: About 30 pounds, so three market-size fish, as opposed to ten market size fish for the same cubic metre in the closed containment, if you're looking at—

Mr. Alistair Struthers: Yes, if you're looking at number of fish—

Mr. Mike Allen: So there's quite a difference in the number of fish in that per cubic metre size.

Now, that leads me to my next question. Have there been any reports or studies done on tilapia from a fish health standpoint? But maybe more importantly, you talked about fish performance. What have been some of the issues for tilapia and those warm water species when you start getting up into that range?

I was saying to Mr. Kamp the other day that at 50 kilos per cubic metre, it's almost like we could walk across the tank on top of the fish. What are some of the challenges for fish performance?

Mr. Kevin Stringer: I'll throw that unfairly to Jay.

Dr. Jay Parsons: Thank you.

I'm not all that familiar with tilapia production issues, so I won't be able to comment extensively on that particular question. But we can certainly get back to you with further information.

One comment I will make, though, is that stocking densities vary quite a bit among species—and I'm not sure, Alistair, if you know the figures for tilapia.

Behaviourally, different species of fish can perform and grow optimally at different stocking densities. Arctic char, for example, and I also believe tilapia, can grow naturally and perform quite well at quite high stocking densities, whereas certain fish, for example Atlantic salmon, don't perform as well at higher densities as some other species.

In terms of specific issues related to tilapia, my understanding is that there are the same types of issues in general around the performance of the fish in respect of their food conversion ratio, their growth, husbandry, and health management. These are the main concerns for tilapia.

Mr. Mike Allen: Okay, thank you.

In the land-based systems that you indicate on slide 13 of your deck, I'm assuming that the recirculating aquaculture system would be set up in a similar fashion to that. Are any of these land-based systems that we know about all close to a major water source, like a lake or an ocean?

Mr. Alistair Struthers: Slide 13 is actually a land-based flow-through system. By their very nature, based on the fact they are flow-through systems, they do need to be next to a high-quality water source. Likewise with slide 14 on the recirculating aquaculture systems, they also require a high-quality water source. So if you're talking about salt water systems, then yes, they need to be close to a salt water system. If it's a freshwater system, then the portability or the range in geography is a little bit larger at that point.

Mr. Mike Allen: What we heard the other day is that each one of these would be approximately 10 hectares in size at a site like this. So we're talking in excess of 20 acres that you'd need as an appropriate water source at a site by the ocean or a lake. I think one can raise salmon in fresh water. The question would be, as part of these demo systems, are we talking about salination systems going with these as well, depending on where they're located?

Mr. Alistair Struthers: The recirculating aquaculture systems that we looked at were specifically for saltwater Atlantic salmon. We didn't look at any type of artificial salination of the water, such as Instant Ocean. If you were to look at something like that, I think the costs would be prohibitive.

Mr. Mike Allen: Okay, thank you, sir.

The Chair: Thank you, Mr. Allen.

Mr. Kamp.

Mr. Randy Kamp: Thank you, Chair.

Let me ask a couple of questions that are more or less unrelated.

My first question is that in both your report and your testimony, as well from the testimony of officials yesterday, it has been pretty clear that your analysis shows closed containment systems, at best, to be minimally feasible from an economic point of view. And I think you make a compelling case about that.

Dr. Andrew Wright, whose work sure you're familiar with, appeared before us as well—although several months ago now. Can you explain why he was less certain about that in his work? In fact, he showed a sort of acceptable rate of return for a land-based recirculating system. Did he apply different assumptions, or can you explain that for us?

● (1655)

Mr. Kevin Stringer: I think that's the answer to the question, that it largely depends on the assumptions you start with. As for the variables that we're throwing into this, I've mentioned a few of them, but I'll mention a couple more.

So much depends on what you're putting in as the price of salmon, and so much depends on what the rearing density figure is. Are you going with a 3:1 ratio compared to net pen, or 2:1 compared to net pen, or 4:1 compared to open-net pen?

The capital costs depend very much on where you're actually building this thing and the trucking costs, etc.

The exchange rate is an enormous factor. Whether you're successful economically depends very much on that going up and down, simply because I think 85% of this is exported to the U.S.—though I don't remember what the figure is.

It presumes the availability of a suitable location with access to a quality water source. We assume access to a large power grid. We assume there are roads, and all those types of things.

Different feasibility studies have landed at different places. They all land at different places, we think, because they all start with different assumptions. But based on what we've seen so far—and we need demonstration projects to prove this—they also land with an understanding that the costs may come down with practice, with economies of scale, with learning new techniques that we haven't thought about, with practice, and those types of things.

I think those different assumptions that go into it largely explain the differences.

Alistair.

Mr. Alistair Struthers: To add to that as well, we commented on Dr. Wright's study and he commented on ours. He actually sat on our technical advisory committee. There was some back and forth on the assumptions used, and we agreed to disagree on the assumptions.

Mr. Randy Kamp: Good. That's helpful.

The short final question is from me.

DFO has gone through the interesting challenge of creating a full-fledged regulatory framework in British Columbia, due to the requirements resulting from a court case, as you know.

Now DFO manages that. In that new framework, with aquaculture, do we still have an all-in all-out framework where for 22 to 28 months, you can grow this many kilograms of salmon? Or do we do it differently now under this new regime?

I guess the basic question is whether that kind of regulatory framework would be optimal for, say, a closed containment style of aquaculture? Or if there was a different regulatory framework tweaked in a different way, would that change the likelihood of closed containment being feasible?

Mr. Kevin Stringer: It's a good point and one that I think we would want to contemplate.

The current regulatory framework, I think you're suggesting, and it's absolutely accurate, presumes the current arrangements with open-net pens. In fact, one of the things we are doing is working with industry and others on what are called integrated management of aquaculture plans, IMAPs. These would look at regional planning so that you will have an appropriate following in the same region, whether it's the west coast of Vancouver Island or whatever cluster you're talking about. That all presumes that it's an open-net pen, because with closed containment, you wouldn't look at some of those things.

So I think you would look at the regulatory system. Certainly some of the licence conditions would change for closed containment. We do have some closed containment systems, and the license conditions are different.

I think it would be good to look at what the regulatory regime might tweak if you were to go in that direction.

● (1700)

The Chair: Thank you very much.

I have one question, Mr. Stringer. It follows up on Mr. Donnelly's question about the impacts aquaculture might have had on traditional fisheries. You referenced southwest New Brunswick in answering that question.

To follow up on that reference, in southwest New Brunswick, aquaculture is a relatively young industry. It was introduced into that area in the early 1980s. The traditional or main fishery in that region would be lobster. I'm wondering whether there has been a decrease in the stocks or the catch from that area since the introduction of aquaculture. Or has there been an increase?

Mr. Kevin Stringer: You know, I don't know the answer to that question. But in thinking about southwest Nova Scotia in particular —and here I'm not sure what the numbers are for southwest New Brunswick—the numbers have been very good in the Bay of Fundy.

You're right that it is a new industry and that relationships are still developing, but I believe the numbers have actually increased, and certainly since the early nineties when the industry started.

The Chair: Thank you very much.

Thank you very much for appearing before our committee today. You have given us a lot of information in a short period of time, and we certainly do appreciate that. Hopefully we can reserve the right to ask you to come back again. I'm sure there will be follow-up questions as we proceed along this path the committee is pursuing.

Once again, on behalf of the committee, I want to thank you all for coming.

The meeting is adjourned.

Published under the authority of the Speaker of the House of Commons

SPEAKER'S PERMISSION

Additional copies may be obtained from: Publishing and Depository Services
Public Works and Government Services Canada
Ottawa, Ontario K1A 0S5
Telephone: 613-941-5995 or 1-800-635-7943
Fax: 613-954-5779 or 1-800-565-7757
publications@tpsgc-pwgsc.gc.ca
http://publications.gc.ca

Also available on the Parliament of Canada Web Site at the following address: http://www.parl.gc.ca

Publié en conformité de l'autorité du Président de la Chambre des communes

PERMISSION DU PRÉSIDENT

On peut obtenir des copies supplémentaires en écrivant à : Les Éditions et Services de dépôt
Travaux publics et Services gouvernementaux Canada
Ottawa (Ontario) K1A 0S5
Téléphone : 613-941-5995 ou 1-800-635-7943
Télécopieur : 613-954-5779 ou 1-800-565-7757
publications@tpsgc-pwgsc.gc.ca
http://publications.gc.ca

Aussi disponible sur le site Web du Parlement du Canada à l'adresse suivante : http://www.parl.gc.ca