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Chair

Mr. Scott Simms

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● (1530)

[*English*]

The Chair (Mr. Scott Simms (Coast of Bays—Central—Notre Dame, Lib.)): Hello, everybody. Welcome. This is the 15th meeting of the Standing Committee on Fisheries and Oceans. Pursuant to Standing Order 108(2), this is part of our study on the wild Atlantic salmon in eastern Canada.

Our witnesses today are Dr. Rick Cunjak, professor, department of Biology, University of New Brunswick. Next we have Mr. Morris Green, author and historian.

I understand you're the former Minister of Natural Resources in New Brunswick. Is that correct, Mr. Morris?

Mr. Morris Green (Author, Historian, As an Individual): Mr. Green.

The Chair: We have Dr. Robert Devlin, engineering research scientist at the deputy minister's office of the Department of Fisheries and Oceans. Finally, we have Mr. François Caron, biologist, ministerial advisory committee on Atlantic salmon.

Gentlemen, thank you for joining us. We allow 10 minutes each. If you come in under 10 minutes, it certainly would be appreciated, as we do have a long session of questions and answers.

We're going to start with Dr. Cunjak.

We'll start with you, sir, for up to 10 minutes.

Mr. Rick Cunjak (Professor, Department of Biology, University of New Brunswick, As an Individual): Thank you. I'd like to thank the committee for the invitation to appear here today.

If the committee would indulge me, I would first like to summarize my background as it relates to my expertise working with wild salmonids and Atlantic salmon in particular.

I first started working with wild Atlantic salmon in eastern Newfoundland rivers in 1979 with the recently deceased Dr. John Gibson, a great salmon biologist and a wonderful mentor. That set the stage for my career-long interest in studying the ecology of salmonid fishes in rivers. I received my M.Sc. in biology in 1982 from Memorial University of Newfoundland and my Ph.D. in 1986 from University of Waterloo, having studied the ecology of wild stream salmonids.

My post-doctoral research with DFO brought me back to eastern Canada to study how wild juvenile salmon use river and estuarine habitats on the northern peninsula of Newfoundland. In 1988, I was hired as a research scientist with the Department of Fisheries and Oceans in the gulf region to study the habitat use and ecology of juvenile Atlantic salmon. My work focused on rivers in Nova Scotia, New Brunswick, and Prince Edward Island, but mostly on the Miramichi river system. I studied forestry impacts, winter biology, survival, and movement behaviour. In 1997, I moved to UNB in Fredericton as the Meighen-Molson research chair to initiate a research program centred on wild Atlantic salmon. I have maintained that research focus to this day as a Canada research chair and professor cross-appointed in the department of Biology and the faculty of Forestry and Environmental Management.

My current research involves salmon stock recruitment dynamics, winter egg survival, the response of wild salmon to the warming of rivers from climate change, and the impacts of flow regulation. I serve as a scientific adviser for various committees and organizations including COSEWIC, Miramichi Salmon Association, the Atlantic Salmon Conservation Foundation, and CAST, the Collaboration for Atlantic Salmon Tomorrow.

Over the past 30 plus years, there has been a disturbing trend of declining numbers of adult salmon returning to many Atlantic rivers, especially those in the southern portion of the salmon's distribution. In the Miramichi river system of New Brunswick where I conduct most of my research, 2014 saw the lowest ever estimated return of adult salmon. Many factors are contributing and have likely contributed to the decline. Most scientists favour the theory that atypically high marine mortality is the main problem, but the principal cause or causes are open to speculation.

Remember that the problem of so-called marine mortality includes losses that might be attributable to the smolts as they enter tidal waters in the spring, through the post-smolt coastal movements in summer, and adult migrations at sea, and the return to spawning rivers, in an area covering tens of thousands of square kilometres in a period of anywhere from 14 to 24 months. Compared with the freshwater environment, the sea is the environment about which we know the least. It truly is the black box.

It's certainly a complex problem. Marine issues often identified include predation, for instance from striped bass or seals; overfishing; especially high seas; changing oceanographic conditions largely related to climate change; and even shifting forage or food or bases; and the quality of available prey species.

It's worth noting that there are still issues of concern in fresh water, especially, for instance, the warming of our rivers in the southern range of Atlantic salmon such as in the Maritimes and in the state of Maine. There is also habitat fragmentation and the impact of non-native competitors.

Another issue worth noting is the relative lack of government research and monitoring, and not just for salmon. Salmon are part of a complex ecosystem. Focusing solely on their dynamics without accounting for the changes in their food web and environment is naive at best and misleading at worst.

In the past, DFO science was taking the lead in addressing important scientific and management problems. DFO used to be the premier fisheries research group in the world. Indeed, as a young Ph. D. graduate, I viewed the federal government and academia as equally rewarding for conducting exciting applied scientific research. This has not been the case for the past two decades, at least with respect to salmon research in eastern Canada.

● (1535)

The few biologists and scientists working with DFO in the Atlantic region—and they are very hard-working people—are able to do little more than monitor stock status as part of annual assessments. There is little opportunity or encouragement to conduct truly independent or collaborative research on topical issues, for instance, aquaculture impacts or predator impacts. I was very pleased, therefore, by the recent announcement of a significant investment in increasing the numbers of federal scientists and biologists, some of whom will hopefully be working to improve our understanding of the salmon decline so that we can take appropriate management decisions.

If I may, I would like to suggest some recommendations for how DFO and other interested parties concerned about the future of wild Atlantic salmon might approach the issue of declining population numbers and species management and conservation.

First, I would encourage DFO scientists and biologists to initiate new research projects and experiments, for example on smolt predation, and truly collaborate with non-DFO partners, such as CAST, to address important management needs. These are questions such as how effective is catch-and-release is for improving salmon populations in specific rivers? Could it be practised in an entire river catchment? Would it realize improved adult survival and returns? Might even closures to any form of exploitation, whether commercial, recreational, or subsistence, for two to three generational cycles be effective?

Second, we should prioritize salmon management in rivers with a realistic view to what is likely to occur within 10 to 25 years, including more emphasis on northern rivers where stocks are stable or increasing but poorly monitored.

With that I would like to conclude, and I'm happy to answer any questions from the committee.

The Chair: Thank you, Dr. Cunjak.

Now we're going to go to Mr. Green.

Mr. Morris Green: Mr. Chairman, committee members, support staff, and fellow presenters, it's an honour to appear before this important resource committee to discuss the issue of wild Atlantic salmon. This committee may, through its report, do much to help restore this vital species.

By way of background, I live on the main Southwest Miramichi River, as did my ancestors for the past 200 years. Since our arrival, like our neighbours, we have always in one way or another been dependent on Atlantic salmon for food, employment, or recreation. This species is, and has been, as much a part of our lives as the forests that surround the river valley, the river, and the air.

Like others, I have angled for salmon, guided sports fishermen and women, and worked in various capacities to help conserve and enhance this signal species. Being minister of natural resources from 1987 to 1991 afforded me the opportunity to make some progress for the salmon by instituting province-wide fish habitat enhancement programs, working with dedicated volunteers in initiating river cleanups, maintaining existing salmon barriers, establishing two new salmon barriers, and working co-operatively with the federal government to facilitate one first nation's entry into angling outfitting rather than net-based salmon harvest. Discussions were under way with several others when I retired from politics. An offshoot of those discussions was the establishment of an aboriginal enforcement arm regulating local fisheries on their waters.

During my political life, and later as a writer and researcher, I've spoken to the salmon elders, some of whom had been involved in the river fishery for more than 70 years. From this, I determined that not all knowledge is learned in the classroom. We have much to learn from their wisdom and knowledge.

All of these various experiences have led me to the following conclusions. The sophisticated Atlantic salmon, which exhibits remarkable survival skills and adaptability, faces a deteriorating environment and increased threats in its spawning rivers, migratory routes, and ocean feeding zones. Much of the distressed environment is the fault of human activity, while some of it can be attributed to natural, earth-generated changes. All we can do is address those things we can change, and begin now to assure the best results.

Some of the problems at home begin with the spawning streams themselves. Two of the greatest threats are habitat destruction by intrusive industrial forestry practices resulting in warming of river water and subsequent siltation of gravel spawning beds, and improper road construction with similar consequences. I want to point out that this isn't necessarily something that only large companies do. It's done on private woodlots, as well.

River warming results when there's destruction of cold-water springs that feed into small streams that eventually end up in main rivers. Reduction of protective shading setback barriers are another part of the problem. Salmon are a cold-water species that die when river temperatures rise into the eighties. Keeping the rivers cold is equivalent to closing the fridge and freezer doors at home. We've been leaving our river door open.

Another problem is the virtual elimination of federal and provincial fisheries officers present along salmon rivers, which allows poachers freedom to illegally harvest large numbers of salmon from remaining cold-water pools, reducing substantially the number of large multi-winter spawners that lay their eggs to begin another life cycle. I can remember when there would be two wardens watching three salmon pools that were put together. Now there are none.

Other threats to salmon are rapid population increases of salmon-predator species, like striped bass, merganser ducks, cormorants, and seals. Current management practices have allowed an imbalance in these species' numbers, which threatens the salmon's existence. Of course, it is well established that international overfishing of salmon on its feeding grounds reduces their numbers as well.

The first step in the restoration project for this federal government is to become involved in a number of ways to fulfill its leadership role in fish management. The first part begins at home.

I have a suggestion to make, and I'm going to sort of cut to the chase on this. If the Department of Fisheries and Oceans really wants to address the wild Atlantic salmon issue, it should do the following. Set up a proactive task force within the department dedicated to that end, one equipped with the finances and selected people to achieve success. Have it begin by tweaking existing management policies by addressing the immediate concerns, such as salmon predator imbalance, enforcement protection, and habitat protection. Broaden the existing management plans by including all salmon habitats, from the spawning rivers to their feeding grounds and back. Go to work on such items as data-gathering, gathering existing or generating new scientific studies of particular problems unique to particular estuaries and rivers. Recognize that any management plan is organic and must change as new information becomes available. Have them dust off the shelved 2,300 scientific studies to find relevant wisdom for current application. Recognize that an important part of this work is to diplomatically work with, rather than at, various partners. In that vein, co-operate and coordinate with the provinces, first nations, NGOs, river management groups, and individual citizens on specific parts of this overall plan.

● (1540)

By utilizing all the resources at hand, develop short-, medium-, and long-term plans within the overall management plan. Encourage other salmon-producing nations to do the same, while working with them to get this problem solved. Inaction is fatal. Focused, determined action with all partners will bring success in salmon restoration.

Thank you.

● (1545)

The Chair: Thank you, Mr. Green. We really appreciate that.

We'll move on to Dr. Devlin, please, for up to 10 minutes.

Dr. Robert Devlin (Engineering Research Scientist, Deputy Minister's Office, Department of Fisheries and Oceans): Thank you very much. I very much appreciate the opportunity to appear before you. I don't have a formal presentation, but I'm here to answer any questions you may have.

I work for the Department of Fisheries and Oceans as a research scientist in West Vancouver. We have an aquatic and molecular biology laboratory there, where we study genetics, physiology, and ecology of a variety of different fish species and strains.

Our main focus has been on the analysis of what we call novel organisms. These are defined under the Canadian Environmental Protection Act as “products of biotechnology”. The main effort in this area has been to be involved in the environmental risk assessment of genetically engineered growth-enhanced Atlantic salmon. This has been a long process for which we have generated similar kinds of strains, using Pacific salmon, to generate scientific data that can be used to support the risk assessment process.

I should say that in 2013 there was a very formal risk assessment conducted on the AquaBounty AquAdvantage Atlantic salmon. The determination under that, which was released by Environment Canada under the Canadian Environmental Protection Act legislation, was that there was a very low risk, with reasonable certainty, of environmental damage and indirect human health issues.

That allowed the proponents to consider growing their Atlantic salmon under the scenario they proposed, which was to grow eggs in the Atlantic region in Souris, P.E.I., and to ship those eggs to Panama, where they would be grown out and then returned to North America for sale.

That initial process in 2013 did not undertake a food safety evaluation, but just less than one hour ago, Health Canada released an announcement that the company is approved to sell transgenic fish in Canada. We are the first country globally to authorize the growth and sale for human consumption of a genetically engineered animal. I have very much been involved in that risk assessment process, and I'm happy to answer any questions on the details of that, if that's of interest.

The other project I've been involved in with regard to Atlantic salmon involved looking at whether there was a hybridization capability between Atlantic salmon grown in aquaculture facilities in British Columbia to breed with our local Pacific salmon. A basic conclusion from this is that there is very low risk of that.

I'll leave it there. I'm happy to answer any questions you may have on those topics or any others.

The Chair: Thank you for that, Dr. Devlin.

[*Translation*]

We will now hear from our next witness, Mr. François Caron, who is taking part in our meeting from Quebec city.

Mr. Caron, you have the floor for 10 minutes.

Mr. François Caron (Biologist, Ministerial Advisory Committee on Atlantic Salmon, As an Individual): Good afternoon, everyone.

Mr. Chair and members of the committee, thank you for the opportunity to appear here today.

Let me introduce myself briefly. My name is François Caron and I am a biologist. In 1980, I began working for the Ministry of Forests, Wildlife and Parks of Quebec, and my work was on salmon.

As you probably know, for a long time, that is to say since 1922, salmon management and research in Quebec has been a matter of provincial jurisdiction, but there is also the Fisheries Act, a federal law, which contains a chapter that deals particularly with Quebec.

I began my career as a salmon researcher by choosing control rivers where we calculated, yearly, how many young salmon, smolts, went out to sea, and how many returned in subsequent years, that is to say after a year or two, and sometimes three, of being at sea.

As Mr. Gérald Chaput explained, salmon stocks are different according to regions. Quebec's salmon have a particular characteristic. With the exception of salmon populations that are close to Labrador and resemble the populations in that region, in the rest of Quebec, approximately 25% of the salmon are grilse, i.e. salmon that returns after only one year at sea. These are for the majority male, whereas the females spend two or three years at sea before they come back to reproduce for the first time.

These characteristics have greatly affected salmon management in Quebec. For quite a while now, we have taken additional measures to protect the females especially, which are the big salmon, by establishing the conservation limits we want to see observed in the rivers. Through my research and the work others have done previously, we also know that a river can receive a limited number of salmon, since the young ones have to be able to feed themselves during three, four and sometimes even five years in the river before they leave it.

I often compare a river to an agricultural field that can feed a given number of sheep or cows. A river also has a limited capacity to feed young salmon during the years they must stay there before they leave for the sea. That is a characteristic that is very different from most of the other salmon populations. For instance, in the case of Pacific salmon, certain populations leave the river only a few days after the eggs hatch.

My work has shown that there was a very important change in the survival of salmon at sea as of the beginning of the 1990s. Rivers continued to produce a relatively constant number of smolts, but the number of salmon that returned declined significantly. If we take a broader view of this, this phenomenon is not unique to Quebec, nor to North America. It has been observed in all of the salmon populations throughout the world. Other species such as cod also saw considerable declines in the beginning of the 1990s.

I am ready to answer your questions, but first I would like to point out some of the features of the Quebec salmon management system. In most of the large rivers, salmon is managed through what we call controlled harvesting zones. That is quite unique in Quebec. Local organizations collect a daily fee from the people who come to fish in a river.

● (1550)

With this money, they hire conservation officers to ensure the salmon are protected during fishing season. This way of doing things seems very much appreciated and very effective. Conservation is ensured by these officers whose salaries are paid for by the fishers who come and fish in the rivers.

There are many economic spinoffs for the regions where salmon is fished. It is luxury fishing that is expensive, but it still interests people a great deal. There will always be appropriate management to first of all ensure stock conservation before allowing harvesting.

Those are my preliminary remarks. I will be happy to answer your questions.

● (1555)

The Chair: Thank you, Mr. Caron.

[*English*]

Now we're going to start with our questions. This is the first round of questions—four of them at seven minutes each. We're going to start with the government side.

[*Translation*]

Mr. Finnigan, you have the floor.

[*English*]

Mr. Pat Finnigan (Miramichi—Grand Lake, Lib.): Thank you, Mr. Chair.

Thank you to the witnesses for appearing. We're really happy to have you here today with all of your knowledge. My first question will be to Morris Green.

Morris, I know you and we've had many conversations about the salmon. You know about the salmon on the Miramichi, its history, and the way it functions. Of course, you've written two beautiful books on that, so I'm really happy to have you here today.

We have very limited time, so I'm going to try to get a couple of questions in for different witnesses. To start off, Mr. Green, you know all the interventions we've done over the years, especially on the river itself. Is there anything we're still missing the mark on? Is there anything we really haven't dealt with, or something that, in your view, would really help to conserve and enhance the salmon population on the Miramichi?

Mr. Morris Green: Mr. Finnigan, thank you very much. The problem is that the salmon is a very complex fish, and its ecosystem is very complex as well. Many changes have taken place on the river over the past 30 or 40 years. The disappearance of green eels, for example, is a very significant absence on the river. There are other species that have slowly disappeared, too, but because they're not of any particular interest to anybody, nobody's paid much attention to them. That's why I'm suggesting a federal task force within DFO to tackle this whole problem, so that they can look at not only the overarching salmon management but all of the other parts that are networked to it in order to assure a healthy river system.

Mr. Pat Finnigan: Thank you, Mr. Green.

On that, I'll move to Mr. Cunjak, whom I've also had the pleasure of listening to on the Miramichi last summer.

You've admitted yourself that there's no exact science. We still need a lot of data. Especially, we've lost a lot of scientists, a lot of resources in research. Things like CAST, for instance, are tools we've been able to use. We have all kinds of private partners who are helping us, as well as a lot of donations and resources, but it seems that we're missing that partnership with DFO. Hopefully, we can use those new investments to good ends. In the case of CAST, for instance, we've had very big problems in getting that under way. We've had some reluctance from DFO to get that done.

How would you characterize the relationship with DFO? How can they do better?

Mr. Rick Cunjak: Well, I think we are improving. I'm optimistic that it will get better. That's because there's a common need or understanding that it's almost impossible to address this issue single-handedly by any organization or by any group. There's valuable expertise among so many different people within the public, within industry, within NGOs, within government, and within universities, that by drawing upon that, especially where there's a common interest such as conservation of Atlantic salmon, I think we'll achieve that goal.

I think DFO is actually starting to come around. I don't think there was ever a reluctance so much as they were not able to effectively do some of this because of the lack of resources. They were already too busy with so many things, whereas historically, there were more people around. I think it is going to be improving. I'm hoping that some of these new positions will help in that regard, so long as there's a welcoming spirit to collectively look at everyone as an equal partner rather than having someone dictating the rules.

● (1600)

Mr. Pat Finnigan: Thank you, Professor Cunjak.

I have another question.

[*Translation*]

Mr. Caron, people say that Quebec has been successful in its salmon management. Can you tell us what it is doing differently from the Atlantic provinces? Why does Quebec have better results in salmon conservation?

Mr. François Caron: I did not want to imply that Quebec has not suffered from the decline in salmon. It was also affected by it.

Generally speaking, in the North Atlantic region, both on the European and the Canadian side, the salmon populations that suffered the most were the ones located in the southern part of the habitat.

In the past, there were salmon populations in the United States. In the beginnings of the colony, there was salmon as far away as New York. But now, the populations have disappeared in the south and they are in difficulty in the United States and in the Bay of Fundy. The southern populations are the ones that have been the most affected.

In Canada, in Quebec as well as Newfoundland and Labrador, things are all right. I would not want to attribute that strictly to the management of the species. However, as I said in my presentation, I think that Quebec does a good job of protecting salmon rivers. I think it is a combination of these factors which means that the situation is good.

[*English*]

Mr. Pat Finnigan: Mr. Devlin, we've been hearing from DFO that something is happening out there in the ocean. We don't know what it is. They don't know what happens from the time the salmon leaves the river to the time it goes to the feeding ground.

When are we going to invest the resources in partnership with private financiers to get those answers once and for all? It seems that's where the bulk of the disappearance of salmon is happening.

Dr. Robert Devlin: I'm not in that area. I'm a geneticist. I hear that the department on the west coast is trying to integrate many studies on ecosystem parameters at the same time. Many studies are done on an ad hoc basis, with small studies here or there, and they don't end up being integrated to show functional reasons as to why one prey source might be limiting in one condition versus another. I know at least that there are ecosystem research initiatives on the west coast to try to understand those complex trophic interactions among species. My understanding is there aren't enough resources to do it on a very large scale.

The Chair: Thank you very much.

Mr. Sopuck, you have seven minutes.

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

Mr. Green, I fished with Vince Swazey on the Miramichi a couple of years ago. I talked to Mr. Doak last week and, again, I can see the passion that all you folks have for that particular, beautiful waterway.

I very much appreciated your comments, Mr. Green, when you said, do what we can do. Often we hear from the scientific community that it's about more study. It almost paralysis by analysis. Without a doubt, we don't know everything.

What can we do in the very short term in active management practices to deal with the decline of the Miramichi Atlantic salmon?

● (1605)

Mr. Morris Green: The first thing I'd do is set up that task force I talked about, because I think that's something we can do immediately, and I think it's something we should do immediately.

That task force then could tackle those things that are most easily solved right away, one of them being protection of the salmon pools. For example, with the decline in the number of DFO scientists came the decline in fisheries officers too. Nobody was immune from those particular cutbacks.

As I said, I can remember when I first started angling on the river, there were three salmon pools within sight of one another in Nelson Hollow and there were two guys there who were wardens. You never knew where they were going to be, but they were always watching those three pools. In one of the pools you might find as many as 5,000 salmon in hot water in the summer. Big Hole Brook was the name of the pool. Now there are no wardens. The wardens drive up and down the roads past the rivers.

Salmon protection would be one thing. There are other things we can be doing too. We can be doing some more research immediately on ways to keep the rivers cold. MSA has started some programs to that end. They're doing some thermal imaging up and down the river.

The other thing they have to remember is that the river grows from the feeder springs along the way. There's one spring in the upper Miramichi River near McKeel Lake that is so cold that it will freeze butter. That stream, that spring water, is flowing into the Miramichi River. That spring should be maintained. There shouldn't be any cutting around that stream, nor along the barrier strip that takes up water to the river. That's another immediate thing that could be done.

I'd say those are a couple of things. There are others as well, but those would be two of the first things I would do.

Mr. Robert Sopuck: In your comments, you also talked about a predator-prey imbalance. Should there be more emphasis on reducing some of the predator species to allow better smolt escapement?

Mr. Morris Green: There's no question about it. Our river actually produces quite a good number of smolts, but a good percentage of them disappear on their way out. We have a voracious striped bass population that is breeding at the mouth of the Northwest Miramichi River, the junction of the Southwest and Northwest Miramichi rivers, and they're chewing up a lot of smolts. Something has to be done about that.

We have interests within DFO who are protecting the striped bass. They don't think there are enough of them. Well, the fact is—

Mr. Robert Sopuck: The last estimate I saw was 250,000 fish.

Mr. Morris Green: It's more than that.

But I'll tell you, worse than that is that people way up river in Doaktown and Boiestown are now catching striped bass in the river. They're not restricting themselves to that particular area. They're moving up into the rivers as well, so they're feeding on the smolts all the way up. That's one I'd go after right away.

I'd also work hard to bring in a sustainable harvest of grey seals. I think that number is out of balance too.

Mr. Robert Sopuck: Monsieur Caron, I think it was you who talked about hook and release. What are the current estimates of hooking mortality from salmon that are hooked, fought, and then released?

[*Translation*]

Mr. François Caron: The mortality rate of the species varies according to the conditions of the habitat.

When the water is warm, mortality is higher, and it varies from 2% to 10%. This is how we see that phenomenon: a harvested salmon will die 100% of the time. However, 90% to 98% of those that are put back in the water survive. So, there is an advantage to doing that. When fishers do that adequately, survival rates are higher.

[*English*]

Mr. Robert Sopuck: Going back to Mr. Green regarding the Greenland overfishing, what would you recommend to the Canadian government in terms of putting some very serious pressure on Greenland to stop the plundering of our MSW salmon?

Mr. Morris Green: That's an interesting question.

I think one of the difficulties is that Greenland has sort of gone its own way, and when its economy is down, it catches more salmon and ignores those international limits that were suggested by NASCO and so on.

One approach to that might be to work with the European Union, because it set very strict quotas about the number of fish that can be caught offshore. That could be one way of doing it. The other thing is that, if we do our homework in Canada, it's going to be much easier for us to force Denmark and Greenland to get in line and help save these salmon.

● (1610)

Mr. Robert Sopuck: I have one quick question for Dr. Cunjak. Why are the stocks of northern Atlantic salmon off Labrador and Newfoundland doing so much better than the ones, for example, in the Bay of Fundy?

Mr. Rick Cunjak: The prevailing theory on that one, as François Caron mentioned, is that it's really the sort of north-south clime. Temperatures are cooler in the rivers. Conditions are better for fish in these systems than they are in the southern end of the distribution for early Atlantic salmon. I think our southern rivers are just far too warm right now.

Mr. Robert Sopuck: I'm very glad to hear that, because I'm fishing the Eagle this August.

Mr. Rick Cunjak: You should do well.

Mr. Robert Sopuck: Thank you very much.

The Chair: With that in mind, thank you, gentlemen.

I live on the Exploits River near Bishop's Falls.

Mr. Robert Sopuck: I'll be there too.

The Chair: I'll fish it but I won't swim in it after the testimony I just heard. Cold waters indeed.

Now we go to Mr. Donnelly for seven minutes, please.

Mr. Fin Donnelly (Port Moody—Coquitlam, NDP): Thank you, Mr. Chair.

Thank you to all our witnesses for being here on this important subject, wild Atlantic salmon.

In 2015, the Senate Standing Committee on Fisheries and Oceans published a three-part report on aquaculture. I want to read a couple of quotes from that here.

In his testimony to the committee on May 12, 2016, Mr. Bill Taylor of the Atlantic Salmon Federation noted that there is a much steeper decline in numbers of wild salmon living in rivers that are close to salmon-farming sites.

Dr. Jeffrey Hutchings of Dalhousie University noted that because wild salmon populations are at low levels in areas where there are salmon aquaculture sites, they are more vulnerable to aquaculture impacts.

Dr. Cunjak, could you comment on what you think the impacts of aquaculture are on wild salmon and on whether you would support a moratorium or an expansion of open-net aquaculture industry in your area?

Mr. Rick Cunjak: In terms of the impacts of aquaculture on Atlantic salmon, there hasn't been an awful lot actually done on this to specifically look at that question. There certainly are speculations and some studies looking at correlations have been done. For instance, in the Bay of Fundy, where we have pretty well lost most of our salmon stocks, and the greatest amount of aquaculture occurs, there seems to be this sort of coincidence of an increase in aquaculture operations and a decline in the Atlantic salmon. Whether it's cause and effect is a tough one to actually call. So I'm not sure.

Aquaculture certainly has been done better in recent years than it was done historically. Whether they can actually occur together—and I'd like to believe so—we really need to understand by looking at that question directly.

Mr. Fin Donnelly: You'd like to see more science and more studies done on that.

Mr. Rick Cunjak: I hate to sound like another one of those researchers who keep calling for more research every time somebody asks a question, because we do actually know a fair amount already from studies that have been done in other places, but I think certainly a focused question on whether aquaculture in this particular area is actually contributing to the decline would be a way to go at that. That hasn't been done on this coast.

Mr. Fin Donnelly: Do you feel the same way about ocean research?

Mr. Rick Cunjak: I think we really have to target ocean research, but again, what specific question are we asking? That's a big area to go into. Remember what I said in my brief about calling it marine mortality. Is the marine mortality really something that's happening to smolts at the head of tide? Is it a function of what happens in fresh water before they get to that transition zone? Is it something that's happening off the coast or all the way out at Greenland or during the return migration? Those are all separate questions. They're not just one question as it relates to marine mortality.

Mr. Fin Donnelly: Thank you, and thank you for your recommendations to the committee as well.

Dr. Devlin, of course there was a large announcement today and you talked about that with reference to genetically modified salmon and being the first country in the world. Now Canada has made this announcement and you talked about some of the scientific studies that happened to, I would assume, allow this decision to go forward. You mentioned low risk.

Could you expound on how the department got to that determination? My understanding is that it was Health Canada that made the announcement today and DFO was not part of that. Could you talk about the science behind this, the scientific studies, and the evidence to show that there would be low risk? Also, do you know about any consumer concerns or the aquaculture industry's concerns?

● (1615)

Dr. Robert Devlin: Certainly.

There are really several aspects to the risk assessment. Just to clarify, DFO interacts with Environment Canada, which is one of the leads for the Canadian Environmental Protection Act; the others are Health Canada and CFIA. Fisheries and Oceans is not directly involved in the CEPA regulation, but Environment Canada asked us to do a risk assessment because of our involvement in aquatic systems.

A number of different research and evaluation processes are under way. The main things that were undertaken in the risk assessment were to assess exposure, that is, the potential for the genetically engineered fish to enter the Canadian waterways, and the other components were whether there were any indirect human health issues, and most importantly perhaps, whether or not any environmental risk issues were identified.

On the first side of that equation, the exposure, there was an extremely thorough assessment of the Prince Edward Island facility where these animals are produced. Just to reiterate, AquaBounty's plan is to grow the fish in Prince Edward Island, up to the eyed egg stage, and then move them to Panama for grow-out, and then bring back into Canada and the United States the non-living organisms for sale. The main consideration was whether or not these animals could escape from the Prince Edward Island facility, and a very careful failure-mode analysis was done.

It was found that there were at least three to six different containment controls at every possible point of release at that facility. Because of that, the determination of a peer-reviewed committee undertaking this risk assessment was that there was negligible risk of the entry of those fish into Canadian waterways. “Negligible” is defined as there not being any fish in the Canadian waterways.

That's the exposure side of things. On the other side, there's indirect human health, which looks at the potential for pathogens or allergens to have an impact on humans. That was also felt to be very low. There was no scientific data to support that. But on the environmental hazard side of things, the potential for damage to the environment, five or six different components of the environment—Atlantic salmon, predators, prey, competitors, habitat, and so on—the potential risk was determined to be very high.

These two components—the exposure component and the hazard assessment—are combined, and the ultimate determination was a low risk. What determines that is that the fish are not going to be entering the aquatic system because of the containment measures that exist at the facility, under those exact conditions only.

The Chair: Thank you very much.

We're now going to move on to Ms. Jordan, for seven minutes, please.

Mrs. Bernadette Jordan (South Shore—St. Margarets, Lib.): Thank you, Mr. Chair, and thank you to the witnesses for appearing today.

Dr. Cunjak, after hearing testimony for the past number of weeks on the decline of the Atlantic salmon, it seems as if it's more like death by a thousand cuts than any one thing. We have problems with habitat predation, aquaculture, at-sea mortality. Although we don't know yet where the 135 scientists are going to be located throughout DFO, if you had one area that you think needs more study, something more defined that we can look at, where would you suggest that we look for the Atlantic salmon?

● (1620)

Mr. Rick Cunjak: It's a tough question, because I certainly have interests in the fresh water. Everyone keeps pointing to the marine side, so I think a significant amount of emphasis has to go to address questions as they relate to marine mortality. Whether that means focusing on what's happening in the estuaries in terms of predation, that might be relatively easy and a good first step. The question being raised in many places right now is whether predation, as it occurs in the estuary, by striped bass in the Miramichi or by seals in the nearshore, is really significant. One of the problems right now is that the evidence that relates to this is anecdotal. Sometimes you'll hear they found salmon in 20 fish. I was out last week fishing stripers in the Miramichi estuary and all the ones we saw and the ones whose stomachs we looked in had smelts. Is it really an issue or is it because there hasn't been a concerted effort scientifically to sample across the time period that smolts are moving to see if they're being consumed in any significant number?

As Jeff Hutchings said, one of the problems when you already have a small population size, is that it may not take that many to significantly hammer a population. Nevertheless, I think a concerted effort to start looking at that nearshore might be one way to start focusing at least on one aspect of that marine mortality.

Mrs. Bernadette Jordan: Thank you very much.

Dr. Devlin, I have a question for you. You said you've done research that shows you can't breed Atlantic salmon with...did you say chinook?

Dr. Robert Devlin: Pacific salmon.

Mrs. Bernadette Jordan: Okay. One of the things we've heard a lot during the testimony is that aquaculture, particularly open-pen aquaculture, is a real concern if it's put close to waterways that have wild Atlantic salmon, because of the escapees.

Do you see that as not really an issue, then, or am I just taking two and two and getting five? I'm wondering what your thoughts are on that.

Dr. Robert Devlin: On the west coast of Canada, where Atlantic salmon are not indigenous, there seems to be very little risk of them hybridizing with Pacific salmon. We do get the odd few survivors, but they die very early in development, and never would contribute any of the genetic material to the next generation. So it's not really an issue on that side.

With regard to where you can have hybridization between escaped aquaculture fish and wild populations, there's quite a bit of literature on Atlantic salmon but also other salmonids—Pacific salmon, rainbow trout—that shows that when they do hybridize, they produce a less fit individual. Depending on the numbers of animals that escape, there is the potential, particularly, as we've heard, in small populations, for those introgressions, or hybridization events, to cause genetic damage and fitness damage to those smaller populations.

A number of measures are being considered. Of course, the first thing you need to focus on is excellent physical containment. There have been massive improvements in that in the aquaculture cages. As well, biological containment measures are being developed with the development of sterile triploids, fish that are unable to reproductively interact if they do escape from a net pen.

Mrs. Bernadette Jordan: Thank you.

Mr. Green, you talked about working together. I believe you mentioned first nations, provincial, federal, DFO groups working together, and universities too, I think. How do you better integrate the research efforts that all of these groups do? How can we make sure, if we're working together, that we have the proper data, and that the research is integrated properly?

Mr. Morris Green: If your task force establishes an overarching management policy or a management plan for salmon, then within it there might be segments that particular people could address more adequately than others. For example, Dr. Cunjak is a freshwater biologist specialist. Maybe part of it requires that. There may be somebody else who could deal better with the estuaries. There may be somebody else who'd be better at the marine science.

So you're giving everybody what they do best in order to contribute to an overall better result in the end.

● (1625)

Mrs. Bernadette Jordan: Who do you see as the lead on that?

Mr. Morris Green: I see DFO, and I see them putting an ADM in charge of that, somebody who has a proven track record, somebody capable of getting a job done. Give them the resources, the people, and the support, and they'll do it.

Mrs. Bernadette Jordan: Thank you.

Do I have time for one more question?

The Chair: You have one minute.

Mrs. Bernadette Jordan: Thank you.

Monsieur Caron, you mentioned "controlled exploitation zones". Is that like an enforcement group? Can you explain that to me a little bit more? How does it work, and how is it different from DFO enforcement?

[*Translation*]

Mr. François Caron: Yes, that is unique to Quebec. These are local associations that are close to the rivers.

Let's take the city of Gaspé as an example; a group of citizens there can indicate that it is interested in managing the fishery in the rivers there. It then signs a contract with the Government of Quebec, who gives it the power to collect the daily fishing fees. In return, it has the obligation to hire salmon conservation officers for the rivers, and to offer services to the fishermen.

This way of managing is very different in Quebec. It is more costly for Quebeckers to fish. However, the salmon is better protected.

[*English*]

The Chair: Thank you very much.

Mrs. Bernadette Jordan: Thank you.

The Chair: We're now going to go to a five-minute round of questions.

Mr. Arnold, go ahead, please.

Mr. Mel Arnold (North Okanagan—Shuswap, CPC): Thank you, Mr. Chair.

Thanks to all of you for taking the time to appear before the committee today.

I have a few questions. None of them are very long but I'm hoping we can get through all of them.

Mr. Green, you mentioned that there seems to be some interest in predator control and so on. What would you consider to be the biggest barrier to that? Is it the lack of science around what might be the results? Is it reluctance within DFO, or social pressure against it? Is it a capacity to actually carry out predator management, or is it political will or all of the above?

Mr. Morris Green: It's probably a combination of all of the above.

Again, I'm sort of whipping the same horse. I really believe that a task force could put those things in perspective and deal with them with the priority they deserve. I really believe that's the ultimate answer to solving this problem in a couple of ways. First of all, it's going to be a signal to the salmon community that Canada is serious again. In 1971, we had a federal cabinet minister named Jack Davis, a guy who graduated from school in Kamloops. He went on to become a Rhodes Scholar. He, in four months, did more to promote salmon conservation in Canada than any other single minister before his time and, I might say, since. If you want to read a little history of what's happened in the conservation business, I refer you to my book, *160 Years of Salmon Stories*. By the way, all the profits go to the Atlantic Salmon Museum. In this book, I talk about the life of Dr. Wilfred Carter and Jack Fenety, people who fought on the front lines, giants of conservation. In there, I talk about what they did and how that progressed.

Jack Davis, to me, is one of the greatest heros the Atlantic salmon ever had. Another is John Fraser. Another is John Crosbie. Those people stood up when it was time to be counted, and they made a difference. Ministers who stand up can make a difference, and that's why I think that if Minister Tootoo decides to set up this task force, then he'll be standing up and he'll be somebody people will be talking about in 50 years' time as being the one who made the difference.

● (1630)

Mr. Mel Arnold: Thank you.

Maybe each of you can answer the next question quickly.

I'm just wondering how effective the recreational fisheries conservation partnerships program has been in bringing in projects that are beneficial to the river and possibly the estuary with regard to habitat issues. Has it been an effective program?

The Chair: Dr. Cunjak.

Mr. Rick Cunjak: Is this the "rec fish" program of about a decade ago? Is that what you mean?

Mr. Mel Arnold: No, it's just in the last few years that we've introduced government funding being available for conservation groups to implement and —

Mr. Rick Cunjak: I guess the fact that I asked if it was the ten-year-old one probably suggests that I would think it probably hasn't been that effective, in my opinion.

Mr. Mel Arnold: I'm just curious, because I know that in some areas it has been. Maybe the word needs to get out there about the good work that has been done in other areas with that program.

Mr. Caron, you mentioned that in the 1990s there was a dramatic change in the return numbers and so on.

Do you have any input into what you would peg those dramatic changes to? Would it be habitat or fishing? At this point there's been a lot of work done and so many studies that we must have some idea.

[*Translation*]

Mr. François Caron: Yes.

Over those years, researchers at the Department of Fisheries and Oceans, oceanographers, have shown that in the Labrador Sea in particular, that is to say in the salmon—and cod—wintering zones, water temperatures have been abnormally cold during several consecutive years. This had a very important effect on the survival of the fish that were there during the winter. Since then, the water temperature has returned to normal.

If you look at temperature graphs for all of Canada, you will see that the Labrador Sea currents are often colder than water in other regions. Climatologists attribute this to the more rapid melting of glaciers in the North, which makes the water colder and sends more cold water into the Labrador Sea.

However, that is not the only factor. There have been other changes at sea. People will talk to you about the increase in the number of predators such as seals. The populations of gulf seals have gone from approximately a million to six, seven, eight or ten million. Of course, seals eat almost no salmon. It is very rare. But if each seal ate one salmon in a given year, there would not be any left. In fact, the quantity of salmon predated by seals is very low.

These ocean changes have not only affected salmon and cod, but there has also been the appearance and disappearance of certain species of plankton. We have observed enormous changes. It is logical to conclude that global climate change has had an effect on the ocean and on the species that live in it. I hear more and more researchers talking about this. Yesterday, researchers presented a report on birds that are in difficulty in North America. This is particularly the case for marine birds. I think that birds and fish are affected by climate change that affects the ocean.

The Chair: Thank you, Mr. Caron.

[*English*]

I don't normally ask questions. I have one small question, however, before we go to our next questioner.

Mr. Green, is your book available online?

Mr. Morris Green: No, but if you're interested, I could have one sent to you. They're $60 apiece.

● (1635)

The Chair: Sixty bucks apiece—does everybody have that? You can check *Hansard* if you don't believe me.

Mr. Morris Green: That's all.

The Chair: At $60 apiece we may end up bringing it with us if we get our trip approved for the fall.

Now we're off to Mr. Hardie for five minutes.

Mr. Ken Hardie (Fleetwood—Port Kells, Lib.): Thank you, Mr. Chair.

Thank you to all of the presenters for being here. I'm from the west coast, and on the west coast we're looking at a report from Justice Cohen on the Fraser River salmon. I'm going to read a short excerpt and then I want you to vote—agreement thumbs up, disagreement thumbs down—on what Justice Cohen said.

He said:

> As long as DFO has a mandate to promote salmon farming, there is a risk that [DFO] will act in a manner that favours the interests of the salmon-farming industry over the health of wild fish stocks. The only way to address this potential conflict is by removing from DFO's mandate the promotion of...salmon-farming [as an] industry and farmed salmon [as a] product.

I'd like to take a quick poll. If you agree with his conclusion, it's thumbs up; if you disagree, it's thumbs down.

That's interesting. That's fascinating. Thank you for that.

The Chair: Maybe you should outline what the results were for everybody.

Mr. Ken Hardie: It was two thumbs up and two "meh".

I wanted to recall something that my colleague Mr. Sopuck said a couple of meetings ago.

Mr. Robert Sopuck: It wasn't me.

Mr. Ken Hardie: It was something to the effect of "let's get on and do something". He was particularly focusing on striped bass, but there was maybe a side comment on the grey seal population, and it was interesting to see that perhaps there's some agreement that something should be done.

If, in the absence of the perfect scientist—because we may not find out what the problem is until it is too late to do something about it—there is irremediable harm, then having a focus on harvesting striped bass, for instance... I heard somebody say grey seals aren't necessarily an issue here, but what about striped bass?

Would we be making a huge mistake to just say look, we may not know everything we need to know, but let's go after the striped bass population?

Maybe we can ask Dr. Cunjak and Morris Green to comment.

Mr. Rick Cunjak: As a scientist, the first thing I would ask is what the question is directed at. Is the presumption here that they are a predator of salmon? My first step in that regard would be to establish that that was the case. Before I would say we should go out and increase the harvest of striped bass, I would want to be sure that the problem existed.

So that means a comprehensive study first or at least a census by people who are already angling them. In fact you don't even have to spend a lot of money; there's already an angling fishery out there for them. Assess those fish that are captured and taken home to see, over the course of the period that striped bass are out in an estuary, what they are feeding on.

Mr. Ken Hardie: But with respect to—

Mr. Rick Cunjak: Then I'd make the decision.

Mr. Ken Hardie: Dr. Cunjak, that wasn't actually the question, but I can't disagree with the need to know more.

Mr. Green, what are your thoughts?

Would we be harming anything if we just simply said look, as Mr. Sopuck said, let's pick on the striped bass because we know that they are a predator and they may be doing some of the damage?

Mr. Morris Green: I can tell you the striped bass have been in that river for a long time. In 1874 there was a winter fishery of striped bass on the Miramichi, just for your information.

However, the other thing I would suggest is that striped bass, like the salmon, need a sustainable number. I don't think they need 300,000 in order to survive. I wouldn't be averse to removing some of those fish out of there, but I certainly wouldn't be interested in eradicating them, because they have an important part to play in the ecosystem as well. I think there should be some scientific parameters set around to make sure that it was done properly.

Mr. Ken Hardie: Thank you.

Mr. Ken Hardie: Mr. Caron, it was noted by one of our earlier witnesses that Quebec's approach of a river-by-river strategy seemed to make a lot of sense and to be a more intelligent approach to managing the overall issue as opposed to a pan-regional strategy.

Can you comment on that?

● (1640)

[*Translation*]

Mr. François Caron: This is a management approach we put in place about 30 years ago. In order to be able to do so, you have to be able to evaluate the quantity of salmon at the end of the season and calculate how many salmon come back to the rivers. That is made easier in Quebec because in most rivers the water is very clear. In the fall, for instance, it is possible to count the number of salmon in the rivers, which is an advantage.

For each river, we set the number of spawning salmon we want to have at the end of the season. Afterwards, at the end of the year, we check to see if we attained that result. In some rivers we also check during the summer to see if salmon are returning normally and whether we will be able to reach our objective. In addition, if need be, we adjust fishing during the season. For instance, when I was at the ministry, sometimes in mid-July, after counting the salmon, if we saw that there would be a shortage of spawners to achieve the full potential of the river, we imposed restrictions. This meant fewer catches, and putting large salmons back in the water when fishing them in these rivers was allowed, so as to protect them and reach the objectives that had been set.

Some years were difficult. For instance, 2014 was one such year. We did not reach our objective at the end of that year. However, in most cases, this was very helpful in reaching the objectives.

[*English*]

Mr. Ken Hardie: Thank you.

The Chair: *Merci*, Monsieur Caron and Mr. Hardie.

Mr. Strahl, go ahead for five minutes, please.

Mr. Mark Strahl (Chilliwack—Hope, CPC): Thank you very much, Mr. Chair.

My first question is for Mr. Green.

You spoke about the task force that you believe is a good starting point to make a whole bunch of determinations on how to proceed. What would be your best guess on timing for something like that, from the time that it was struck to the time it had to produce something useful for the minister, or for the department, or for Parliament? I think there is some urgency here. I'd like you to flesh that out a little bit for me. What sort of time frame do you think is possible there?

Mr. Morris Green: That might depend a little bit upon the political impetus that's given to it, because I think it's important to have the will to do it, to make Atlantic salmon a priority.

There's one small thing I'm going to mention to you that could be done immediately. One thing that really troubled me was the removal of protection of our rivers that occurred in the previous administration. I understand why they were doing it. I understand that, but at the same time, we could have cured the problem by looking after that particular exception rather than broadly sweeping away all the river protections the federal government used to have. That's one thing we could do fairly quickly.

I mention that because, as I say, I've devoted a good part of my life to Atlantic salmon conservation in one form or another, and that really tore my heart out. There wasn't anything I could do about it but sit there and watch it happen. So that's one thing.

I think there are other things we could address equally quickly. This working group that I'm talking about would, of course, have short-, medium-, and long-term goals. Within the short-term parameters there would be some things they could do. One is co-operation with the NGOs that are willing to step up and spend millions of dollars to help in protecting the salmon and restoring their numbers. Start doing some things like that. Take those silos down. Work with the provinces, get them involved again the way they used to be, and start managing individual rivers similar to what they do in Quebec.

For example, rivers in Nova Scotia have a real problem because of acid rain. They don't have any limestone in their base that helps neutralize that. There might have to be some mitigation measures taken there. In 1993, I attended a fly-fishing symposium in Kamloops, British Columbia, where I spoke about salmon conservation in New Brunswick. There was one guy from Virginia who talked about his river, which ran through a coal mining area, and he was celebrating the fact that they had introduced enough lime into that river the previous year to actually allow one coarse fish to survive in that waterway. A beautiful river was killed with acid runoff from a coal mine. Here we have these beautiful, pristine rivers, and all we're trying to do is to get the fish back there in appropriate numbers. We should be addressing those things.

● (1645)

Mr. Mark Strahl: Thank you. I know the ministerial advisory committee talked about that and supported continuing work on there. I won't get into navigable waters, and whether that actually strips a river of all its protections. We'll save that for another time.

I want to talk about seals. We heard some contradictory commentary today about whether or not that should be an issue of concern. I think the point is well taken. If there are 10 million of them and they're not killing all the salmon, maybe they're not a problem. But at the same time, we've heard evidence that they are a predator, in some cases. Maybe on a river-by-river, area-by-area basis that needs to be looked at.

In the parlance of our time, we like to talk about how we're in favour of a sustainable seal harvest. If we're talking about 10 million, I don't think there's a market for that many. Other committees in previous Parliaments have recommended, actually, a cull. I know we don't like to talk about that, but I think we have to have a genuine conversation here about what is required.

Maybe we'll go back to Mr. Cunjak or to Mr. Green, who I think mentioned that. Politically, it's perhaps difficult to talk about, but does the science support just enough for a sustainable seal harvest, or do we need to be more aggressive than that?

Mr. Rick Cunjak: I'm unaware of the science supporting any sort of cull at this point, but I don't know what they're feeding on. Like François Caron said, first of all, these are predators. They're going to eat anything that comes near them that they can fit in their mouths. They don't care if it's salmon, striped bass, or capelin. They're going to eat what's there. When you have that large a number, obviously they're opportunistic and they'll feed on whatever they can.

As I think Dr. Hutchings mentioned in earlier testimony to you, the problem occurs, from the salmon's perspective, in that our numbers are so low now that even that relatively small number that may be taken by seals is contributing further to the decline, to the “death by a thousand cuts” reference that was made earlier today

The Chair: Thank you very much.

Mr. Morrissey, you have five minutes.

Mr. Robert Morrissey (Egmont, Lib.): Thank you, Chair.

Mr. Green, given that the Quebec management model, river by river, is being held up as successful, has there ever been a request to DFO to establish a similar management plan for any rivers in New Brunswick?

Mr. Morris Green: I don't think people here are asking for the same model that they have in Quebec. I think they're asking DFO, within its management plan, to look at each river individually. For example, the Miramichi river system has four main branches. The three of us live in Southwest Miramichi, the Northwest Miramichi, and Main Southwest Miramichi in Cains River.

On the Main Southwest Miramichi we have quite a large and healthy grilse population, and 90% of them are male. They're not really necessary to the spawning of the multi-winter female salmon. We could allow a retention of one or two of those grilse in the same way we used to, to satisfy the local involvement, local interest in the river, the protection of the river, and so on—points that you've all heard before—but not extend the same privilege to the other two branches because they have fewer fish.

The northwest Miramichi in particular has had severe problems over the years. Twice in its history it had a mine dam burst from Heath Steele Mines, in the 1960s and the early 1980s, that wiped out the entire fish population in one afternoon. That river had to be restored almost rock by rock, larva by larva, and so on. That's an individual problem of the Northwest Miramichi. Over the years, people have tried to rebuild it, and they have had some success.

We should be doing individual river management, and it should be within this overall management policy that DFO is looking after.

Mr. Robert Morrissey: Thank you.

Can I have another question, Mr. Chair?

The Chair: You have two minutes.

Mr. Robert Morrissey: Dr. Devlin, different evidence has been given before this committee that the practice of raising—I may have the terminology wrong—the small eggs from the natural wild salmon and then releasing them could contribute to the weakness of the genetic stock in wild salmon. Could you comment on that?

● (1650)

Dr. Robert Devlin: Those practices can have effects on natural populations if the breeding strategies are not controlled very carefully. In British Columbia, for example, the fish that are used to produce the next generation in hatcheries are as much as possible selected from fish that have been born in the wild, so they're at least one generation wild fish. There is emerging evidence from the United States that rearing in hatchery conditions and other conditions can change the genetics of the fish population in one generation. These are very much emerging questions that we're trying to understand, and I'd say the jury is still out on that.

One of the complications is that there are both genetic and environmental influences on the characteristics of the fish. To try to pull those two influences apart to understand whether there are long-term effects is very difficult to do. Improving on research facilities that allow for natural streams under controlled conditions is required to answer those questions.

The Chair: You have a minute.

Mr. Robert Morrissey: Mr. Green or Dr. Cunjak, I'm not sure which, commented on the loss of DFO protection of the resource in the various rivers in New Brunswick. Could you elaborate on that a bit, expand a little more, quantify that, please?

Mr. Morris Green: Two things happened. The federal government reduced the number of fisheries wardens who patrol the rivers, and the Department of Natural Resources split its staff in two, one piece being protection and one piece being forest rangers who did the forestry work. Before, everybody did everything. If the forest ranger saw some sort of an illegal act going on in a salmon river, he'd step in and do something. Now he doesn't do that, so the number of provincial people involved in protection has been reduced as well.

The Chair: Thank you very much.

Folks, we've had some informal discussions. Normally, we would end it here with Mr. Donnelly's conclusion, but we have some time before we get into committee business. So we're going to have five minutes for Mr. Donnelly instead of three. We'll have up to five minutes for Mr. McDonald, who hasn't asked a question yet, and then finally five minutes for Mr. Sopuck. Agreed?

Some hon. members: Agreed.

The Chair: Okay, great.

Mr. Donnelly, you have five minutes.

Mr. Fin Donnelly: Thanks, Mr. Chair.

We've had a number of witnesses at the committee, including Mr. Jim Irving, who referenced the 2,300 studies that have been done on the wild Atlantic salmon. His suggestion was to review those studies and find the recommendations as one of the ways forward.

Mr. Green, I appreciate your recommendations as well and your dedication to the idea of the department establishing a wild Atlantic salmon task force, and there was an earlier question.

First of all, I want to read another comment from Mr. Bill Taylor of the Atlantic Salmon Federation.

In his testimony to the Senate committee, he indicated that DFO should introduce an approach similar to Quebec's river-by-river management model.

Mr. Kevin Stringer of DFO, in his testimony, pointed out that "Quebec has a system that largely does that. It's not inexpensive, it involves work with NGOs, and it is a complex system".

I'm wondering, Mr. Green, in your recommendations—and you did just talk about this—if you could elaborate on whether you think the department should put the kind of resources needed into that river-by-river management, or you agree...and I thought I heard you say you did. Could you comment a bit more about the expenses and the resources needed to make the system effective?

● (1655)

Mr. Morris Green: The remarkable things about salmon anglers is they're totally devoted to the species and the restoration of the species, Many of them have spent countless years volunteering to help in any particular project that happens to rear its head, any opportunity they get to try to help the salmon, they're willing to do. These are individuals I'm talking about.

I'm also talking about the river management groups, the watershed committees that exist on some rivers. I'm talking about organizations like the Miramichi Salmon Association, the Northumberland Salmon Protection Association, the Atlantic Salmon Federation, the New Brunswick Salmon Council, all those groups. Saint John River, Kennebecasis River, Tobique River, Restigouche River—all those rivers have groups that are ready and willing to stand up and do a lot of the labour. So the cost factor may not be as great as you may think.

When I was minister, I had people all over the province volunteering to clean up streams, pick up all the garbage, and tidy them up. All we bought as a department were the garbage bags and T-shirts and for a matter of a few thousand dollars, we actually cleaned up our rivers and really made them something to be proud of. Individual groups, the Moncton Fish and Game Association, were the ones who started that on the North Pole Stream.

People are out there, ready to go to work. All they need is for somebody to set them into action, and the federal government is the one to do it. This task force that I keep talking about should be the lead entity in doing that.

Mr. Fin Donnelly: So the task force is struck; we look at watershed governance; we review the studies; we engage the provinces; the stewardship organizations.

Mr. Morris Green: Yes.

Mr. Fin Donnelly: We move forward in a collaborative manner. There are obviously multiple jurisdictions. Federal has certain regulations and abilities to make changes. At the provincial level, you talked about riparian setbacks and habitat protection. Obviously the municipalities and first nations can play a role. You talked about enforcement.

Is there a particular governance model that you feel is more successful? Obviously Ontario has conservation authorities. Where I'm from on the west coast, British Columbia does it differently. On the east coast in your area, would you suggest a particular watershed governance model that the task force could explore?

Mr. Morris Green: Because each jurisdiction, each province, has its own set of volunteers, so to speak, I think perhaps one should be tailored to New Brunswick, one to Nova Scotia, one to Prince Edward Island, and one to Newfoundland and Labrador. Each one would be slightly different, depending on the particular makeup of the volunteer organizations. I do think that with the overall leadership of DFO, this task force, people would be willing to come, like salmon returning to spawn in the river. You would be amazed.

Mr. Fin Donnelly: Thank you very much, and thank you to all the witnesses for submitting their ideas. As a final comment, we've had Dr. Cunjak and Mr. Green make specific recommendations.

Monsieur Caron or Dr. Devlin, if you have specific recommendations on the wild Atlantic salmon, could you submit them in writing to the committee? We'll look at them when we're putting the report together, and we would very much appreciate any recommendations you might have to address this issue.

The Chair: Thank you, Mr. Donnelly.

Mr. McDonald, you have five minutes.

Mr. Ken McDonald (Avalon, Lib.): Thank you, Mr. Chair. I'll be splitting my time with Mr. Finnigan, if time permits.

Dr. Devlin, correct me if I'm wrong, but you mentioned the genetically modified salmon. The product is going to be allowed into Canada to be sold as a great source of protein, as we know salmon is. You spoke about the negligible risk of escape in the containment process that is used, and I thought you said we were the first country to allow that product, as our government departments today announced.

In the event that the salmon did escape containment—it's fine to say the risk is negligible, but people didn't think the *Titanic* would sink—and managed to get to our sources of wild Atlantic salmon, what would be the result? Would it be detrimental to our stock if that should happen?

● (1700)

Dr. Robert Devlin: Unfortunately, the answer to that question is associated with a huge amount of uncertainty, not based on the lack of information but because various experiments have shown that the engineered salmon can have influences under certain conditions and be at a disadvantage under other conditions. So to try to integrate all that information into a net effect as to what would occur in nature is very difficult, and because of that, the uncertainty is large and that was taken into account in the risk assessment.

However, to answer your question, under certain conditions, with the escape of a fast-growing, voraciously feeding salmon in particular environments, the committee felt there could be effects on populations in the ecosystem of either competitors or Atlantic salmon themselves. So it is possible, but the overriding decision was that the confinement was massive and that there was not going to be an escape.

I should point out that there are no plans to grow these kinds of fish outside land-based, contained facilities, so they would not be in net pens where escape would be much more likely. That's the main objective at this time.

The Chair: Thank you, Mr. McDonald.

Mr. Finnigan, you have two and a half minutes.

Mr. Pat Finnigan: I'm going to follow up on Mr. McDonald's point, because as you know, today the department of health announced this was going to happen. I'm chair of the agriculture committee, and for some reason it has been put to our committee to study the effects and any questions that we or the public may have on salmon. A lot of groups right now are totally opposed to farmed salmon, especially in open waters, and so a lot of people will say this is just opening the door to that. Eventually we will see that in open pens in the ocean or the bays.

The other question on the health side—I know I'm going to get one—is whether this food is going to be labelled genetically modified product.

The Chair: We'll start with Dr. Cunjak. Do you want all of them?

Mr. Pat Finnigan: Maybe after that we could hear from Mr. Devlin.

Mr. Rick Cunjak: I'm afraid I don't know very much about this particular situation or the product. I can't comment.

The Chair: Dr. Devlin, we're going to go to you.

Dr. Robert Devlin: On the issue of whether these animals will end up in net pens, I have heard of no plans to do that, and it's because of the things I mentioned previously that there's a great deal of uncertainty as to what the effects are. It would be unlikely that there would be approval of a product or a production scenario if the animals were outside a very tightly confined land-based facility.

Their use in land-based facilities may have some very significant benefit in the sense that they're very efficient at using food resources, and they can improve on the production efficiency of those operations and make land-based aquaculture a more attractive option for aquaculture producers.

The food safety side of things—I think this was your second question—is not really my area at all. I read the press release from Health Canada and CFIA, and there is no requirement for labelling of this product in Canada.

The Chair: Thank you very much.

Mr. Sopuck, you have five minutes.

Mr. Robert Sopuck: Thanks.

Mr. Green, just to set your mind at ease, section 35 of the new Fisheries Act is still in place with the habitat protections. There was a hue and cry in rural Canada with the old act with fisheries officers inspecting every farmer's drainage ditch. Quite frankly, it was to little effect in fish production. We changed the act to focus on fisheries of human concern. Section 35 is still there.

Dr. Cunjak, in terms of the recreational fisheries conservation partnerships program, that program, that kind of partnership, became allowed because we changed the Fisheries Act.

I'm sure, Mr. Green, you're familiar with the Miramichi Salmon Association. We worked with Stephen Tonning and Mark Hambrook, and they did some great work using those funds to create cold-water refugia, eliminate the beaver dams from some of the tributaries, and so on. We were very strong believers in on-the-ground conservation efforts in partnerships with local groups.

There were some 800 projects across Canada under the RFCPP.

I'd like to follow up on Mr. Hardie's excellent line of questioning on adaptive management.

I've got the report from the wild salmon committee in front of me. The striped bass have gone up to 250,000 fish. One study showed that some sample fish had between one and six salmon smolts in them.

Dr. Cunjak, your point about 10% predation is much more significant when the population is low. What would be wrong with running a field experiment where you decide that instead of 250,000 striped bass, we'd like to knock the population back to 100,000, which I gather is about four times what it was when it was potentially a SARA-listed species? What would be the downside of running a real live in-the-field experiment?

● (1705)

Mr. Rick Cunjak: I don't think there's any downside. I'd encourage it. That's exactly the point, even in the recommendations: we need some action. Having comprehensive, directed research and experiments is exactly what I think we should be doing more of.

Mr. Robert Sopuck: That's excellent.

In terms of a project like that, I don't know the striped bass fishery in eastern Canada. Is it fairly concentrated? If you did the Miramichi, for example, where the anglers are obviously on the banks, if you went up and down the bank and sampled their catch for stomach analysis and catch per unit effort, that would be a fairly easy study to do, I would presume. Am I correct in that, Dr. Cunjak?

Mr. Rick Cunjak: I'd suggest it would be relatively easy.

We have deer stations when people go out on the much larger landscape and have to have their animals weighed or measured and aged. Here you're talking about, within an estuary in a lower portion of a river, having a couple of census stations where, if you're going to be bringing.... Or someone could go along the bank and collect stomachs when the fish are opened up, and look inside them. There are relatively easy ways to do this.

Mr. Robert Sopuck: The smallmouth bass also came up in the report as an invasive species that was illegally introduced. Do we have any data, Dr. Cunjak, on smallmouth bass predation on young salmon?

Mr. Rick Cunjak: I would say that we don't have any direct evidence of it on salmon, only because they co-occur so infrequently, but there's a huge concern right now in the Miramichi because of the introduction into one headwater lake, that they will now get into the Main Wouthwest Miramichi. They do occur in the Saint John River system, where there are also salmon, but to my knowledge there has been no directed study to look at their potential impact on salmon there.

Mr. Robert Sopuck: I gather that either DFO or the province was trying to eradicate smallmouth bass from Miramichi Lake. Do you think that's even possible now?

Mr. Rick Cunjak: No.

Mr. Robert Sopuck: They're too far gone.

Mr. Rick Cunjak: I think it may have been possible in a different system. For instance, there was another predator years ago, in another lake in the Miramichi, but it was a shallower, more simple sort of system, where they were able to eradicate with a poison, rotenone. That was effective.

The problem in this particular system in Miramichi Lake is that they apparently weren't allowed to use the poison. The attempts made through a combination of gillnetting and electrofishing in different portions basically kept the numbers down, but that agreement is now over. The young-of-the-year smallmouth bass are up again, and there's only a four-kilometre stretch with no barriers to the Main Southwest Miramichi for them to move to.

● (1710)

Mr. Robert Sopuck: Yes. And—

The Chair: Thank you, Mr. Sopuck.

Mr. Robert Sopuck: Thanks very much.

Thank you very much to our witnesses. That was most interesting testimony.

The Chair: I'd like to echo those sentiments.

We've come to the conclusion of our witness testimony. I would like to sincerely thank Monsieur Caron, Dr. Cunjak, Dr. Devlin, and of course Mr. Green for their contributions here today.

Thank you very much.

We'll take a short break and then go straight into committee business.

[*Proceedings continue in camera*]