



CANADA

Standing Committee on Fisheries and Oceans

Comité permanent des pêches et des océans

**EVIDENCE NUMBER 08,
TÉMOIGNAGES DU COMITÉ NUMÉRO 08**

UNEDITED COPY - COPIE NON ÉDITÉE

Wednesday, April 14, 2010 - Le mercredi 14 avril 2010

* * *

⊕ (1535)

[*English*]

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

Before we begin with our guest this afternoon, it's just a housekeeping item. In your packages you will find a couple of budgets that are required for our witnesses, just to cover their expenses. I was looking, there are two budgets, one is for \$7,700 and the other is for \$5,700. The motion, is it the pleasure of the committee to adopt the proposed budget titled Budget Number One and it's in the amount of \$7,700.

Is it the pleasure of the committee to adopt that budget? All those in favour say aye. Those opposed.

(Motion agreed to)

The Chair: Likewise, is it the pleasure of the committee to adopt the second budget in the amount of \$5,700 for expenses pertaining to the video conference and briefings that we have received and will receive?

Is it the pleasure of the committee? All those in favour signify by saying aye. Those opposed.

(Motion agreed to)

The Chair: Thank you very much for your cooperation on those housekeeping items.

Dr. Sheppard is with us today. We thank you very much for taking the time out of your schedule, Dr. Sheppard, to come and appear before the committee and provide us with a briefing, an update, in your capacity.

You will probably hear throughout the time here today, Dr. Sheppard, a beeping noise. There's a timer here. There are some time constraints that we try to adhere to. We generally allow about a 10-minute time frame for our witnesses, our guests, to make an opening presentation and then we move into questions from our committee members. The members are aware of the time frames that they are each allotted and that's for questions and answers. I generally don't cut out guests off but if you hear the beeping noise, it's kind of a signal to you to finish your thoughts and comments and then we'll move on to the next after hearing that.

At this time, Dr. Sheppard, I would ask you if you have any opening comments?

Dr. Mark Sheppard (Veterinarian, Aquatic Animal Health, Ministry of Agriculture and Lands, Government of British Columbia): Thank you very much.

First, I'd like to thank you very much for the invitation and the opportunity to come to speak with you in person and address any questions the committee has about the management of fish health in British Columbia. And I trust the committee has received a small package or brief, including some graphs that I anticipated might cover the usual topics of interest in B.C. aquaculture, so I'm happy to speak to those notes if they require further clarification.

To begin, I should introduce my credentials and experience. I have a Bachelor of Science degree. Subsequent to that, I earned a doctorate of veterinary medicine from the Canadian Western College of Veterinary Medicine. I have 20 years of veterinary experience in finfish aquaculture management, both in Canada and abroad when I provided veterinary services as an animal health consultant to aquaculture farms and the federal fish enhancement facilities.

I joined the province just three years ago and currently I manage the operations of the British Columbia provincial fish health program within the Animal Health Branch of the B.C. Ministry of Agriculture and Lands. I provide advice on the management and health and diseases of economic and regulatory significance to the aquaculture sector and to senior ministry executive for strategic planning. I interact regularly with federal and provincial agencies, industry, first nations, and the public.

Now that I've told you what I am, I should probably balance that by telling you what I am not. I am not a policy-maker, I am not a sea lice researcher, and I am not a wild fisheries biologist. So please understand that I will do my best to answer your questions, but I am restrict my comments to aquaculture and my area of expertise, hopefully using sound and scientific objectivity rather than delving into the world of speculation and innuendo, which is often what we are exposed to in the media and the Internet lately.

I would like to introduce 10 or so key points at the outset, if I may.

British Columbia's salmon aquaculture industry is monitored through very frequent inspections by the Ministry of Agriculture and Lands and the Ministry of Environment. My staff alone audits and monitors the industry farms approximately 150 times each year. In other words, the fish health staff are on the salmon farms, on average, more than 12 times per month. And when considering infectious agents or disease agents on those salmon farms, on average, the survival of the farmed salmon exceeds 97%. Any other losses beyond that are due to environmental and predation issues. So overall, the farmed fish are very healthy populations.

As a measure of accountability and transparency, the industry-specific results are regularly made public online and are included in the annual fish health and compliance inspection reports. Farms' sea lice values are posted either by the farms directly onto the web or on a monthly basis through the provincial government website. And contrary to what you hear or see in the media, sea lice in British Columbia are not a growing problem. The management of lice in British Columbia is very much under control. In general, the lice abundance on both farmed and wild fry have actually declined for five consecutive years.

So the province takes this issue and the public's concern very seriously and follows a comprehensive sea lice management strategy. That strategy is part of the larger fish health program that takes a proactive approach to fish health management at the farms.

⊕ (1540)

To speak directly to the issue of sea lice in British Columbia, a few points. Lice abundance on farmed salmon in British Columbia is low compared to lice abundance experienced in other countries and regions, and by this I mean we're talking ones and tens of lice per fish, as opposed up to hundreds of lice per fish in other regions.

Some recent research, 2007 and 2008, which I consider cornerstone research, genetic research, shows that the Pacific Ocean louse is genetically different from the Atlantic Ocean louse, which is the problem in Europe and in eastern Canada. This largely explains in British Columbia why we have not seen the lice-related damage that the other aquaculture regions experience. That genetic difference, by the way, between the Pacific and the Atlantic Ocean louse is basically equivalent to comparing a human to a chimpanzee, and largely explains why we do not see the lesions and the disease problems.

Sea lice, as you know, are naturally occurring parasites, as common as fleas on a dog, and we are not going to get rid of them from our ecosystem. The changes and the ups and down in lice abundance patterns are common, and are readily explained by environmental and farming events.

Fresh and new populations of lice come to B.C. from wild fish as they return to the B.C. coastline at the end of each summer and there is insufficient evidence to substantiate the claim that lice in British Columbia are resistant to the one drug that we use.

I'm sure you have many questions, but, in closing, British Columbians want the risks to wild fish minimized and so does the provincial government. That is why the Animal Health Branch has monitored and analyzed routinely and reported the status of lice and disease on B.C. salmon farms for the past seven or eight years. From that we can claim that the ecosystem, as it relates to salmon aquaculture, remains healthy and sustainable.

So, Mr. Weston, that ends what I would like to present today and am very happy to entertain questions.

⊕ (1545)

The Chair: Thank you very much, Dr. Sheppard.

Mr. Andrews.

Mr. Scott Andrews (Avalon, Lib.): Thank you, Mr. Chair.

Just to start out, I'd like to go back to one of the first points you made, and maybe get you to provide a little bit more detail to the committee regarding the access that you had to the aquaculture farms. You made the statement that they're 12 times per month.

Have you had access to all the aquaculture farms, and what kind of access have you been given in order to do some of your research?

Dr. Mark Sheppard: Right, in fact, a very good question.

The fish health program is largely based on a database system which has an algorithm, and what we do at the beginning of each quarter of the year is put in the active farms that are currently active with growing fish in that quarter, and the computer will randomly choose which sites we are going to go audit and visit, not only for health visits, but also for sea lice monitoring and audits.

Our staff, once that's chosen, will communicate with each of the farms, and over the next three-month period will go and visit those particular sites, coordinate it with the carcass collection days, whether that be coordinating with a third-party diving company, sometimes the carcasses are brought up by a pump. So we go out and we attend the carcass collections, collect the samples from the selected group of dead fish, and bring them back, where they are analyzed very thoroughly in the laboratory in the Animal Health Centre in Abbotsford.

Mr. Scott Andrews: Are the aquaculture farms giving you full cooperation and full access to all aspects of the farm, and is there a need to improve that or is it sufficient?

Dr. Mark Sheppard: No, we have absolutely full access to the information once we arrive on site. As I said, each farming company has a fish health management plan where they have to meet certain requirements in terms of monitoring their carcasses, monitoring their fish, everything to do with husbandry. They have to record all that. We do have access to all of that information on site.

If I can break this down for you, Mr. Andrews, the fish health program is composed of three basic components, one is that fish health management plan that the farmers must follow and must abide by, which does speak mostly to monitoring, recording and reporting their own information and making that available to government officials.

The second component is what I was talking about earlier, which is the fish health audit and surveillance program where we will coordinate our visits to go and actually collect dead fish of diagnostic quality and have those submitted and screened for pathogens that are of concern to Canada and internationally, not to mention the endemic infectious agents that are just in the ocean in B.C.

The third component is to coordinate visits to actually go and conduct sea lice counts at the farm, shoulder to shoulder with the farmer; and by that I mean they will count half of the fish and we will count the other half of the fish that are collected. In other words, they count 30, we count 30, 10 from each pen and 10 from each pen. So that we can make a comparison and feel confident that what they're looking at and what they're reporting is the same thing we're seeing and what we record likewise.

⊕ (1550)

Mr. Scott Andrews: Saying that aquaculture has been one of the possible causes of the loss of sockeye salmon, do you agree with that statement?

Dr. Mark Sheppard: As I said, to reiterate, I'm not a fisheries biologist. I would suggest that question might be better answered by a DFO scientist.

However, not to dismiss the question, from an aquaculture perspective, as I said, with the infectious rate in farmed salmon and the survivor rate being over 97%, I do not foresee that the aquaculture industry has an effect on the Fraser River sockeye.

Mr. Scott Andrews: Speaking about scientists, do you think government agencies have enough scientists? Are we doing enough science in this matter? Could we do more? Is it at the suffice level now or should we look at possibly expanding it or suggesting it be expanded?

Dr. Mark Sheppard: Personally, I feel the industry is very highly monitored, not only by the provincial government and the ministry of environment, but also within the industry itself. They have their own veterinarians. They have a much more detailed database than the province does.

The veterinarians working in that industry see things on a daily basis, they have their fingers on the pulse.

Of course, there has been a tremendous number of questions and improvement over the last 25 years and a lot of that has been due to ongoing projects and questions, and then supporting that through research and applicable research. There's an awful lot being done already and of course, the focus lately has been on sea lice activity and trying to find the answers to that. But we feel we've got a fairly good finger on the pulse in terms of what's happening health-wise at the farms.

Mr. Scott Andrews: I have a question here that one of our analysts put together. We heard evidence that tolerance to SLICE, an antiparasitic drug used to treat sea lice infection, was not a problem in British Columbia. Can you confirm that this is the case and how do you test for this type of drug tolerance? Are you familiar with that?

Dr. Mark Sheppard: Yes and again, we'll reiterate that there is no evidence to substantiate that allegation that there is drug resistance to SLICE by lice in British Columbia. To make such a claim, in my opinion, is misleading and quite frankly, irresponsible.

It's a complex issue, drug resistance and the development of it and there are a myriad of other factors that need to be considered before putting it on the list. Now it is on the list, it would be on the very bottom of the list as a likelihood as how one would explain why SLICE treatment did not work.

If that is a line of questioning people are interested in, perhaps I should start at the beginning and explain what is really happening as opposed to the allegations that are out there. Is that acceptable?

Mr. Scott Andrews: Go ahead.

Dr. Mark Sheppard: Maybe I should begin with a normal SLICE treatment in British Columbia.

Again, British Columbia is in a very unique situation. The lice are very much in control. SLICE is only used approximately one time each year, so its infrequent use, first of all, is not conducive to the development of resistance. It's a very effective drug, normally.

What happens is, as I said, a new batch of naive lice come back on the wild salmon and they seem to be readily transferred into the farming system, usually beginning some time in August or September. Normally, what would happen at a farm site, a veterinarian would continue to monitor that situation, and then finally write a prescription to medicate that population of farm fish, sometimes in November, sometimes December, sometimes January. In the winter months, you'll see that's when the lice numbers have accumulated, compared to the rest of the year. Normally, then, within a month or so after that treatment, the lice numbers have dropped down to next to nothing, and without any further challenge of lice, which is the normal case in British Columbia, because as I said, the resident availability of lice usually doesn't begin again until September, so after that SLICE treatment normally what happens is that the farmers in British

Columbia have the opportunity to have effectively a louse-free or very low-lice count, often below one per fish, for anywhere from three, four or five, six months, until again they're challenged with lice when the next batch of Pacific salmon come through, late in August or September.

If I can take you back to June or so of 2009, a different scenario set up this year in one particular area of British Columbia. It was a very dry year, very little rain, and in June, July, August, what happens on the west coast, the outside coast of Vancouver Island is the farms there often suffer from what's called the "low-dissolved oxygen."

Is that for me?

⊕ (1555)

The Chair: Carry on.

Dr. Mark Sheppard: It's a low dissolved oxygen situation. Again, it's a natural situation; it happens every year because outside, and my understanding on the Pacific northwest is that there's sort of a low oxygen dead zone, if you will, dead water, and it comes to shore sometimes. So, in that period of time, fish can be killed but certainly they can't be fed very well because that will kill them. In addition to that, when you've got a lot of sun and sometimes a little bit of rain, harmful algae blooms will develop. Again, that can either kill your fish, they certainly can't be fed, so the farmers leave them down in the bottom and don't want to entice them up to the top.

In that period of time--June, July, August, September--some farms just literally cannot feed their fish very much. Instead of the normal 30 or 31 times a month, they may only get seven, ten, fifteen days of feeding in. Those are some of the environmental factors. What's happened now is, you've got a group of animals who haven't really had access to feed very much and as a result, they haven't grown. That would explain why we've got undersized fish now and that can wreak havoc with your harvest schedule and your marketing schedule. That was the case here where you've got a group of fish who have just been sort of maintained for several months.

In addition, if you start looking population dynamics, just like a group of chickens, for example, a pecking order will develop. You get the aggressive fish that will get the feed and they'll grow a little bit, but you get a bimodal population so now you've got another group of fish that just isn't doing well. It goes by a number of different names poordoes, slinks, just basically subordinate fish that are marginalized in the population in every pen.

Here comes now, end of October, and as I said, it hasn't been raining so the salinity of the ocean has been increasing. In other words, the salt content, was, as far as I can tell, a record high in that area. Lice really like high salt contents, so you get waves of Pacific salmon coming in with their lice, you've got fish that aren't feeding, you've got perfect salinity conditions, you've got lice getting into the farms and multiplying in the farms. So, at the end of October, finally, it looks like the fish are going to start feeding again, so the veterinarian, and I applaud him for this very diligent activity and judicious use of the product, set up a seven day medication for the fish. The medication was fed for seven days at the end of October; cameras were used, as they are in

every pen to make sure that little or no medication fell through. Sure enough, the entire medication was consumed, 100% by the fish that were eating, and that's the key. Again, you can imagine that you've got a prescription of SLICE eaten by, for argument sake, 80% of the fish, and that SLICE worked very well to reduce the numbers of lice to next to nothing on those robust fish that had access to the feed. You've got another 20% of the fish that are marginalized and didn't have access to that medicated feed and those lice would remain on those fish not exposed to slice.

What's happening then, is shortly after the SLICE medication, the concentration of that product in the mucous and the skin starts to decline over a number of weeks, and as it declines, you can imagine that the lice from the subordinate fish are now looking to move over back onto the robust fish. The lice from the ecology, other waves of Pacific salmon coming through that area, same thing. Or the resident lice that are on small fish, like sticklebacks, for example. A number of sources of SLICE-free lice that are now moving back onto those fish that had been medicated in the last month or two. You've likely seen some of the graphs. There was an increase in lice and instead of seeing a nice flat line after that, you see an increase again. That would be the explanation for that. There is not SLICE-resistant and credible scientists with objectivity have looked at all those factors. We went out to visit the site; I went out personally at the end of January to assess the situation

🕒 (1600)

We went out to visit the site. I went out personally at the end of January to assess the situation and the farmer is following all of its requirements, exceeding all of their requirements. I applaud the veterinarian for doing what he did because at that point, there was tremendous pressure to keep throwing drugs at those fish in order to control that situation. They realized that it's just not going to work when we only have one infeed product and how can one infeed product be effective when you've got animals that aren't eating it. So that's why the decision was made, a multi-million dollar decision was made to start to harvest undersized, undermarketed fish to get them out of the system. Quite frankly, it's sort of what everybody would like to have done but it certainly didn't come across as being praised.

The Chair: Thank you very much, Dr. Sheppard.

Monsieur Lévesque.

[Français]

M. Yvon Lévesque (Abitibi—Baie-James—Nunavik—Eeyou, BQ): Bonjour, monsieur Sheppard. Vous me corrigerez si j'ai mal compris. À venir jusqu'à maintenant, j'avais cru comprendre des témoins qui s'étaient présentés, que le poux était produit justement par les poissons en aquaculture. Aujourd'hui, vous venez renverser ce que j'avais compris jusqu'à maintenant, vous nous dites que le poux a été amené par le poisson du Pacifique. Et en même temps vous nous dites qu'il y a moins de poux sur le poisson du Pacifique que celui de l'Atlantique. Ai-je bien compris?

[English]

Dr. Mark Sheppard: Thank you for your question and I apologize I do not speak French well enough to answer in French but may I repeat your question in English to confirm I have the gist of it. Yes I've given you an opposing opinion about where the lice come from. Others have said the lice come from the farm fish. I'm saying the lice come from the wild fish. The last part of the question, you said that I said fewer lice were on the Pacific fish compared to the Atlantic fish, the farm fish. Is that your question? So that's true.

If we backtrack, we know the lice do come from the wild. The Atlantic salmon that are grown in the cages come from the hatcheries and they're completely lice-free. They do not start to acquire lice until they get into the marine cages. Small Atlantic salmon can acquire lice but they generally have much fewer lice than the larger fish. As they get older, they start to accumulate things in the next season. So the lice do come from the wild fish. In the package that I delivered earlier, you will notice that there's a typical pattern of where lice are increased in the farm cages at the same time that the Pacific salmon are coming back. I think it's well understood that those lice are coming from the Pacific salmon that are returning to the coastline.

If I may, but in terms of there being fewer lice on the farm fish or on the Pacific fish than the Atlantic fish, no I said in the last five years, in measuring both the farm fish in the open migration period of the small Pacific fry from March until June, there's a decline in both populations, the farm fish as well as the presence of lice on the wild fry in that same period for the last five years.

Does that answer your question?

🕒 (1605)

[Français]

M. Yvon Lévesque: C'est plus clair. Mais quand vous me parlez de votre document, le document a-t-il été distribué, monsieur le président? Le document avec des diagrammes dont parle M. Sheppard, je ne l'ai pas vu dans ceux que j'ai.

[English]

The Chair: The documents were distributed. The charts were not because they were not translated.

[Français]

M. Yvon Lévesque: C'est la raison.

[English]

Dr. Mark Sheppard: My apologies for that. I can make some of these charts available. Leave them with you if members are interested to look at them but they're largely just bar charts and line charts which do show the history of lice counts at the farms compared to ... there are no wild fish on them. These are farm counts from the farmers themselves versus what we audit at the farms. There's a number of reports on lice from the DFO scientists that have been monitoring the wild fry for those same periods for the last seven or eight years, well five years, I guess since 2005 likely.

[*Français*]

M. Yvon Lévesque: Monsieur Sheppard, on sait que la juge Hinkson a décidé que l'aquaculture, souvent appelée élevage piscicole ou aquacole — je ne sais pas comment on doit l'appeler au juste — était, par essence, bel et bien de la pêche et non de l'élevage agricole. D'après vous, cette décision est-elle surprenante?

[*English*]

Dr. Mark Sheppard: To reiterate your question, was it surprising to me that the farmed fish are now referred to by Justice Hinkson as being a fishery? His decision was a bit surprising to most people. My understanding is some questions still circulate around the wild fishery versus the aquaculture fishery and what happens when these fish are inside the cages and who owns them. We certainly know who is going to manage them.

I'm not quite sure what else to comment. Being from a veterinarian background and being from the province of British Columbia and the animal health branch where most of the farm animals that we monitor are actually farmed animals, farmed chickens, farmed pigs, it just seemed natural that these should be treated just like the chickens in that they are farmed fish and managed from egg to harvest.

[*Français*]

M. Yvon Lévesque: Suite à l'affidavit déposé par le gouvernement fédéral, le gouvernement provincial a décidé de transférer ou céder au gouvernement ses responsabilités actuelles. Est-ce que la province aurait pu avoir une autre avenue pour agir ou une autre façon d'agir que d'accepter de remettre au gouvernement fédéral la gestion des piscicultures?

[*English*]

Dr. Mark Sheppard: Right. I understand the question, thank you, the question being could the provincial government have made a different choice as to what was finally taken and retained the right to manage aquaculture in British Columbia. It's a very good question. I've had the same question.

I'm afraid I'm not qualified to answer that question. As I said, I'm not a policy maker. I'm a manager. Those decisions are certainly made at the political level. I'm just following what will happen in the future and we're waiting to see what the Department of Fisheries and Oceans will

present to us. I'm trusting that it will carry on being managed very well by Fisheries and Oceans Canada.

🕒 (1610)

The Chair: Thank you very much.

Mr. Donnelly.

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

In reference to the graphs, I would be very interested in getting copies of those graphs.

Thank you, Dr. Sheppard. Thank you for being in front of the committee and providing your comments.

In one of the handouts in the background information it says that from a strictly medical perspective—this is talking about SLICE—the drug protects fish from lice for a short period. It goes on to say that if medicated fish are exposed to unmedicated lice the second time those lice may re-infest the recently medicated fish and the situation as it has recently occurred in the Nootka area is not evidence of drug resistance even though some may interpret it that way.

I have a couple of questions on that. I'm wondering if you could describe what drug resistance looks like. This is not drug resistance in your opinion. What does drug resistance look like? Second, why are some saying this is, in their opinion, evidence or a case of resistance to SLICE?

Dr. Mark Sheppard: Right. Both are good questions.

If I may answer the second question first. The development of drugs resistance is an extremely complex phenomenon. Some people--who are not qualified to make comments on it in my opinion--have decided to put forth a wildly speculative conclusion based on a graph, which, I think I've explained to you, have many other factors that needed to be considered before any conclusion was made on that point.

That case in itself is just a matter of someone who either doesn't understand the science or simply prefer to move forth with a perspective to suit their agenda. Drug resistance, what it looks like, if you'd like I can refer to antibiotic resistance in bacteria--Is your question, Mr. Donnelly, specific about lice?

Mr. Fin Donnelly: It's about SLICE.

Dr. Mark Sheppard: I see that's about SLICE in lice.

By the way, for those who don't know, SLICE is the trade name for a drug. Its generic name is emamectin benzoate. It's used in different countries, and it's very effective at killing all life stages of lice when it works.

In other countries, it's used multiple times each year. They use it every six weeks sometimes, for example. In B.C., as I said, we use it once a year normally. Drug resistance can develop if there is a repetitive use of the product numerous times over short periods. If a drug is not effective at killing all the lice or all of the bacteria, the animals that survive--the lice or the bacteria--then have the opportunity to pass on their genetic resistance to the drug to the offspring.

When the drug is used again, there's more protection. More animals survive, and they keep passing on that genetics. It takes quite some period of time before drug resistance will develop in a population of parasites or bacteria. Unfortunately that is what we're seeing. We're seeing failed treatments in other parts of the world where they are using SLICE on numerous occasions.

Unfortunately the lice again--we're talking here about the Atlantic Ocean louse, a very different animal from what we have here in British Columbia. That's what they're seeing, and as a result, they have to use alternate products to try to control their lice infestations on their fish.

Does that answer your question?

🕒 (1615)

Mr. Fin Donnelly: Yes.

Dr. Mark Sheppard: If I may.

If it hasn't been--Without the depth of knowledge to look at a graph, I can see that there is a peak, medication and then another peak. I suppose if we had drug resistance, that might be what it looked like.

I would still go through the other 20 factors first before making that conclusion.

The Chair: Thank you.

Mr. Kamp.

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

I think it's fair to say that most of us here are not scientists, and you have done a good job of explaining some of these issues for us in a way that we can understand.

Just to be clear, after December this year when there's a changeover for management to the federal government, what do you expect your role or your department's role to be? Do you know that yet? Let me start there.

Dr. Mark Sheppard: Thank you very much, Mr. Kamp.

Your questions are my questions. I trust Fisheries and Oceans Canada very much appreciates the current activity in terms of audit and surveillance of the fish industry right now. Verbally, they've said they'd like to continue it. I know that the environmental non-governmental organizations, the NGOs, are quite appreciative of the fact that we're keeping a finger on the pulse and feel confident that we're watching for the things we need to be watching for.

The provincial government surely is happy with the situation and our program has been touted as exceeding international standards. I know the Canadian Food Inspection Agency is suggesting that it would be nice for all other agri-businesses to follow suit. Again, it's unfortunate you didn't get the graphs which pinpoint down to...we can measure the amount of chemicals used in fish right down to grams per metric tonne of animal produced.

So I think DFO wants to continue this. I think they feel the need to continue this but I don't know how it will look. I'm looking forward to seeing their new regulations. I think they will tighten up some of the regulatory requirements for fish health because right now the fish health plans are tagged to a term and condition of licence whereas I have a feeling the federal regulations may firm that up and turn it into a regulation, but I'm not quite sure whether I'll be involved or my team will be involved or where it will be, but some semblance will....

Mr. Randy Kamp: It's clear to you that fish health management will after December become a responsibility of the federal government. That's not something that's being negotiated as part of any sort of agreement with the provincial government at this point, as far as you know, and in some way, the federal government will have to discharge that responsibility.

Dr. Mark Sheppard: Yes, I feel confident it will continue. I do not know whether it will be a federal responsibility or a provincial responsibility at this point. We're waiting to hear the final conclusions on that.

Mr. Randy Kamp: Are you expecting to have any role in the Cohen Commission?

Dr. Mark Sheppard: I don't anticipate having a role in the Cohen Commission. I'm not opposed to bearing witness to it. If called upon, I'm happy to present information from our database if Judge Cohen feels it fit.

🕒 (1620)

Mr. Randy Kamp: Returning to the specifics of what we've been talking about, let me start with a sort of general statement. In fact it was a statement made--and you've referred to it already--but let me just bring it back again. When Alexandra Morton was here, she referred a number of times to viruses and bacteria and the threat that they posed, an imminent threat, I think it would be fair to say. She also referred to the graphs of the Ministry of Agriculture and Lands. She said, and I quote: "For a scientist they're a neon sign warning of drug resistance."

It sounds like you disagree with that. Would you like to comment further on that?

Dr. Mark Sheppard: As I said, the DFO scientist, the scientist within the province, the private researchers, the veterinarians would not consider that graph that she is referring to a neon sign of drug resistance. As I said, that aspect would have to appear on the differential list. I'd put it at the very bottom. The graph really reflects a count of lice over a period of time. It does not reflect the activity that happened or the environmental conditions that happened, or the population dynamics that happened within that period of time, and I hope I've explained those components to you today.

Mr. Randy Kamp: Very clearly, and we do appreciate that.

Dr. Sheppard, what's your relationship to the Association of Aquaculture Veterinarians of B.C.?

Dr. Mark Sheppard: Right. I have been a member of that association for the last 20 years. I play little or no role in the association now, other than to receive invitations to the meetings that occur once or twice a year or letters or announcements that they put forth. I don't play an active role.

Mr. Randy Kamp: Who are the members, primarily?

Dr. Mark Sheppard: The Association of Aquaculture Veterinarians of B.C. is comprised of private veterinarians who are working in fish, corporate veterinarians who work for the aquaculture companies, research veterinarians, veterinarians within the provincial and federal government who are involved in fish. There are some pharmaceutical veterinarians in the group. The active membership is about 10 veterinarians in British Columbia, I suppose, give or take. There are other members who, of course, receive information, and these would be members from out of province who are keen to hear what's happening in British Columbia from a veterinarian perspective.

Mr. Randy Kamp: How many members of that association or other private veterinarians, or aquaculture experts, who do disagree with your conclusion that the evidence doesn't show any resistance to sea lice? In other words, are there any experts or aquaculture veterinarians that you know who are drawing the same conclusion as Alexandra Morton, for example?

Dr. Mark Sheppard: I know of none. In fact, the opposite, they are vehemently opposed to her opinion of that.

That said, again in the brief that I put forth is a list of research-related activities that are either ongoing or about to start in British Columbia to address this topic of lice and the use of chemicals, and the genetics around lice, not because we have drug resistance in British Columbia, but again British Columbia is in a very unique position in that we're one of the few areas in the world that has the opportunity to measure these things before it happens. So this type of activity is going to occur, which will allow us to benchmark the current situation in 2010, and would give us the tools, then, to monitor much more closely for responses to drug use from this point forward.

⌚ (1625)

Mr. Randy Kamp: Thanks for that.

In the executive summary of the *Sea Lice Management Strategy* that you provided for us, it refers to the strategic use of SLICE, and it says it's "fewer than two times per finfish grow out." If you can just tell us how long that cycle is. Then it also says "there has been a steady decline in the drug's overall annual use since 2005." So used less frequently than it used to be, I would conclude there. It also says in that same section that "the abundance of sea lice on farmed salmon has remained low and has continued to trend downward since 2005."

So you're using it less and we're seeing fewer lice. Why are we seeing fewer lice if we're losing it less? I guess that's kind of where I'm going with that.

Dr. Mark Sheppard: Those are very good questions, Mr. Kamp.

To begin, the grow out period for our typical Atlantic salmon that gets into the cages would be somewhere in the neighbourhood of 20 to 24 months--at the outset, 24 months--maybe 18 to 22 months. It depends on water temperatures, etc. So when I say it's used up to two times in that grow out period, you can imagine that when the small fish come from the hatchery into the ocean in the fall, they're exposed to that influx of lice from new Pacific salmon. So sometimes what we call smoulds are treated with SLICE before March to reduce any lice load that those small smoulds have. Again, the goal being to try to minimize the amount of lice on the farmed fish in the period from March 1 to June 30, what is called the "wild fry out-migration period". So those small fish may get exposed once to SLICE. The second treatment on that same group of small fish is not likely to occur until the next winter. So again, on average it's once per year.

Does that answer that question?

In terms of the decline in use of the product, SLICE, it is unfortunate you didn't get these graphs because we monitor this very closely through the province. The graph indicates that the amount of SLICE has been declining over the years. What you cannot see--which is very important here--is the scale is from zero to 1 gram of active ingredient per metric tonne of fish. In 2008, 0.2 of a gram of the product was used per metric tonne of fish. I can tell you that in 2009 that declined to 0.15 of a gram.

To put things into relative perspective, you'd be hard-pressed to get 0.15 of a gram on your fingernail. It's just such a tiny amount of SLICE that is used in B.C.

Your third point, Mr. Kamp, was that the information that doesn't generally get out there is that over the last five or ten years the production of Atlantic salmon has gone up, the mortality has decreased, the lice abundance has decreased, and the use of the control product has decreased. The use of this control product is not because the farmed salmon need it. It's largely to meet the social expectation of the farmers, the industry, and the province trying to do what it can to minimize the abundance of lice or the risk of lice transferring into those wild fry in that spring period.

The Chair: Thank you.

Mr. MacAulay.

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

And welcome back.

In 2004, about 2 million sockeye disappeared. In 2009, of course, there was a bigger disaster. Do you think there is a link there?

And number two, what I've heard today differs from a lot of things I've heard up to now. I have been told that the farms were put in improper places and that they were in direct line with the wild stock returning; and that the farmed fish were causing the lice problem. What you have told us today is totally different. Is that the way it is?

To me, we've heard a lot of stuff. Somebody is not right.

🕒 (1630)

Dr. Mark Sheppard: Right.

Hon. Lawrence MacAulay: And either we wasted a lot of time, or....

And another thing, if you get a minute, we were speculating we might do a review of the fishery on the west coast. Do you think that would be harmful or helpful or would it make any difference during this time of the hearing?

Dr. Mark Sheppard: Those are all good questions.

I'm thrilled to be here, really, in person. I thank you so much because there are an awful lot of myths that needed debunking. The federal government and the provincial government--and certainly the scientists and veterinarians within government--are diligent, hard-working people who really try to bring some scientific objectivity and neutrality to the story. But as you know, most citizens have decided they don't want to believe industry, they don't want to believe business, and they certainly don't want to believe government.

So we, as provincial employees, don't get the story out. It just doesn't sell in the newspapers. Facts interfere with the story. It's all on our website. I'm happy to leave you with cards to find this information. It's just that the general public doesn't access that information. They just reach for the newspaper or the Internet where, unfortunately, claims and allegations are made and then we're busy trying to defend them.

Hon. Lawrence MacAulay: Can I just add, we have seen pictures of fish eaten, so you're telling us that it's the wild fish that brought the lice in, not the farm fish that put the lice to the wild salmon? That's what you're telling us.

Dr. Mark Sheppard: To clarify that, in the fall period, at the end of each summer, the wild Pacific salmon come in with heavy loads of lice. I don't know if you've had the opportunity to come and fish in that period of time, but beautiful, silver, robust, Pacific salmon come in and it's not uncommon to see 40, 50, 80 lice per pink salmon or chum salmon. They bring them to the coastline each year. That's what's unique about B.C. compared to other areas in the world. I think what you're referring to, sir, is the debate about whether the farms have lice and do they transmit those lice outward to the small Pacific salmon fry. That is the \$64 million question, if you will. It's no secret that the Atlantic salmon inside the farms will receive lice and there can be amplification of the populations of those lice inside the cages. In general, in B.C., again, those numbers are in the ones and tens per fish as opposed to what others like to compare with Norway, Ireland, and Chile where the numbers are in the hundreds per fish, or even east coast Canada. So, very, very low numbers, and we've set the number of three lice per fish as a trigger value, a very precautionary and very rational number to deal with. In most cases throughout the year, the average on farm fish is less than three. It does rise above that in the fall and winter periods; that's not a problem. So what we do is try to minimize the amount of lice on the farm fish in the springtime period to minimize the risk of any transfer of lice to the small fry, which may be sensitive to the lice. The argument has become, is it happening? Are the lice moving from the farms into the wild fry, or are the wild fry getting these lice from another source?

Hon. Lawrence MacAulay: There's no problem with where the farms are located?

Dr. Mark Sheppard: Twenty years ago there were problems where the farms were located, but there's been tremendous improvement in the last twenty years in their locations. Again, I think people have put some perspective --I've heard words of "running the gauntlet", of "farms everywhere". Again, I invite you to visit the B.C. coastline and you would be hard-pressed to see one farm from another farm. They are at least three kilometres apart, sometimes 50 kilometres apart; there's a vast ocean out there of corridors where pink salmon, fry, wild salmon, can travel without seeing a farm. It's not running the gauntlet, so I don't know what impression I've left with you. The farms are spotted in very remote areas and not generally on the corridors. They are placed, generally, within bays, inside archipelagos, etc.

🕒 (1635)

Hon. Lawrence MacAulay: *[inaudible]*

The Chair: *[inaudible]*

[Français]

M. Yvon Lévesque: Lors de votre présentation, j'ai cru comprendre que la disparition du saumon sauvage n'était pas principalement due au pou, mais, à 97 p. 100, si j'ai bien compris, par des prédateurs naturels. Pour vous, des prédateurs naturels, c'est qui, ou quoi? Vous avez parlé de prédateurs, et j'ai pu comprendre que, pour vous, le pou du saumon n'est pas un prédateur, dans la présentation que vous avez faite.

[English]

Dr. Mark Sheppard: Please allow me to clarify then.

Your question was about my previous statements about the 97% survival of Atlantic salmon inside the cages. I refer to that, if we're talking about infectious disease agents and diseases, in other words, fewer than three percent of the farmed salmon usually succumb to that disease or those diseases. On average, the survival of the farmed salmon is in the range of 90%, so the additional mortality is largely due to periods of low oxygen, or harmful algae blooms, or predation by seals and sea lions. The loss of farmed fish due to bacteria or viruses is less than three percent. The loss of farmed fish due to lice is zero. The lice in B.C. do not kill farmed fish. Does that answer your question?

[Français]

M. Yvon Lévesque: Oui. Avez-vous une mesure qui vous permet de calculer l'augmentation de la diminution de la population du saumon sauvage par la prédation du phoque?

[English]

Dr. Mark Sheppard: Thank you.

Perhaps I should reiterate to make sure I've got your question correct.

You asked if there was an increase and decrease in wild fish populations. Is there any way to measure whether that increase or decrease is due to predators or farmed fish?

[Français]

M. Yvon Lévesque: Le loup marin.

[English]

Dr. Mark Sheppard: Again, I think a DFO scientist would be more qualified to answer that question about the pressure of seal predation or predation in general on wild fish. It's outside of my expertise. We do know and it is generally accepted that seals and sea lions certainly do follow herring in and eat a number of herring and salmon. They grow on salmon. From the farm perspective seals and sea lions are a significant problem in the winter months. Because of that the seals and sea lions do accumulate around the farms and they can literally kill thousands of fish each night. What they do, if you'd like me to explain, they are very strong animals, they rush the nets, push it through, and they grab a fish by its belly or throat and they just suck the internal organs through the net. They drop the carcass there and they do it dozens of times. It's almost like a cat and mouse game. That's the way they fill themselves up. You get groups of sea mammals that will do that over and over again. The farms need to deal with that.

🕒 (1640)

[Français]

M. Yvon Lévesque: C'est une très bonne information, je vous remercie, monsieur Sheppard.

[*English*]

The Chair: Thank you.

Mr. Donnelly.

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

Dr. Sheppard, if I've got it right in terms of the picture you're painting essentially you've presented a case that there is no problem whatsoever with sea lice or with the application of slice. In fact it's diminishing as an issue or a problem over the years. Pretty much every scientist and expert in British Columbia agrees with that.

If I could just ask you three questions. Are you aware of any jurisdictions around the world that are using slice that are developing resistance to this drug and if there are any countries admitting that they're having a problem with sea lice. If they're having a problem why does British Columbia have no problem and how are we able to manage to have no problem, in fact, a diminishing issue when other countries around the world are experiencing possibly the opposite. Finally, there was a report that was just published out in the UK by a salmon and trout organization. Have you read that recent report and can you comment on that report at all?

Dr. Mark Sheppard: Thanks, Mr. Donnelly. All good questions.

The answer to all of those questions, if I can bring you back to the key point, B.C. is different. Why is it different? That's been the big question. A number of different things affect the coastline of British Columbia. Again, if I can reiterate those, and then I will answer each of your questions.

The key point being that the Pacific Ocean louse is genetically different than the Atlantic Ocean louse, and that largely explains why we don't see the same pathology, the same disease, the same, if you will, virulence and pathogenicity and the ability to cause disease as is seen in other countries. It's a different animal, a different parasite.

The other main concern, of course, is that the farms are a long way apart, very large distances between them. That's an important factor.

The third factor is that the waves of new lice come in each year that are naive to farming, they are naive to SLICE, they haven't been exposed to things because they come in every August, September, October on the returning Pacific salmon, five different species, right?

By the way, if I can backtrack a little bit, the genetic difference in the Pacific louse is likely due to the fact that, as it was related to its Atlantic cousin, upon exposure to the five different species through evolution it had to lose something, and it likely lost its capacity to attack one

type of salmon. So that's why they've adapted together, they exist, and we don't see any mortality or disease to it in B.C., okay?

I think I should carry on and answer your questions, though. Resistance in other countries? Yes, there seems to be resistance to emamectin benzoate in most places that have been using it: Norway, Ireland, Scotland, Chile. So that is true.

Now, it's a big stretch to extrapolate from those countries with Atlantic salmon and farms that are close together and the use of SLICE on a monthly basis sometimes. It's difficult to extrapolate that to what's happening in B.C. In fact, I don't agree that the extrapolation should occur given this other information, but people like to do that. And understandably so, because they don't understand the differences, okay?

As a result, then, in these other countries, SLICE is becoming not very useful, and, as a result, they have had a much greater opportunity than B.C. to develop what's called "integrated pest management", in that they have different techniques, they have different products that they can use to control lice in those areas. They have different in-feed products and they also have different topical products which the fish can be dipped in and exposed to so that the chemical can actually contact the lice on the outside.

In British Columbia, we just have the one product. Which is very effective still, we hope it to be effective for a long period of time, given the way we use it and how little we use of it. That said, the situation that we just got through here with the 20% of the fish that were marginalized, that didn't access the in-feed product, if they're not feeding, they're not getting the drug. In B.C., had B.C. had a topical product where they could have dipped those fish, you know, instead of trying to feed them and get the lice off, then we wouldn't have seen the same scenario. But we don't have those products in B.C., we just have the one.

Will other scientists agree with everything I've said? I think if you ask the DFO scientists, the credible scientists that do the lab research and things, I feel in good company, that they would agree that there's insufficient information to suggest that lice on farms is affecting Pacific salmon in a detrimental way. But the question still needs answering. I'm not even sure if it's an answerable question.

🕒 (1645)

There are reports, obviously, from both the anti-fish farm people and the DFO scientists to suggest that there is an slight increase in the abundance of lice on fry near the farms. There's an association. Does that make sense?

In other words, wild fry away from the farms have fewer lice than wild fry near the farms. There has been papers by Beamish, for example, which show the opposite of that. There are wild fry that have a significant amount of lice nowhere near the farms. There is an association, however, with wild fry as they come near the farms that there is a slight increase in lice abundance or prevalence, how many lice that are found in general.

There is no proof to--

The Chair: Sorry, Dr. Sheppard, for interrupting you here.

State your point of order.

Hon. Gerry Byrne (Humber—St. Barbe—Baie Verte, Lib.): We've received testimony that the amount of literature on this issue is extremely limited. Could we ask the witness if he would be able to provide us with copies of the literature that he just cited?

The Chair: Dr. Sheppard, would you be able to provide copies?

Dr. Mark Sheppard: Gladly. I have them here, if I could leave them with you, at least the cover pages so that they would be easier to find.

Hon. Gerry Byrne: I appreciate it. Thank you.

Dr. Mark Sheppard: I have the three papers that I've mentioned: one by Beamish and one by Jones et al., as well as the Ozawa paper regarding genetics. There certainly is a link within our fish health reports, and I'm happy to leave our fish health reports here as well for anybody who cares to look at it.

The Chair: I'll ask the Clerk to retrieve those from you.

Thank you.

Mr. Weston.

[*Français*]

M. John Weston (West Vancouver—Sunshine Coast—Sea to Sky Country, PCC): Merci, monsieur le président.

Je pense que ce débat est probablement le plus intéressant, le plus frustrant et le plus public que j'ai vu comme membre de ce comité.

[*English*]

We're hearing totally different stories. We're about to confront a tidal wave of responsibility, if we consider ourselves as wheels in a large machine called the Government of Canada that is now placed to accept this responsibility.

Thank you for coming and for your very direct answers. If there were one question that I could ask, I think it would be this: given that we are receiving such contrasting stories, what is the epistemology--the theory of knowledge--of what we can do to resolve these things? Presumably everybody in this debate wants the fish to survive, so there has to be a lot of common ground.

What's the next step, Dr. Sheppard, to move us to a stage where we can compare apples to apples and then do something that will promote that ultimate goal of preserving the fish stocks?

🕒 (1650)

Dr. Mark Sheppard: A very astute perspective, Mr. Weston. Welcome to my job.

I have a couple of points, if I may. I'm not exactly quite sure how to answer your question.

It is frustrating. There appear to be two different stories, but I think that's largely because the silent majority, the credible scientists who bring a modicum of objectivity to this entire topic, don't appear in the newspaper or on the Internet. They publish their articles, they're factual, and the average Canadian citizen doesn't read them. It's very technical information. So communication is one problem. I think there needs to be better communication from the industry, better communication in lay terms from the scientific community, and from the provincial and federal governments.

Instead what we hear is the vocal minority who, quite frankly, are not aquaculture specialists. Rather, they are anti-aquaculture specialists. They're very good at what they do. They're very intelligent people, very passionate people, and they're very good at communicating to the media and to the Internet. For the majority of Canadians, that's what they hear. Of course, that's what they will believe because they're only hearing one side of the story.

The next step, apples-to-apples, there is a tremendous amount of collaboration on the go in British Columbia right now between the industry, fish farmers, and the ENGOs who are willing, of course, wanting things to improve, as the farmers are, and as the province is. There's always room for improvement, but there is a tremendous amount of collaboration that is happening: joint funding, joint projects, both looking at the same things, comparing notes. There is an awful lot of transparency and communication between those groups. Again, that's the helpful group.

There is another faction that is just quite simply anti-aquaculture, and that's where the transparency stops. That's where the information is not generally forthcoming because, in many cases, the information is abused.

Does that answer your question?

Mr. John Weston: Well it's a good try. Thank you. I'm sure that the inquiry is going to have the same question.

Can you maybe give us something a little more specific? Infectious salmon anaemia is something that Alexandra Morton also mentioned on several occasions. Is that something that is monitored? What can be done about?

Dr. Mark Sheppard: Good question.

It is monitored. It has been monitored for the last eight years. It is on our list of five pathogens of concern both provincially and federally, and internationally. Every single sample that we collect at the farms is monitored for that pathogen. Again, Mr. Weston, I don't know if you got the pre-brief, but there is a summary about ISA virus in there which explains why BC doesn't have it and how we plan to not get it.

For those of you who don't know, ISA stands for infectious salmon anaemia virus. It's been a devastating infection with high mortality in Atlantic salmon in most of the same countries that we've been talking about that are affected by sea lice: Norway, Ireland, east coast Canada, and Chile most recently. It's not harmful to humans at all as neither are any other fish diseases that we deal with.

The difference again why BC is free of ISA is that, contrary to what is said, the Atlantic salmon that exist in BC right now have come in as eggs originally. The brood stock and the production stock from that point forward were then developed in BC. So live growing Atlantic salmon are not imported to BC.

Eggs that may be applied for to enter BC can only come from ISA-free countries or regions. There have been—and I don't have the figures, I'm sorry—some eggs imported to British Columbia from Iceland for example which is ISA-free, and I think in the past, maybe ten years ago, some eggs from Washington State, again ISA-free.

We monitor for it 150 times a year, 800 samples a year, that sort of thing. There are tremendous bio-security measures taken. Those eggs, by the way, that are imported from ISA-free countries need to be screened again, they need to be under quarantine for at least one year and be tested again, etc.

So, touch wood, BC has not seen and never will see ISA. That said, Mother Nature has a funny way of doing things. The virus can be carried by other types of fish. Whether those fish show up on currents from other countries, whether those things show up in the ballast water of ships, but certainly they won't be introduced from the fish farming community in British Columbia.

🕒 (1655)

The Chair: Thank you.

Mr. Donnelly.

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

Two quick comments and then maybe if you could answer that last question I asked about the report in the UK.

I think, Mr. Weston's comment, I share some of that. I think we're getting two different pictures here and it's hard to get to the bottom of what's the accurate picture happening on the

west coast. There are a number of people that have essentially a vested interest in seeing a resolved situation.

A couple of comments. You mentioned about the ENGOs and you referenced their agenda, either they have an agenda or they don't know enough. I think earlier you referenced the information about SLICE or sea lice and that they're able to communicate their position. I'm just really curious as to why would they put so much energy and effort into something that isn't a problem? If I think of climate change for instance, that's a whole other story, but it's almost the reverse situation where we had scientists for years telling the story of this problem but couldn't get that out.

The other comment that I was a little surprised to hear was the reference when I said you've drawn a conclusion but there is no problem. When I asked you that you said there's insufficient information, there's no information to point to there being a problem. I'm wondering how you can conclusively say there is no problem and then say we don't have enough information to say there's a problem? Those are two different things, in my opinion anyway.

I wanted to see if you could comment on the UK study.

🕒 (1700)

Dr. Mark Sheppard: Sure. Before I do, Mr. Donnelly, in what specific reference, there's no problem to--

Mr. Fin Donnelly: I think, well, and then again, it's in my words....

Dr. Mark Sheppard: Sea lice.

Mr. Fin Donnelly: Sea lice and slice and....

Dr. Mark Sheppard: Right. Thank you. Sure.

Mr. Fin Donnelly: That's what I thought I heard you say today.

Dr. Mark Sheppard: Right. Thank you very much. So to answer your question, I'm sorry I missed it earlier, about the U.K. report. I have not read it. If it came out recently, I have not read that one. That said, again, this falls into the category of extrapolating from one country to the next, extrapolating types and genetics of fish from one country to the next, extrapolating the activity of an Atlantic salmon louse from one country to the next. It's a common practice which is problematic. So I'm sorry, I can't comment further on the paper itself specifically.

Your other questions, ENGOs, environmental non-governmental organizations, very useful groups. They hold everybody's feet to the fire and I'm thankful that they're around, and the improvements that have happened in the industry in the last 20 years are because good questions were asked that required scientific research to be answered.

We mentioned this earlier, there are collaborative ENGO groups that realize that aquaculture is here to stay and it can be sustainable and healthy, and they're working closely with industry and the government to continue to improve that. Where I make the distinction is between ENGOs and activists. So I hope that clarifies that. There are some people out there who just simply are very good at what they do and that is continue to put sensationalized emotional information into the media, and that is how they get support.

So that is why, then, this committee or the people that I have dinner parties with think there's a problem because their only access to information is what is reported in the media. So, again, I'm very thankful that you invite the province to this table to actually speak very openly to you about information that just doesn't get out there. I think part of the reason it doesn't get out there is because if a government agency puts out this type of information, it gives the impression the government is promoting the industry, when in fact it is just corroborating, supporting, the same information to citizens who tend not to believe industry or business or the government. So if information is put forth with any more energy, the worry is that it will look like it is promotion of an industry.

Extrapolation. I wrote down extrapolation because again, I think we have to be very careful. What the activists like to do is say, "It's happening in Norway, so it's going to happen here." They don't understand the depth of the biology and the epidemiology involved. All they want to do is try to take people's minds from a historically real problem in different countries and transport it to British Columbia to stop farming.

So that's why I say, in my opinion, the reality in B.C. with sea lice is that it's very much in control. It's highly regulated. It's monitored on a weekly, monthly basis. The information is transparent. We receive it. The farming companies put it out there. There's transparency from the farms to the provincial government employees, from the farms to DFO, from the farms to credible researchers.

The Chair: Thank you, Dr. Sheppard.

Mr. Calkins.

Mr. Blaine Calkins (Wetaskiwin, CPC): Thank you, Mr. Chair, and thank you, Dr. Sheppard, for being here.

I've got a few quick questions. I've only got five minutes and you're giving very thorough answers, but I think for some of these you could probably give us the answers fairly quickly.

In your original presentation you said that lice, the numbers of lice are reported directly by industry to the government website. Can you tell us by whom is that reported? How is that collected? Who verifies that? What are the controls in place to make sure that the industry is reporting this information accurately?

🕒 (1705)

Dr. Mark Sheppard: Sure enough and that's part of their fish health management plan and the sea lice management strategy. The farms are required to count their lice abundance once per month and for most of the year. In fact, they count their lice more than that. They count twice a month if their lice counts reach three per fish. Is that, first of all, clear?

Mr. Blaine Calkins: Are there any observers or anybody to verify? I mean....

Dr. Mark Sheppard: Yes, I understand that.

So it's a very standardized procedure at the farms, taught by the veterinarians who attend those farms and the provincial government as well. The procedure is to have one....

By the way, just so you know, there's a flotilla of cages often, may 10 to 12. The farms are instructed to pick one cage as the reference cage and that cage will be counted every month and then the farm is at liberty to pick two other cages on the site at random or at convenience to....

So in total every month they must count lice from three different cages. From each of those cages they're going to count 20 fish, 20, 20, and 20, so 60 fish altogether. The fish are collected by a box seine or a big seine. So many fish are gathered into the corner, thousands usually and then what happens is there's an anesthetic tote that's presented there. The fish are scooped up randomly.

By the way, in that collection of fish, back to the situation we're talking about, 80% were eating the medication and 20% weren't. Remember that story earlier on? When you collect these fish, you collect not only the robust fish, but you're likely to collect the slowest, insubordinate fish that are likely to have more lice on them, because they can collect in the corners.

So they collect them up in the corners, they put a dip net in and randomly choose fish. They put them into an anesthetic bath, the fish go to sleep and they count the numbers, but not just the numbers, they categorize all of the different lice stages that they are seeing.

The only thing to add to that is we audit that on a regular basis 70 times a year.

Mr. Blaine Calkins: Good. So those audits are compliance audits then?

Dr. Mark Sheppard: Yes and we count side by side.

Mr. Blaine Calkins: Is SLICE biodegradable or bioaccumulative in any way, shape or form?

Dr. Mark Sheppard: SLICE, again, a better question for an official from Health Canada and the veterinary drug directorate. It is my understanding of the pharmacokinetics of SLICE is that it is distributed very well inside the fish. It takes some time, once it goes in the mouth, to accumulate in the mucus and the skin and then the lice get exposed to it and it kills the lice. But it doesn't last very long in the fish.

Mr. Blaine Calkins: So it's not bioaccumulative then?

Dr. Mark Sheppard: No, it's not, no.

Mr. Blaine Calkins: Okay.

I have a question for you about sea lice. We talked specifically about Pacific salmon and Atlantic salmon. I would imagine that steelhead and any other salmonid would be a potential host for sea lice. We don't talk about any of the other fish in the Pacific Ocean as potential hosts for sea lice. Are there any other species or families of fish that would involve sea lice in their life cycle?

Dr. Mark Sheppard: Yes, there are. The Atlantic salmon are susceptible to sea lice as are rainbow trout, as are steelhead, for example, in the ocean. Steelhead, for example, will lose their lice as they go back to the estuary and up the rivers, because lice just don't like non-sea water. So they might get lice when they're out in the ocean, but they lose them by the time they get back in the rivers.

There are two types of lice mainly. For the purposes of this discussion, there are salmon lice and there are herring lice, many different species of each, but the salmon lice occurs on all of the five species of Pacific salmon as well as the Atlantic salmon that are farmed.

We have monitored chinook salmon that are farmed and they have few to zero lice on them to the point where it's not even worth making the effort to try to count them, so we don't monitor the chinook lice.

Mr. Blaine Calkins: I have one quick question, Dr. Sheppard, if I may and it's an important question.

In any of the research, has anyone modelled the possibility of a smolt or fry navigating, say, from the mouth of the Fraser River and if you take a look at all of the islands, all of the channels and you say that the farms are spaced far apart, sometimes 3 kilometres, sometimes 50 kilometres, I think the relevant question is can a fry emerging from the Fraser River navigate to the wintering and the growing grounds and has anybody modelled the chances of success of that fry going through any channel or any passage between the islands that doesn't contain a fish farm? What the probability of that would be?

🕒 (1710)

Dr. Mark Sheppard: I do not know of anybody who has modelled that again. It's probably a good question for somebody like Brian Riddell or a DFO scientist.

Mr. Blaine Calkins: That's okay.

Thank you.

The Chair: Mr. Blais.

[*Français*]

M. Raynald Blais (Gaspésie—Îles-de-la-Madeleine, BQ): Merci, monsieur le président.

Je voulais simplement m'excuser auprès de M. Sheppard. J'étais là mais pas toujours présent. Malheureusement vous le savez, on s'occupe de d'autres dossiers et il y a une crise actuellement qui se déroule dans ma région de l'Atlantique qui s'appelle la crise du crabe des neiges. Je suis actuellement à travailler là-dessus et c'est pour cette raison que je n'ai pu participé pleinement au comité, je m'en excuse. Mais je voulais quand même vous le souligner et que ce n'est pas par manque d'intérêt par rapport à votre sujet ou votre témoignage. Merci.

[*English*]

The Chair: Thank you, Mr. Blais.

Dr. Sheppard, on behalf of the committee I want to thank you very much for taking the time of your schedule to travel here to Ottawa and meet with our committee. We really do appreciate your time and the information that you've shared with this committee here today.

Thank you very much.

Meeting adjourned.